Mathematica 11.3 Integration Test Results

Test results for the 1541 problems in "4.2.4.2 (a+b cos)^m (c+d cos)^n (A+B cos+C cos^2).m"

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

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

Optimal (type 3, 42 leaves, 4 steps):

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

Result (type 3, 112 leaves):

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

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

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

Optimal (type 3, 58 leaves, 4 steps):

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

Result (type 3, 218 leaves):

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

Problem 8: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 117 leaves, 7 steps):

$$\frac{a (3 A + 4 C) \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{8 d} + \frac{a (2 A + 3 C) \operatorname{Tan}[c + d x]}{3 d} + \frac{a (3 A + 4 C) \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{8 d} + \frac{a A \operatorname{Sec}[c + d x]^2 \operatorname{Tan}[c + d x]}{3 d} + \frac{a A \operatorname{Sec}[c + d x]^3 \operatorname{Tan}[c + d x]}{4 d}$$

Result (type 3, 377 leaves):

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

Problem 14: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 112 leaves, 6 steps):

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

Result (type 3, 293 leaves):

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

Problem 15: Result more than twice size of optimal antiderivative.

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

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

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

Result (type 3, 748 leaves):

$$\frac{1}{4} C x \left(a + a \cos[c + d x]\right)^2 \sec\left[\frac{c}{2} + \frac{d x}{2}\right]^4 + \frac{1}{4 d}$$
$$\left(-A - 2 C\right) \left(a + a \cos[c + d x]\right)^2 \log\left[\cos\left[\frac{c}{2} + \frac{d x}{2}\right] - \sin\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \sec\left[\frac{c}{2} + \frac{d x}{2}\right]^4 +$$
$$\frac{1}{4 d} \left(A + 2 C\right) \left(a + a \cos[c + d x]\right)^2 \log\left[\cos\left[\frac{c}{2} + \frac{d x}{2}\right] + \sin\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \sec\left[\frac{c}{2} + \frac{d x}{2}\right]^4 +$$
$$\frac{A \left(a + a \cos[c + d x]\right)^2 \sec\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \sin\left[\frac{d x}{2}\right]}{24 d \left(\cos\left[\frac{c}{2}\right] - \sin\left[\frac{c}{2}\right]\right) \left(\cos\left[\frac{c}{2} + \frac{d x}{2}\right] - \sin\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^3} +$$
$$\frac{\left(a + a \cos[c + d x]\right)^2 \sec\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(7 A \cos\left[\frac{c}{2}\right] - 5 A \sin\left[\frac{c}{2}\right]\right)}{48 d \left(\cos\left[\frac{c}{2}\right] - \sin\left[\frac{c}{2}\right]\right) \left(\cos\left[\frac{c}{2} + \frac{d x}{2}\right] - \sin\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^2} +$$
$$\frac{\left(a + a \cos[c + d x]\right)^2 \sec\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(5 A \sin\left[\frac{d x}{2}\right] + 3 C \sin\left[\frac{d x}{2}\right]\right)}{12 d \left(\cos\left[\frac{c}{2}\right] - \sin\left[\frac{c}{2}\right]\right) \left(\cos\left[\frac{c}{2} + \frac{d x}{2}\right] - \sin\left[\frac{c}{2} + \frac{d x}{2}\right]\right)} +$$
$$\frac{A \left(a + a \cos[c + d x]\right)^2 \sec\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \sin\left[\frac{d x}{2}\right]}{24 d \left(\cos\left[\frac{c}{2}\right] + \sin\left[\frac{c}{2}\right]\right) \left(\cos\left[\frac{c}{2} + \frac{d x}{2}\right] + \sin\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^3} +$$
$$\frac{\left(a + a \cos[c + d x]\right)^2 \sec\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(-7 A \cos\left[\frac{c}{2}\right] - 5 A \sin\left[\frac{c}{2}\right]\right)}{48 d \left(\cos\left[\frac{c}{2}\right] + \sin\left[\frac{c}{2}\right]\right) \left(\cos\left[\frac{c}{2} + \frac{d x}{2}\right] + \sin\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^2} +$$
$$\frac{\left(a + a \cos[c + d x]\right)^2 \sec\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(5 A \sin\left[\frac{d x}{2}\right] + 3 C \sin\left[\frac{d x}{2}\right]\right)}{12 d \left(\cos\left[\frac{c}{2}\right] + \sin\left[\frac{c}{2}\right]\right) \left(\cos\left[\frac{c}{2} + \frac{d x}{2}\right] + \sin\left[\frac{c}{2} + \frac{d x}{2}\right]\right)}$$

Problem 22: Result more than twice size of optimal antiderivative.

$$\int \left(a + a \cos[c + d x]\right)^3 \left(A + C \cos[c + d x]^2\right) \sec[c + d x]^2 \, dx$$

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

$$\frac{1}{2} a^3 \left(6 A + 5 C\right) x + \frac{3 a^3 A \operatorname{ArcTanh}[\sin[c + d x]]}{d} +$$
$$\frac{5 a^3 C \sin[c + d x]}{2 d} - \frac{\left(3 A - C\right) \left(a^2 + a^2 \cos[c + d x]\right)^2 \sin[c + d x]}{3 a d} -$$
$$\frac{\left(6 A - 5 C\right) \left(a^3 + a^3 \cos[c + d x]\right) \sin[c + d x]}{6 d} + \frac{A \left(a + a \cos[c + d x]\right)^3 \tan[c + d x]}{d}$$

Result (type 3, 298 leaves):

$$\frac{1}{96} a^3 \left(1+\text{Cos}[c+d x]\right)^3 \text{Sec}\left[\frac{1}{2} (c+d x)\right]^6 \left(6 (6 A+5 C) x-\frac{36 A \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{d}+\frac{36 A \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{d}+\frac{3 (4 A+15 C) \text{Cos}[d x] \text{Sin}[c]}{d}+\frac{9 C \text{Cos}[2 d x] \text{Sin}[2 c]}{d}+\frac{C \text{Cos}[3 d x] \text{Sin}[3 c]}{d}+\frac{3 (4 A+15 C) \text{Cos}[c] \text{Sin}[d x]}{d}+\frac{9 C \text{Cos}[2 c] \text{Sin}[2 d x]}{d}+\frac{C \text{Cos}[3 c] \text{Sin}[3 d x]}{d}+\frac{12 A \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+\frac{12 A \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}\right)$$

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

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

Optimal (type 3, 156 leaves, 7 steps):

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

Result (type 3, 832 leaves):

$$\frac{3}{8} C x \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 + \frac{1}{16 d}$$
$$\left(-5 A - 6 C\right) \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 +$$
$$\frac{1}{16 d} \left(5 A + 6 C\right) \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 +$$
$$\frac{C \operatorname{Cos}[d x] \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \operatorname{Sin}[c]}{8 d} +$$
$$\frac{C \operatorname{Cos}[c] \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \operatorname{Sin}[d x]}{8 d} +$$
$$\frac{A \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \operatorname{Sin}\left[\frac{d x}{2}\right]}{48 d \left(\operatorname{Cos}\left[\frac{c}{2}\right] - \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^3} +$$
$$\frac{\left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \left(5 A \operatorname{Cos}\left[\frac{c}{2}\right] - 4 A \operatorname{Sin}\left[\frac{c}{2}\right]\right)}{48 d \left(\operatorname{Cos}\left[\frac{c}{2}\right] - \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^2} +$$
$$\frac{\left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \left(11 A \operatorname{Sin}\left[\frac{d x}{2}\right] + 3 C \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{24 d \left(\operatorname{Cos}\left[\frac{c}{2}\right] - \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)} +$$
$$\frac{A \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \operatorname{Sin}\left[\frac{d x}{2}\right]}{48 d \left(\operatorname{Cos}\left[\frac{c}{2}\right] + \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^3} +$$
$$\frac{\left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \left(-5 A \operatorname{Cos}\left[\frac{c}{2}\right] - 4 A \operatorname{Sin}\left[\frac{c}{2}\right]\right)}{48 d \left(\operatorname{Cos}\left[\frac{c}{2}\right] + \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^2} +$$
$$\frac{\left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \left(11 A \operatorname{Sin}\left[\frac{d x}{2}\right] + 3 C \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{24 d \left(\operatorname{Cos}\left[\frac{c}{2}\right] + \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)}$$

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

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

Optimal (type 3, 186 leaves, 8 steps):

$$2 a^4 \left(2 A + 3 C\right) x + \frac{a^4 \left(13 A + 2 C\right) \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{2 d} - \frac{5 a^4 \left(A - 2 C\right) \operatorname{Sin}[c + d x]}{2 d} -$$
$$\frac{\left(15 A - 2 C\right) \left(a^2 + a^2 \operatorname{Cos}[c + d x]\right)^2 \operatorname{Sin}[c + d x]}{6 d} - \frac{\left(9 A - 4 C\right) \left(a^4 + a^4 \operatorname{Cos}[c + d x]\right) \operatorname{Sin}[c + d x]}{3 d} +$$
$$\frac{2 a A \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Tan}[c + d x]}{d} + \frac{A \left(a + a \operatorname{Cos}[c + d x]\right)^4 \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{2 d}$$

Result (type 3, 756 leaves):

$$\frac{1}{8}(2A+3C)\,x\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8+\frac{1}{32\,d}$$
$$(-13A-2C)\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8+$$
$$\frac{1}{32\,d}(13A+2C)\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8+$$
$$\frac{(4A+27C)\,\mathrm{Cos}[d\,x]\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\mathrm{Sin}[c]}{64\,d}+$$
$$\frac{C\,\mathrm{Cos}[2\,d\,x]\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\mathrm{Sin}[2\,c]}{16\,d}+$$
$$\frac{C\,\mathrm{Cos}[3\,d\,x]\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\mathrm{Sin}[3\,c]}{192\,d}+$$
$$\frac{(4A+27C)\,\mathrm{Cos}[c]\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\mathrm{Sin}[d\,x]}{64\,d}+$$
$$\frac{C\,\mathrm{Cos}[2\,c]\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\mathrm{Sin}[2\,d\,x]}{16\,d}+$$
$$\frac{C\,\mathrm{Cos}[3\,c]\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\mathrm{Sin}[3\,d\,x]}{192\,d}+$$
$$\frac{A\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8}{64\,d\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+\frac{A\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{4\,d\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}-$$
$$\frac{A\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8}{64\,d\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+\frac{A\,(a+a\,\mathrm{Cos}[c+d\,x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{4\,d\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}$$

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

$$\int\frac{A+C\,\mathrm{Cos}[c+d\,x]^2}{a+a\,\mathrm{Cos}[c+d\,x]}\,dx$$

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

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

Result (type 3, 108 leaves):

$$\frac{1}{4\,a\,d}\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]\left(-2\,C\,d\,x\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]-2\,C\,d\,x\,\mathrm{Cos}\left[c+\frac{d\,x}{2}\right]+\right.$$
$$\left.4\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+5\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+C\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]\right)$$

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

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

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

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

Result (type 3, 114 leaves):

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

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

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

Optimal (type 3, 61 leaves, 5 steps):

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

Result (type 3, 229 leaves):

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

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

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

Optimal (type 3, 105 leaves, 6 steps):

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

Result (type 3, 284 leaves):

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

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

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

Optimal (type 3, 133 leaves, 6 steps):

$$-\frac{(3A+2C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{2ad}+\frac{(4A+3C)\,\text{Tan}[c+dx]}{ad}-\frac{(3A+2C)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{2ad}-\frac{(A+C)\,\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]}{d\,(a+a\,\text{Cos}[c+dx])}+\frac{(4A+3C)\,\text{Tan}[c+dx]^3}{3ad}$$

Result (type 3, 765 leaves):

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

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

$$\frac{2\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d\,(a+a\,\text{Cos}[c+dx])}+\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,\text{Sin}\left[\frac{dx}{2}\right]\right)\Big/$$

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

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,\left(-A\,\text{Cos}\left[\frac{c}{2}\right]+2\,A\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

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

$$\left(2\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,\left(5\,A\,\text{Sin}\left[\frac{dx}{2}\right]+3\,C\,\text{Sin}\left[\frac{dx}{2}\right]\right)\right)\Big/$$

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

$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,\text{Sin}\left[\frac{dx}{2}\right]\right)\Big/$$

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

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,\left(A\,\text{Cos}\left[\frac{c}{2}\right]+2\,A\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

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

$$\left(2\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\,\left(5\,A\,\text{Sin}\left[\frac{dx}{2}\right]+3\,C\,\text{Sin}\left[\frac{dx}{2}\right]\right)\right)\Big/$$

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

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

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

Optimal (type 3, 191 leaves, 8 steps):

$$\frac{(28A+55C)\,x}{8a^2}-\frac{8\,(A+2C)\,\text{Sin}[c+dx]}{a^2 d}+\frac{(28A+55C)\,\text{Cos}[c+dx]\,\text{Sin}[c+dx]}{8a^2 d}+$$

$$\frac{(28A+55C)\,\text{Cos}[c+dx]^3\,\text{Sin}[c+dx]}{12a^2 d}-\frac{2\,(A+2C)\,\text{Cos}[c+dx]^4\,\text{Sin}[c+dx]}{a^2 d\,(1+\text{Cos}[c+dx])}-$$

$$\frac{(A+C)\,\text{Cos}[c+dx]^5\,\text{Sin}[c+dx]}{3\,d\,(a+a\,\text{Cos}[c+dx])^2}+\frac{8\,(A+2C)\,\text{Sin}[c+dx]^3}{3a^2 d}$$

Result (type 3, 399 leaves) :

$$\frac{1}{384\, a^2\, d\, \left(1+\text{Cos}[c+d\, x]\right)^2} \text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]\, \text{Sec}\left[\frac{c}{2}\right] \left(72\, (28\, A+55\, C)\, d\, x\, \text{Cos}\left[\frac{d\, x}{2}\right]+72\, (28\, A+55\, C)\, d\, x\, \text{Cos}\left[c+\frac{d\, x}{2}\right]+672\, A\, d\, x\, \text{Cos}\left[c+\frac{3\, d\, x}{2}\right]+\right.$$
$$1320\, C\, d\, x\, \text{Cos}\left[c+\frac{3\, d\, x}{2}\right]+672\, A\, d\, x\, \text{Cos}\left[2\, c+\frac{3\, d\, x}{2}\right]+1320\, C\, d\, x\, \text{Cos}\left[2\, c+\frac{3\, d\, x}{2}\right]-$$
$$3048\, A\, \text{Sin}\left[\frac{d\, x}{2}\right]-5184\, C\, \text{Sin}\left[\frac{d\, x}{2}\right]+1176\, A\, \text{Sin}\left[c+\frac{d\, x}{2}\right]+1344\, C\, \text{Sin}\left[c+\frac{d\, x}{2}\right]-$$
$$1912\, A\, \text{Sin}\left[c+\frac{3\, d\, x}{2}\right]-3488\, C\, \text{Sin}\left[c+\frac{3\, d\, x}{2}\right]-504\, A\, \text{Sin}\left[2\, c+\frac{3\, d\, x}{2}\right]-1312\, C\, \text{Sin}\left[2\, c+\frac{3\, d\, x}{2}\right]-$$
$$120\, A\, \text{Sin}\left[2\, c+\frac{5\, d\, x}{2}\right]-285\, C\, \text{Sin}\left[2\, c+\frac{5\, d\, x}{2}\right]-120\, A\, \text{Sin}\left[3\, c+\frac{5\, d\, x}{2}\right]-285\, C\, \text{Sin}\left[3\, c+\frac{5\, d\, x}{2}\right]+$$
$$24\, A\, \text{Sin}\left[3\, c+\frac{7\, d\, x}{2}\right]+57\, C\, \text{Sin}\left[3\, c+\frac{7\, d\, x}{2}\right]+24\, A\, \text{Sin}\left[4\, c+\frac{7\, d\, x}{2}\right]+57\, C\, \text{Sin}\left[4\, c+\frac{7\, d\, x}{2}\right]-$$
$$\left.7\, C\, \text{Sin}\left[4\, c+\frac{9\, d\, x}{2}\right]-7\, C\, \text{Sin}\left[5\, c+\frac{9\, d\, x}{2}\right]+3\, C\, \text{Sin}\left[5\, c+\frac{11\, d\, x}{2}\right]+3\, C\, \text{Sin}\left[6\, c+\frac{11\, d\, x}{2}\right]\right)$$

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

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

Optimal (type 3, 163 leaves, 7 steps) :

$$-\frac{(2\, A+5\, C)\, x}{a^2}+\frac{(5\, A+12\, C)\, \text{Sin}[c+d\, x]}{a^2\, d}-$$
$$\frac{(2\, A+5\, C)\, \text{Cos}[c+d\, x]\, \text{Sin}[c+d\, x]}{a^2\, d}-\frac{2\, (2\, A+5\, C)\, \text{Cos}[c+d\, x]^3\, \text{Sin}[c+d\, x]}{3\, a^2\, d\, \left(1+\text{Cos}[c+d\, x]\right)}-$$
$$\frac{(A+C)\, \text{Cos}[c+d\, x]^4\, \text{Sin}[c+d\, x]}{3\, d\, \left(a+a\, \text{Cos}[c+d\, x]\right)^2}-\frac{(5\, A+12\, C)\, \text{Sin}[c+d\, x]^3}{3\, a^2\, d}$$

Result (type 3, 341 leaves) :

$$\frac{1}{48\,a^2\,d\,\left(1+\text{Cos}[c+d\,x]\right)^2}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\left(-72\,(2\,A+5\,C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-72\,(2\,A+5\,C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-48\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-120\,C\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-48\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-120\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+264\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+516\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]-120\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-156\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+164\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+342\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+36\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+118\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+12\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+30\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+12\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+30\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-3\,C\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-3\,C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+C\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+C\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

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

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

Optimal (type 3, 90 leaves, 6 steps):

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

Result (type 3, 195 leaves):

$$\frac{1}{48\,a^2\,d}\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\left(-36\,C\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-36\,C\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-12\,C\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-12\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+12\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+66\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]-12\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-30\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+8\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+41\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+9\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]\right)$$

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

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

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

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

Result (type 3, 141 leaves):

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

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

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

Optimal (type 3, 77 leaves, 4 steps):

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

Result (type 3, 166 leaves):

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

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

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

Optimal (type 3, 91 leaves, 6 steps):

$$-\frac{2\,A\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}+\frac{(10 A+C)\,\text{Tan}[c+d x]}{3 a^2 d}-$$
$$\frac{2\,A\,\text{Tan}[c+d x]}{a^2 d\,(1+\text{Cos}[c+d x])}-\frac{(A+C)\,\text{Tan}[c+d x]}{3 d\,(a+a\,\text{Cos}[c+d x])^2}$$

Result (type 3, 288 leaves):

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

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

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

Optimal (type 3, 146 leaves, 7 steps):

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

Result (type 3, 560 leaves):

$$-\frac{2\,(7A+2C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]}{d\,(a+a\,\mathrm{Cos}[c+dx])^2}+$$
$$\frac{2\,(7A+2C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]}{d\,(a+a\,\mathrm{Cos}[c+dx])^2}+$$
$$\frac{1}{48\,d\,(a+a\,\mathrm{Cos}[c+dx])^2}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]^2$$
$$\left(14\,A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+20\,C\,\mathrm{Sin}\left[\frac{dx}{2}\right]-97\,A\,\mathrm{Sin}\left[\frac{3dx}{2}\right]-22\,C\,\mathrm{Sin}\left[\frac{3dx}{2}\right]+126\,A\,\mathrm{Sin}\left[c-\frac{dx}{2}\right]+\right.$$
$$36\,C\,\mathrm{Sin}\left[c-\frac{dx}{2}\right]-42\,A\,\mathrm{Sin}\left[c+\frac{dx}{2}\right]-36\,C\,\mathrm{Sin}\left[c+\frac{dx}{2}\right]+98\,A\,\mathrm{Sin}\left[2c+\frac{dx}{2}\right]+$$
$$20\,C\,\mathrm{Sin}\left[2c+\frac{dx}{2}\right]+3\,A\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right]+18\,C\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right]-37\,A\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right]-$$
$$22\,C\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right]+63\,A\,\mathrm{Sin}\left[3c+\frac{3dx}{2}\right]+18\,C\,\mathrm{Sin}\left[3c+\frac{3dx}{2}\right]-75\,A\,\mathrm{Sin}\left[c+\frac{5dx}{2}\right]-$$
$$18\,C\,\mathrm{Sin}\left[c+\frac{5dx}{2}\right]-15\,A\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right]+6\,C\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right]-39\,A\,\mathrm{Sin}\left[3c+\frac{5dx}{2}\right]-$$
$$18\,C\,\mathrm{Sin}\left[3c+\frac{5dx}{2}\right]+21\,A\,\mathrm{Sin}\left[4c+\frac{5dx}{2}\right]+6\,C\,\mathrm{Sin}\left[4c+\frac{5dx}{2}\right]-32\,A\,\mathrm{Sin}\left[2c+\frac{7dx}{2}\right]-$$
$$\left.8\,C\,\mathrm{Sin}\left[2c+\frac{7dx}{2}\right]-12\,A\,\mathrm{Sin}\left[3c+\frac{7dx}{2}\right]-20\,A\,\mathrm{Sin}\left[4c+\frac{7dx}{2}\right]-8\,C\,\mathrm{Sin}\left[4c+\frac{7dx}{2}\right]\right)$$

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

$$\int\frac{\left(A+C\,\mathrm{Cos}[c+dx]^2\right)\,\mathrm{Sec}[c+dx]^4}{(a+a\,\mathrm{Cos}[c+dx])^2}\,dx$$

Optimal (type 3, 172 leaves, 7 steps):

$$-\frac{(5A+2C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+dx]]}{a^2\,d}+\frac{(12A+5C)\,\mathrm{Tan}[c+dx]}{a^2\,d}-\frac{(5A+2C)\,\mathrm{Sec}[c+dx]\,\mathrm{Tan}[c+dx]}{a^2\,d}-\frac{2\,(5A+2C)\,\mathrm{Sec}[c+dx]^2\,\mathrm{Tan}[c+dx]}{3\,a^2\,d\,(1+\mathrm{Cos}[c+dx])}-\frac{(A+C)\,\mathrm{Sec}[c+dx]^2\,\mathrm{Tan}[c+dx]}{3\,d\,(a+a\,\mathrm{Cos}[c+dx])^2}+\frac{(12A+5C)\,\mathrm{Tan}[c+dx]^3}{3\,a^2\,d}$$

Result (type 3, 672 leaves):

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

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

$$\frac{1}{48\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3$$

$$\left(-3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-24\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+155\,A\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]+66\,C\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-153\,A\,\text{Sin}\left[c-\frac{d\,x}{2}\right]-\right.$$

$$60\,C\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+21\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+24\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-135\,A\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-$$

$$60\,C\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]+25\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-4\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+45\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+$$

$$36\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-85\,A\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-34\,C\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+99\,A\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]+$$

$$42\,C\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]+21\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+33\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+24\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-$$

$$45\,A\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-18\,C\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+57\,A\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+24\,C\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+$$

$$18\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+24\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+15\,C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-$$

$$15\,A\,\text{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]-6\,C\,\text{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]+24\,A\,\text{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]+10\,C\,\text{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]+$$

$$\left.11\,A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+13\,A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+7\,C\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

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

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

Optimal (type 3, 216 leaves, 8 steps):

$$-\frac{\left(6\,A+23\,C\right)\,x}{2\,a^3}+\frac{4\,\left(9\,A+34\,C\right)\,\text{Sin}[c+d\,x]}{5\,a^3\,d}-\frac{\left(6\,A+23\,C\right)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^3\,d}-$$

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

$$\frac{\left(6\,A+23\,C\right)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{3\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}-\frac{4\,\left(9\,A+34\,C\right)\,\text{Sin}[c+d\,x]^3}{15\,a^3\,d}$$

Result (type 3, 463 leaves):

$$-\frac{1}{480 a^3 d \left(1+\text{Cos}[c+d x]\right)^3}\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(600 (6 A+23 C) d x \text{Cos}\left[\frac{d x}{2}\right]+600 (6 A+23 C) d x \text{Cos}\left[c+\frac{d x}{2}\right]+\right.$$
$$1800 A d x \text{Cos}\left[c+\frac{3 d x}{2}\right]+6900 C d x \text{Cos}\left[c+\frac{3 d x}{2}\right]+1800 A d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]+$$
$$6900 C d x \text{Cos}\left[2 c+\frac{3 d x}{2}\right]+360 A d x \text{Cos}\left[2 c+\frac{5 d x}{2}\right]+1380 C d x \text{Cos}\left[2 c+\frac{5 d x}{2}\right]+$$
$$360 A d x \text{Cos}\left[3 c+\frac{5 d x}{2}\right]+1380 C d x \text{Cos}\left[3 c+\frac{5 d x}{2}\right]-7020 A \text{Sin}\left[\frac{d x}{2}\right]-$$
$$20410 C \text{Sin}\left[\frac{d x}{2}\right]+4500 A \text{Sin}\left[c+\frac{d x}{2}\right]+11110 C \text{Sin}\left[c+\frac{d x}{2}\right]-4860 A \text{Sin}\left[c+\frac{3 d x}{2}\right]-$$
$$15380 C \text{Sin}\left[c+\frac{3 d x}{2}\right]+900 A \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+380 C \text{Sin}\left[2 c+\frac{3 d x}{2}\right]-1452 A \text{Sin}\left[2 c+\frac{5 d x}{2}\right]-$$
$$4777 C \text{Sin}\left[2 c+\frac{5 d x}{2}\right]-300 A \text{Sin}\left[3 c+\frac{5 d x}{2}\right]-1625 C \text{Sin}\left[3 c+\frac{5 d x}{2}\right]-$$
$$60 A \text{Sin}\left[3 c+\frac{7 d x}{2}\right]-230 C \text{Sin}\left[3 c+\frac{7 d x}{2}\right]-60 A \text{Sin}\left[4 c+\frac{7 d x}{2}\right]-230 C \text{Sin}\left[4 c+\frac{7 d x}{2}\right]+$$
$$\left.20 C \text{Sin}\left[4 c+\frac{9 d x}{2}\right]+20 C \text{Sin}\left[5 c+\frac{9 d x}{2}\right]-5 C \text{Sin}\left[5 c+\frac{11 d x}{2}\right]-5 C \text{Sin}\left[6 c+\frac{11 d x}{2}\right]\right)$$

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

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

Optimal (type 3, 189 leaves, 4 steps):

$$\frac{(2 A+13 C) x}{2 a^3}-\frac{2 (11 A+76 C) \text{Sin}[c+d x]}{15 a^3 d}+$$
$$\frac{(2 A+13 C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{2 a^3 d}-\frac{(A+C) \text{Cos}[c+d x]^4 \text{Sin}[c+d x]}{5 d \left(a+a \text{Cos}[c+d x]\right)^3}-$$
$$\frac{(A+11 C) \text{Cos}[c+d x]^3 \text{Sin}[c+d x]}{15 a d \left(a+a \text{Cos}[c+d x]\right)^2}-\frac{(11 A+76 C) \text{Cos}[c+d x]^2 \text{Sin}[c+d x]}{15 d \left(a^3+a^3 \text{Cos}[c+d x]\right)}$$

Result (type 3, 393 leaves):

$$\frac{1}{480\,a^3\,d\,\left(1+\text{Cos}[c+d\,x]\right)^3}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\left(600\,(2\,A+13\,C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+600\,(2\,A+13\,C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+600\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+3900\,C\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+600\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+3900\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+120\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+780\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+120\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+780\,C\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-2960\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-12\,760\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+2160\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+7560\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-1840\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-9230\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+720\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+930\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-512\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-2782\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-750\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-105\,C\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-105\,C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+15\,C\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+15\,C\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

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

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

Optimal (type 3, 136 leaves, 7 steps):

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

Result (type 3, 283 leaves):

$$-\frac{1}{960\,a^3\,d}\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\left(900\,C\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+900\,C\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+450\,C\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+450\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+90\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+90\,C\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-160\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-1755\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+120\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+1125\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-80\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-1215\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+60\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+225\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-28\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-363\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-75\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-15\,C\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-15\,C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 62: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 129 leaves, 7 steps):

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

Result (type 3, 596 leaves):

$$\frac{1}{a^3}\Bigg(\left(48\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,\left(1+\text{Cos}[c+d\,x]\right)^3\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)-$$
$$\left(48\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,\left(1+\text{Cos}[c+d\,x]\right)^3\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\frac{1}{60\,d\,\left(1+\text{Cos}[c+d\,x]\right)^3\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)}$$
$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)$$
$$\Bigg(-255\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-20\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+567\,A\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]+22\,C\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-600\,A\,\text{Sin}\left[c-\frac{d\,x}{2}\right]-$$
$$10\,C\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+375\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+10\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-480\,A\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-$$
$$20\,C\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-60\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+402\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+22\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-$$
$$225\,A\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+315\,A\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]+10\,C\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]+30\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+$$
$$240\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+10\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-45\,A\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+72\,A\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+$$
$$2\,C\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+15\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+57\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+2\,C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\Bigg)\Bigg)$$

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

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

Optimal (type 3, 192 leaves, 8 steps):

$$\frac{(13 A+2 C) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{2 a^3 d}-\frac{2 (76 A+11 C) \operatorname{Tan}[c+d x]}{15 a^3 d}+\frac{(13 A+2 C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 a^3 d}-\frac{(A+C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{5 d (a+a \operatorname{Cos}[c+d x])^3}-\frac{(11 A+C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{15 a d (a+a \operatorname{Cos}[c+d x])^2}-\frac{(76 A+11 C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{15 d (a^3+a^3 \operatorname{Cos}[c+d x])}$$

Result (type 3, 672 leaves):

$$-\frac{4 (13 A+2 C) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d (a+a \operatorname{Cos}[c+d x])^3}+\frac{4 (13 A+2 C) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d (a+a \operatorname{Cos}[c+d x])^3}+$$

$$\frac{1}{480 d (a+a \operatorname{Cos}[c+d x])^3} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[c] \operatorname{Sec}[c+d x]^2$$

$$\left(1235 A \operatorname{Sin}\left[\frac{d x}{2}\right]+490 C \operatorname{Sin}\left[\frac{d x}{2}\right]-3805 A \operatorname{Sin}\left[\frac{3 d x}{2}\right]-530 C \operatorname{Sin}\left[\frac{3 d x}{2}\right]+4329 A \operatorname{Sin}\left[c-\frac{d x}{2}\right]+\right.$$
$$654 C \operatorname{Sin}\left[c-\frac{d x}{2}\right]-1989 A \operatorname{Sin}\left[c+\frac{d x}{2}\right]-654 C \operatorname{Sin}\left[c+\frac{d x}{2}\right]+3575 A \operatorname{Sin}\left[2 c+\frac{d x}{2}\right]+$$
$$490 C \operatorname{Sin}\left[2 c+\frac{d x}{2}\right]+475 A \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+350 C \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]-2005 A \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]-$$
$$530 C \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]+2275 A \operatorname{Sin}\left[3 c+\frac{3 d x}{2}\right]+350 C \operatorname{Sin}\left[3 c+\frac{3 d x}{2}\right]-2673 A \operatorname{Sin}\left[c+\frac{5 d x}{2}\right]-$$
$$378 C \operatorname{Sin}\left[c+\frac{5 d x}{2}\right]-105 A \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]+150 C \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]-1593 A \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]-$$
$$378 C \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]+975 A \operatorname{Sin}\left[4 c+\frac{5 d x}{2}\right]+150 C \operatorname{Sin}\left[4 c+\frac{5 d x}{2}\right]-1325 A \operatorname{Sin}\left[2 c+\frac{7 d x}{2}\right]-$$
$$190 C \operatorname{Sin}\left[2 c+\frac{7 d x}{2}\right]-255 A \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]+30 C \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]-875 A \operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]-$$
$$190 C \operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]+195 A \operatorname{Sin}\left[5 c+\frac{7 d x}{2}\right]+30 C \operatorname{Sin}\left[5 c+\frac{7 d x}{2}\right]-304 A \operatorname{Sin}\left[3 c+\frac{9 d x}{2}\right]-$$
$$\left.44 C \operatorname{Sin}\left[3 c+\frac{9 d x}{2}\right]-90 A \operatorname{Sin}\left[4 c+\frac{9 d x}{2}\right]-214 A \operatorname{Sin}\left[5 c+\frac{9 d x}{2}\right]-44 C \operatorname{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)$$

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

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

Optimal (type 3, 225 leaves, 8 steps):

$$-\frac{(23 A+6 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 a^3 d}+\frac{4 (34 A+9 C) \text{Tan}[c+d x]}{5 a^3 d}-\frac{(23 A+6 C) \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 a^3 d}-\frac{(A+C) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{5 d (a+a \text{Cos}[c+d x])^3}-\frac{(13 A+3 C) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{15 a d (a+a \text{Cos}[c+d x])^2}-\frac{(23 A+6 C) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 d \left(a^3+a^3 \text{Cos}[c+d x]\right)}+\frac{4 (34 A+9 C) \text{Tan}[c+d x]^3}{15 a^3 d}$$

Result (type 3, 798 leaves) :

$$\frac{4 (23 A+6 C) \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d (a+a \text{Cos}[c+d x])^3}-\frac{4 (23 A+6 C) \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d (a+a \text{Cos}[c+d x])^3}+$$

$$\frac{1}{960 d (a+a \text{Cos}[c+d x])^3} \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c] \text{Sec}[c+d x]^3$$
$$\left(-2484 A \text{Sin}\left[\frac{d x}{2}\right]-1764 C \text{Sin}\left[\frac{d x}{2}\right]+12622 A \text{Sin}\left[\frac{3 d x}{2}\right]+3372 C \text{Sin}\left[\frac{3 d x}{2}\right]-\right.$$
$$13340 A \text{Sin}\left[c-\frac{d x}{2}\right]-3480 C \text{Sin}\left[c-\frac{d x}{2}\right]+4140 A \text{Sin}\left[c+\frac{d x}{2}\right]+2100 C \text{Sin}\left[c+\frac{d x}{2}\right]-$$
$$11684 A \text{Sin}\left[2 c+\frac{d x}{2}\right]-3144 C \text{Sin}\left[2 c+\frac{d x}{2}\right]-450 A \text{Sin}\left[c+\frac{3 d x}{2}\right]-960 C \text{Sin}\left[c+\frac{3 d x}{2}\right]+$$
$$5022 A \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+2232 C \text{Sin}\left[2 c+\frac{3 d x}{2}\right]-8050 A \text{Sin}\left[3 c+\frac{3 d x}{2}\right]-$$
$$2100 C \text{Sin}\left[3 c+\frac{3 d x}{2}\right]+9230 A \text{Sin}\left[c+\frac{5 d x}{2}\right]+2460 C \text{Sin}\left[c+\frac{5 d x}{2}\right]+630 A \text{Sin}\left[2 c+\frac{5 d x}{2}\right]-$$
$$390 C \text{Sin}\left[2 c+\frac{5 d x}{2}\right]+4230 A \text{Sin}\left[3 c+\frac{5 d x}{2}\right]+1710 C \text{Sin}\left[3 c+\frac{5 d x}{2}\right]-$$
$$4370 A \text{Sin}\left[4 c+\frac{5 d x}{2}\right]-1140 C \text{Sin}\left[4 c+\frac{5 d x}{2}\right]+5347 A \text{Sin}\left[2 c+\frac{7 d x}{2}\right]+$$
$$1422 C \text{Sin}\left[2 c+\frac{7 d x}{2}\right]+875 A \text{Sin}\left[3 c+\frac{7 d x}{2}\right]-60 C \text{Sin}\left[3 c+\frac{7 d x}{2}\right]+2747 A \text{Sin}\left[4 c+\frac{7 d x}{2}\right]+$$
$$1032 C \text{Sin}\left[4 c+\frac{7 d x}{2}\right]-1725 A \text{Sin}\left[5 c+\frac{7 d x}{2}\right]-450 C \text{Sin}\left[5 c+\frac{7 d x}{2}\right]+$$
$$2375 A \text{Sin}\left[3 c+\frac{9 d x}{2}\right]+630 C \text{Sin}\left[3 c+\frac{9 d x}{2}\right]+655 A \text{Sin}\left[4 c+\frac{9 d x}{2}\right]+60 C \text{Sin}\left[4 c+\frac{9 d x}{2}\right]+$$
$$1375 A \text{Sin}\left[5 c+\frac{9 d x}{2}\right]+480 C \text{Sin}\left[5 c+\frac{9 d x}{2}\right]-345 A \text{Sin}\left[6 c+\frac{9 d x}{2}\right]-90 C \text{Sin}\left[6 c+\frac{9 d x}{2}\right]+$$
$$544 A \text{Sin}\left[4 c+\frac{11 d x}{2}\right]+144 C \text{Sin}\left[4 c+\frac{11 d x}{2}\right]+200 A \text{Sin}\left[5 c+\frac{11 d x}{2}\right]+$$
$$\left.30 C \text{Sin}\left[5 c+\frac{11 d x}{2}\right]+344 A \text{Sin}\left[6 c+\frac{11 d x}{2}\right]+114 C \text{Sin}\left[6 c+\frac{11 d x}{2}\right]\right)$$

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

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

Optimal (type 3, 223 leaves, 5 steps):

$$\frac{(2 A+21 C) x}{2 a^4}-\frac{32 (5 A+54 C) \,\text{Sin}[c+d x]}{105 a^4 d}+\frac{(2 A+21 C) \,\text{Cos}[c+d x] \,\text{Sin}[c+d x]}{2 a^4 d}-\frac{(10 A+129 C) \,\text{Cos}[c+d x]^3 \,\text{Sin}[c+d x]}{105 a^4 d \,(1+\text{Cos}[c+d x])^2}-\frac{16 (5 A+54 C) \,\text{Cos}[c+d x]^2 \,\text{Sin}[c+d x]}{105 a^4 d \,(1+\text{Cos}[c+d x])}-\frac{(A+C) \,\text{Cos}[c+d x]^5 \,\text{Sin}[c+d x]}{7 d \,(a+a \,\text{Cos}[c+d x])^4}-\frac{2 C \,\text{Cos}[c+d x]^4 \,\text{Sin}[c+d x]}{5 a d \,(a+a \,\text{Cos}[c+d x])^3}$$

Result (type 3, 513 leaves):

$$\frac{1}{6720 a^4 d \,(1+\text{Cos}[c+d x])^4} \text{Cos}\left[\frac{1}{2} (c+d x)\right] \text{Sec}\left[\frac{c}{2}\right] \left(14700 (2 A+21 C) d x \,\text{Cos}\left[\frac{d x}{2}\right]+14700 (2 A+21 C) d x \,\text{Cos}\left[c+\frac{d x}{2}\right]+\right.$$
$$17640 A d x \,\text{Cos}\left[c+\frac{3 d x}{2}\right]+185220 C d x \,\text{Cos}\left[c+\frac{3 d x}{2}\right]+17640 A d x \,\text{Cos}\left[2 c+\frac{3 d x}{2}\right]+$$
$$185220 C d x \,\text{Cos}\left[2 c+\frac{3 d x}{2}\right]+5880 A d x \,\text{Cos}\left[2 c+\frac{5 d x}{2}\right]+61740 C d x \,\text{Cos}\left[2 c+\frac{5 d x}{2}\right]+$$
$$5880 A d x \,\text{Cos}\left[3 c+\frac{5 d x}{2}\right]+61740 C d x \,\text{Cos}\left[3 c+\frac{5 d x}{2}\right]+840 A d x \,\text{Cos}\left[3 c+\frac{7 d x}{2}\right]+$$
$$8820 C d x \,\text{Cos}\left[3 c+\frac{7 d x}{2}\right]+840 A d x \,\text{Cos}\left[4 c+\frac{7 d x}{2}\right]+8820 C d x \,\text{Cos}\left[4 c+\frac{7 d x}{2}\right]-$$
$$79520 A \,\text{Sin}\left[\frac{d x}{2}\right]-539490 C \,\text{Sin}\left[\frac{d x}{2}\right]+66080 A \,\text{Sin}\left[c+\frac{d x}{2}\right]+386190 C \,\text{Sin}\left[c+\frac{d x}{2}\right]-$$
$$57120 A \,\text{Sin}\left[c+\frac{3 d x}{2}\right]-422478 C \,\text{Sin}\left[c+\frac{3 d x}{2}\right]+30240 A \,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]+$$
$$132930 C \,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]-22400 A \,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]-181461 C \,\text{Sin}\left[2 c+\frac{5 d x}{2}\right]+$$
$$6720 A \,\text{Sin}\left[3 c+\frac{5 d x}{2}\right]+3675 C \,\text{Sin}\left[3 c+\frac{5 d x}{2}\right]-4160 A \,\text{Sin}\left[3 c+\frac{7 d x}{2}\right]-$$
$$36003 C \,\text{Sin}\left[3 c+\frac{7 d x}{2}\right]-9555 C \,\text{Sin}\left[4 c+\frac{7 d x}{2}\right]-945 C \,\text{Sin}\left[4 c+\frac{9 d x}{2}\right]-$$
$$\left.945 C \,\text{Sin}\left[5 c+\frac{9 d x}{2}\right]+105 C \,\text{Sin}\left[5 c+\frac{11 d x}{2}\right]+105 C \,\text{Sin}\left[6 c+\frac{11 d x}{2}\right]\right)$$

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

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

Optimal (type 3, 174 leaves, 8 steps):

$$-\frac{4 C x}{a^4}+\frac{2 (3 A+122 C) \operatorname{Sin}[c+d x]}{105 a^4 d}+\frac{(3 A-88 C) \operatorname{Cos}[c+d x]^2 \operatorname{Sin}[c+d x]}{105 a^4 d (1+\operatorname{Cos}[c+d x])^2}+\frac{4 C \operatorname{Sin}[c+d x]}{a^4 d (1+\operatorname{Cos}[c+d x])}-\frac{(A+C) \operatorname{Cos}[c+d x]^4 \operatorname{Sin}[c+d x]}{7 d (a+a \operatorname{Cos}[c+d x])^4}+\frac{2 (A-6 C) \operatorname{Cos}[c+d x]^3 \operatorname{Sin}[c+d x]}{35 a d (a+a \operatorname{Cos}[c+d x])^3}$$

Result (type 3, 371 leaves):

$$-\frac{1}{26880 a^4 d} \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^7 \left(29400 C d x \operatorname{Cos}\left[\frac{d x}{2}\right]+29400 C d x \operatorname{Cos}\left[c+\frac{d x}{2}\right]+17640 C d x \operatorname{Cos}\left[c+\frac{3 d x}{2}\right]+17640 C d x \operatorname{Cos}\left[2 c+\frac{3 d x}{2}\right]+5880 C d x \operatorname{Cos}\left[2 c+\frac{5 d x}{2}\right]+5880 C d x \operatorname{Cos}\left[3 c+\frac{5 d x}{2}\right]+840 C d x \operatorname{Cos}\left[3 c+\frac{7 d x}{2}\right]+840 C d x \operatorname{Cos}\left[4 c+\frac{7 d x}{2}\right]-2520 A \operatorname{Sin}\left[\frac{d x}{2}\right]-60830 C \operatorname{Sin}\left[\frac{d x}{2}\right]+2520 A \operatorname{Sin}\left[c+\frac{d x}{2}\right]+46130 C \operatorname{Sin}\left[c+\frac{d x}{2}\right]-1764 A \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]-46116 C \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]+1260 A \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]+18060 C \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]-588 A \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]-19292 C \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]+420 A \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]+2100 C \operatorname{Sin}\left[3 c+\frac{5 d x}{2}\right]-144 A \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]-3791 C \operatorname{Sin}\left[3 c+\frac{7 d x}{2}\right]-735 C \operatorname{Sin}\left[4 c+\frac{7 d x}{2}\right]-105 C \operatorname{Sin}\left[4 c+\frac{9 d x}{2}\right]-105 C \operatorname{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)$$

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

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

Optimal (type 3, 152 leaves, 6 steps):

$$\frac{C x}{a^4}-\frac{(8 A-55 C) \operatorname{Sin}[c+d x]}{105 a^4 d (1+\operatorname{Cos}[c+d x])^2}+\frac{(16 A-215 C) \operatorname{Sin}[c+d x]}{105 a^4 d (1+\operatorname{Cos}[c+d x])}-\frac{(A+C) \operatorname{Cos}[c+d x]^3 \operatorname{Sin}[c+d x]}{7 d (a+a \operatorname{Cos}[c+d x])^4}+\frac{2 (2 A-5 C) \operatorname{Cos}[c+d x]^2 \operatorname{Sin}[c+d x]}{35 a d (a+a \operatorname{Cos}[c+d x])^3}$$

Result (type 3, 315 leaves):

$$\frac{1}{13440\,a^4\,d}\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^7\left(3675\,C\,d\,x\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]+3675\,C\,d\,x\,\mathrm{Cos}\left[c+\frac{d\,x}{2}\right]+2205\,C\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]+\right.$$
$$2205\,C\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+735\,C\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+735\,C\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+$$
$$105\,C\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]+105\,C\,d\,x\,\mathrm{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]+560\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-9940\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-$$
$$350\,A\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+8260\,C\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+336\,A\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-7140\,C\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-$$
$$210\,A\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+3780\,C\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+182\,A\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-$$
$$\left.2800\,C\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+840\,C\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+26\,A\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-520\,C\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 71: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 161 leaves, 8 steps):

$$-\frac{4\,A\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{a^4\,d}+\frac{2\,(332\,A+3\,C)\,\mathrm{Tan}[c+d\,x]}{105\,a^4\,d}-\frac{(88\,A-3\,C)\,\mathrm{Tan}[c+d\,x]}{105\,a^4\,d\,(1+\mathrm{Cos}[c+d\,x])^2}-$$
$$\frac{4\,A\,\mathrm{Tan}[c+d\,x]}{a^4\,d\,(1+\mathrm{Cos}[c+d\,x])}-\frac{(A+C)\,\mathrm{Tan}[c+d\,x]}{7\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^4}-\frac{2\,(6\,A-C)\,\mathrm{Tan}[c+d\,x]}{35\,a\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^3}$$

Result (type 3, 680 leaves):

$$\frac{1}{a^4}\left(\left(128\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\mathrm{Cos}[c+d\,x]^2\,\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]\left(C+A\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,\left(1+\mathrm{Cos}[c+d\,x]\right)^4\left(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\right)-\left(128\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\mathrm{Cos}[c+d\,x]^2\,\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]\left(C+A\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,\left(1+\mathrm{Cos}[c+d\,x]\right)^4\left(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\right)+\frac{1}{840\,d\,\left(1+\mathrm{Cos}[c+d\,x]\right)^4\left(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x]\right)}\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c]\left(C+A\,\mathrm{Sec}[c+d\,x]^2\right)\left(-10780\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-210\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+18788\,A\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]+252\,C\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]-20524\,A\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]-126\,C\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]+14644\,A\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+126\,C\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-16660\,A\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]-210\,C\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]-4690\,A\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+14378\,A\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+252\,C\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-9100\,A\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+11668\,A\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]+132\,C\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]-630\,A\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+9358\,A\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+132\,C\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-2940\,A\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+4228\,A\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+42\,C\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+315\,A\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+3493\,A\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+42\,C\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-420\,A\,\mathrm{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]+664\,A\,\mathrm{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]+6\,C\,\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]+6\,C\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)\right)$$

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

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

Optimal (type 3, 224 leaves, 9 steps):

$$\frac{(21\,A+2\,C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,a^4\,d}-\frac{32\,(54\,A+5\,C)\,\mathrm{Tan}[c+d\,x]}{105\,a^4\,d}+\frac{(21\,A+2\,C)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,a^4\,d}-\frac{(129\,A+10\,C)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{105\,a^4\,d\,(1+\mathrm{Cos}[c+d\,x])^2}-\frac{16\,(54\,A+5\,C)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{105\,a^4\,d\,(1+\mathrm{Cos}[c+d\,x])}-\frac{(A+C)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{7\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^4}-\frac{2\,A\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{5\,a\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^3}$$

Result (type 3, 784 leaves):

$$-\frac{8\,(21\,A+2\,C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,(a+a\,\mathrm{Cos}[c+d\,x])^4}+\frac{8\,(21\,A+2\,C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,(a+a\,\mathrm{Cos}[c+d\,x])^4}+$$
$$\frac{1}{6720\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^4}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2$$
$$\left(73206\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+14140\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-166668\,A\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]-15160\,C\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]+\right.$$
$$183162\,A\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]+17220\,C\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]-100842\,A\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-17220\,C\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+$$
$$155526\,A\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]+14140\,C\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]+37380\,A\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+$$
$$9800\,C\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-101148\,A\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-15160\,C\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+$$
$$102900\,A\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+9800\,C\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-119364\,A\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]-$$
$$10920\,C\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]+8820\,A\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+4760\,C\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-$$
$$78204\,A\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-10920\,C\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+49980\,A\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+$$
$$4760\,C\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-64053\,A\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-5890\,C\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-$$
$$3885\,A\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+1470\,C\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-44733\,A\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-$$
$$5890\,C\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+15435\,A\,\mathrm{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]+1470\,C\,\mathrm{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]-$$
$$21987\,A\,\mathrm{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]-2030\,C\,\mathrm{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]-3675\,A\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+$$
$$210\,C\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-16107\,A\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]-2030\,C\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+2205\,A$$
$$\mathrm{Sin}\left[6\,c+\frac{9\,d\,x}{2}\right]+210\,C\,\mathrm{Sin}\left[6\,c+\frac{9\,d\,x}{2}\right]-3456\,A\,\mathrm{Sin}\left[4\,c+\frac{11\,d\,x}{2}\right]-320\,C\,\mathrm{Sin}\left[4\,c+\frac{11\,d\,x}{2}\right]-$$
$$\left.840\,A\,\mathrm{Sin}\left[5\,c+\frac{11\,d\,x}{2}\right]-2616\,A\,\mathrm{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]-320\,C\,\mathrm{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]\right)$$

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

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

Optimal (type 3, 96 leaves, 4 steps):

$$\frac{2\sqrt{a}\,A\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{d}+\frac{2\,a\,C\,\text{Sin}[c+d x]}{3\,d\,\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{2\,C\,\sqrt{a+a\,\text{Cos}[c+d x]}\,\,\text{Sin}[c+d x]}{3\,d}$$

Result (type 3, 1487 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Optimal (type 3, 94 leaves, 4 steps):

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

Result (type 3, 1527 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Optimal (type 3, 110 leaves, 4 steps):

$$\frac{\sqrt{a}\,(3A+8C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4d}+\frac{a\,A\,\text{Tan}[c+d\,x]}{4d\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{A\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2d}$$

Result (type 3, 914 leaves):

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

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

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

Optimal (type 3, 153 leaves, 5 steps):

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

Result (type 3, 1084 leaves):

$$\frac{1}{16\sqrt{2}\,d}\,\mathbb{i}\,(-5A-8C)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]$$

$$\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]+\frac{1}{16\sqrt{2}\,d}\,\mathbb{i}\,(-5A-8C)$$

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

$$\frac{1}{16\sqrt{2}\,d}(5A+8C)\,\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]+$$

$$\frac{1}{32\sqrt{2}\,d}(-5A-8C)\,\sqrt{a\,(1+\text{Cos}[c+d x])}$$

$$\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]+\frac{1}{32\sqrt{2}\,d}$$

$$(-5A-8C)\,\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]+$$

$$\frac{A\,\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]}{12 d\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+\frac{A\,\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]}{8 d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$

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

$$\left(16 d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)-$$

$$\frac{A\,\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]}{12 d\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+\frac{A\,\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]}{8 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$

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

$$\left(16 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)$$

Problem 82: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 196 leaves, 6 steps):

$$\frac{\sqrt{a} \left(35 A + 48 C\right) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{64 d} + \frac{a \left(35 A + 48 C\right) \operatorname{Tan}[c + d x]}{64 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{a \left(35 A + 48 C\right) \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{96 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{a A \operatorname{Sec}[c + d x]^2 \operatorname{Tan}[c + d x]}{24 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{A \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sec}[c + d x]^3 \operatorname{Tan}[c + d x]}{4 d}$$

Result (type 3, 1353 leaves):

$$\frac{1}{128\sqrt{2}\,d}\,i\,(-35A-48C)\,\text{ArcTan}\Big[\frac{\text{Cos}[\frac{c}{4}+\frac{dx}{4}]-\text{Sin}[\frac{c}{4}+\frac{dx}{4}]-\sqrt{2}\,\text{Sin}[\frac{c}{4}+\frac{dx}{4}]}{-\text{Cos}[\frac{c}{4}+\frac{dx}{4}]+\sqrt{2}\,\text{Cos}[\frac{c}{4}+\frac{dx}{4}]-\text{Sin}[\frac{c}{4}+\frac{dx}{4}]}\Big]$$

$$\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]+\frac{1}{128\sqrt{2}\,d}\,i\,(-35A-48C)$$

$$\text{ArcTan}\Big[\frac{\text{Cos}[\frac{c}{4}+\frac{dx}{4}]+\text{Sin}[\frac{c}{4}+\frac{dx}{4}]-\sqrt{2}\,\text{Sin}[\frac{c}{4}+\frac{dx}{4}]}{\text{Cos}[\frac{c}{4}+\frac{dx}{4}]+\sqrt{2}\,\text{Cos}[\frac{c}{4}+\frac{dx}{4}]-\text{Sin}[\frac{c}{4}+\frac{dx}{4}]}\Big]\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]+$$

$$\frac{1}{128\sqrt{2}\,d}(35A+48C)\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Log}\Big[\sqrt{2}+2\,\text{Sin}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big]\,\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]+\frac{1}{256\sqrt{2}\,d}$$

$$(-35A-48C)\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Log}\Big[2-\sqrt{2}\,\text{Cos}\Big[\frac{c}{2}+\frac{dx}{2}\Big]-\sqrt{2}\,\text{Sin}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big]\,\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]+$$

$$\frac{1}{256\sqrt{2}\,d}(-35A-48C)\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Log}\Big[2+\sqrt{2}\,\text{Cos}\Big[\frac{c}{2}+\frac{dx}{2}\Big]-\sqrt{2}\,\text{Sin}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]+\frac{A\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]\,\text{Sin}[\frac{dx}{2}]}{16\,d\,(\text{Cos}[\frac{c}{2}]-\text{Sin}[\frac{c}{2}])\,(\text{Cos}[\frac{c}{2}+\frac{dx}{2}]-\text{Sin}[\frac{c}{2}+\frac{dx}{2}])^4}+$$

$$\frac{A\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]\,(7\,\text{Cos}[\frac{c}{2}]-\text{Sin}[\frac{c}{2}])}{96\,d\,(\text{Cos}[\frac{c}{2}]-\text{Sin}[\frac{c}{2}])\,(\text{Cos}[\frac{c}{2}+\frac{dx}{2}]-\text{Sin}[\frac{c}{2}+\frac{dx}{2}])^3}+$$

$$\frac{\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]\,(11\,A\,\text{Sin}[\frac{dx}{2}]+16\,C\,\text{Sin}[\frac{dx}{2}])}{64\,d\,(\text{Cos}[\frac{c}{2}]-\text{Sin}[\frac{c}{2}])\,(\text{Cos}[\frac{c}{2}+\frac{dx}{2}]-\text{Sin}[\frac{c}{2}+\frac{dx}{2}])^2}+$$

$$\Big(\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big(35\,A\,\text{Cos}\Big[\frac{c}{2}\Big]+48\,C\,\text{Cos}\Big[\frac{c}{2}\Big]-13\,A\,\text{Sin}\Big[\frac{c}{2}\Big]-16\,C\,\text{Sin}\Big[\frac{c}{2}\Big]\Big)\Big)\Big/$$

$$\Big(128\,d\,\Big(\text{Cos}\Big[\frac{c}{2}\Big]-\text{Sin}\Big[\frac{c}{2}\Big]\Big)\Big(\text{Cos}\Big[\frac{c}{2}+\frac{dx}{2}\Big]-\text{Sin}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big)\Big)+$$

$$\frac{A\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]\,\text{Sin}[\frac{dx}{2}]}{16\,d\,(\text{Cos}[\frac{c}{2}]+\text{Sin}[\frac{c}{2}])\,(\text{Cos}[\frac{c}{2}+\frac{dx}{2}]+\text{Sin}[\frac{c}{2}+\frac{dx}{2}])^4}+$$

$$\frac{\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]\,(-7\,A\,\text{Cos}[\frac{c}{2}]-A\,\text{Sin}[\frac{c}{2}])}{96\,d\,(\text{Cos}[\frac{c}{2}]+\text{Sin}[\frac{c}{2}])\,(\text{Cos}[\frac{c}{2}+\frac{dx}{2}]+\text{Sin}[\frac{c}{2}+\frac{dx}{2}])^3}+$$

$$\frac{\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Sec}[\frac{c}{2}+\frac{dx}{2}]\,(11\,A\,\text{Sin}[\frac{dx}{2}]+16\,C\,\text{Sin}[\frac{dx}{2}])}{64\,d\,(\text{Cos}[\frac{c}{2}]+\text{Sin}[\frac{c}{2}])\,(\text{Cos}[\frac{c}{2}+\frac{dx}{2}]+\text{Sin}[\frac{c}{2}+\frac{dx}{2}])^2}+$$

$$\Big(\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big(-35\,A\,\text{Cos}\Big[\frac{c}{2}\Big]-48\,C\,\text{Cos}\Big[\frac{c}{2}\Big]-13\,A\,\text{Sin}\Big[\frac{c}{2}\Big]-16\,C\,\text{Sin}\Big[\frac{c}{2}\Big]\Big)\Big)\Big/$$

$$\Big(128\,d\,\Big(\text{Cos}\Big[\frac{c}{2}\Big]+\text{Sin}\Big[\frac{c}{2}\Big]\Big)\Big(\text{Cos}\Big[\frac{c}{2}+\frac{dx}{2}\Big]+\text{Sin}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big)\Big)$$

Problem 86: Result unnecessarily involves complex numbers and more than

twice size of optimal antiderivative.

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

Optimal (type 3, 133 leaves, 5 steps):

$$\frac{2 a^{3/2} A \operatorname{ArcTanh}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{d} + \frac{2 a^2 (5 A + 4 C) \operatorname{Sin}[c + d x]}{5 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{2 a C \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{5 d} + \frac{2 C (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{5 d}$$

Result (type 3, 1617 leaves):

$$-\Bigg(\bigg(\Big(\left(\frac{1}{8} - \frac{i}{8}\right) A \left(1 + e^{i c}\right) \Big(\sqrt{2} - (1 - i) e^{\frac{i c}{2}} + (16 - 16 i) e^{\frac{3 i c}{2} + i d x} + (20 + 20 i) \sqrt{2} e^{2 i c + \frac{3 i d x}{2}} - (34 - 34 i) e^{\frac{5 i c}{2} + 2 i d x} - (20 + 20 i) \sqrt{2} e^{3 i c + \frac{5 i d x}{2}} + (16 - 16 i) e^{\frac{7 i c}{2} + 3 i d x} + (4 + 4 i) \sqrt{2} e^{4 i c + \frac{7 i d x}{2}} - (1 - i) e^{\frac{9 i c}{2} + 4 i d x} + 8 i e^{\frac{1}{2} i (c + d x)} - 16 \sqrt{2} e^{i (c + d x)} - 40 i e^{\frac{3}{2} i (c + d x)} + 34 \sqrt{2} e^{2 i (c + d x)} + 40 i e^{\frac{5}{2} i (c + d x)} - 16 \sqrt{2} e^{3 i (c + d x)} - 8 i e^{\frac{7}{2} i (c + d x)} + \sqrt{2} e^{4 i (c + d x)} - (4 + 4 i) \sqrt{2} e^{\frac{1}{2} i (2 c + d x)}\Big)$$

$$\times \left(a (1 + \operatorname{Cos}[c + d x])\right)^{3/2} \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^3\bigg) \Big/ \bigg(\Big(\left(-1 - i\right) + \sqrt{2} e^{\frac{i c}{2}}\Big) \left(-1 + e^{i c}\right) \left(i - 2 \sqrt{2} e^{\frac{1}{2} i (c + d x)} - 4 i e^{i (c + d x)} + 2 \sqrt{2} e^{\frac{3}{2} i (c + d x)} + i e^{2 i (c + d x)}\right)^2\bigg)\Bigg) -$$

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

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

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

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3-$$

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

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

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+$$

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

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

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

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

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

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

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

$$\frac{C\,\text{Cos}\left[\frac{5\,d\,x}{2}\right]\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Sin}\left[\frac{5\,c}{2}\right]}{20\,d}+$$

$$\frac{(A+C)\,\text{Cos}\left[\frac{c}{2}\right]\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Sin}\left[\frac{d\,x}{2}\right]}{d}+$$
$$\frac{C\,\text{Cos}\left[\frac{3\,c}{2}\right]\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]}{4\,d}+$$
$$\frac{C\,\text{Cos}\left[\frac{5\,c}{2}\right]\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Sin}\left[\frac{5\,d\,x}{2}\right]}{20\,d}$$

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

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

Optimal (type 3, 136 leaves, 5 steps):

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

Result (type 3, 1658 leaves):

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

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

$$\frac{1}{4\,\sqrt{2}\,d}$$
3

i

A

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

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

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3-$$

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

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

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3-$$

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

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

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3+$$

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

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

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

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

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

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

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

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

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

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

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

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

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

Optimal (type 3, 147 leaves, 5 steps):

$$\frac{a^{3/2}\,\left(7\,A+8\,C\right)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{4\,d}-\frac{a^2\,\left(5\,A-8\,C\right)\,\mathrm{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+$$

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

Result (type 3, 1028 leaves):

$$\frac{1}{16\sqrt{2}\,d}\,i\,(-7A-8C)\,\text{ArcTan}\Big[\frac{\text{Cos}\big[\frac{c}{4}+\frac{dx}{4}\big]-\text{Sin}\big[\frac{c}{4}+\frac{dx}{4}\big]-\sqrt{2}\,\text{Sin}\big[\frac{c}{4}+\frac{dx}{4}\big]}{-\text{Cos}\big[\frac{c}{4}+\frac{dx}{4}\big]+\sqrt{2}\,\text{Cos}\big[\frac{c}{4}+\frac{dx}{4}\big]-\text{Sin}\big[\frac{c}{4}+\frac{dx}{4}\big]}\Big]$$
$$(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^3+\frac{1}{16\sqrt{2}\,d}\,i\,(-7A-8C)$$
$$\text{ArcTan}\Big[\frac{\text{Cos}\big[\frac{c}{4}+\frac{dx}{4}\big]+\text{Sin}\big[\frac{c}{4}+\frac{dx}{4}\big]-\sqrt{2}\,\text{Sin}\big[\frac{c}{4}+\frac{dx}{4}\big]}{\text{Cos}\big[\frac{c}{4}+\frac{dx}{4}\big]+\sqrt{2}\,\text{Cos}\big[\frac{c}{4}+\frac{dx}{4}\big]-\text{Sin}\big[\frac{c}{4}+\frac{dx}{4}\big]}\Big]\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^3+$$
$$\frac{1}{16\sqrt{2}\,d}(7A+8C)\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Log}\Big[\sqrt{2}+2\,\text{Sin}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big]\,\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^3+\frac{1}{32\sqrt{2}\,d}$$
$$(-7A-8C)\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Log}\Big[2-\sqrt{2}\,\text{Cos}\Big[\frac{c}{2}+\frac{dx}{2}\Big]-\sqrt{2}\,\text{Sin}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big]\,\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^3+$$
$$\frac{1}{32\sqrt{2}\,d}(-7A-8C)\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Log}\Big[2+\sqrt{2}\,\text{Cos}\Big[\frac{c}{2}+\frac{dx}{2}\Big]-\sqrt{2}\,\text{Sin}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big]$$
$$\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^3+\frac{C\,\text{Cos}\big[\frac{dx}{2}\big]\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\big[\frac{c}{2}+\frac{dx}{2}\big]^3\,\text{Sin}\big[\frac{c}{2}\big]}{d}+$$
$$\frac{C\,\text{Cos}\big[\frac{c}{2}\big]\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\big[\frac{c}{2}+\frac{dx}{2}\big]^3\,\text{Sin}\big[\frac{dx}{2}\big]}{d}+$$
$$\frac{A\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\big[\frac{c}{2}+\frac{dx}{2}\big]^3\,\text{Sin}\big[\frac{dx}{2}\big]}{8\,d\,\big(\text{Cos}\big[\frac{c}{2}\big]-\text{Sin}\big[\frac{c}{2}\big]\big)\,\big(\text{Cos}\big[\frac{c}{2}+\frac{dx}{2}\big]-\text{Sin}\big[\frac{c}{2}+\frac{dx}{2}\big]\big)^2}+$$
$$\frac{A\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\big[\frac{c}{2}+\frac{dx}{2}\big]^3\,\big(7\,\text{Cos}\big[\frac{c}{2}\big]-5\,\text{Sin}\big[\frac{c}{2}\big]\big)}{16\,d\,\big(\text{Cos}\big[\frac{c}{2}\big]-\text{Sin}\big[\frac{c}{2}\big]\big)\,\big(\text{Cos}\big[\frac{c}{2}+\frac{dx}{2}\big]-\text{Sin}\big[\frac{c}{2}+\frac{dx}{2}\big]\big)}+$$
$$\frac{A\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\big[\frac{c}{2}+\frac{dx}{2}\big]^3\,\text{Sin}\big[\frac{dx}{2}\big]}{8\,d\,\big(\text{Cos}\big[\frac{c}{2}\big]+\text{Sin}\big[\frac{c}{2}\big]\big)\,\big(\text{Cos}\big[\frac{c}{2}+\frac{dx}{2}\big]+\text{Sin}\big[\frac{c}{2}+\frac{dx}{2}\big]\big)^2}-$$
$$\frac{A\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\big[\frac{c}{2}+\frac{dx}{2}\big]^3\,\big(7\,\text{Cos}\big[\frac{c}{2}\big]+5\,\text{Sin}\big[\frac{c}{2}\big]\big)}{16\,d\,\big(\text{Cos}\big[\frac{c}{2}\big]+\text{Sin}\big[\frac{c}{2}\big]\big)\,\big(\text{Cos}\big[\frac{c}{2}+\frac{dx}{2}\big]+\text{Sin}\big[\frac{c}{2}+\frac{dx}{2}\big]\big)}$$

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

$$\int (a+a\,\text{Cos}[c+dx])^{3/2}\,(A+C\,\text{Cos}[c+dx]^2)\,\text{Sec}[c+dx]^4\,dx$$

Optimal (type 3, 155 leaves, 5 steps):

$$\frac{a^{3/2}\,(11\,A+24\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{8\,d}+\frac{a^2\,(19\,A+24\,C)\,\text{Tan}[c+d\,x]}{24\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a\,A\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{4\,d}+\frac{A\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 1106 leaves):

$$\frac{1}{32\sqrt{2}\,d}\,\mathrm{i}\,(-11\,A-24\,C)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]$$
$$(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+\frac{1}{32\sqrt{2}\,d}\,\mathrm{i}\,(-11\,A-24\,C)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+$$
$$\frac{1}{32\sqrt{2}\,d}\,(11\,A+24\,C)\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+$$
$$\frac{1}{64\sqrt{2}\,d}\,(-11\,A-24\,C)\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+\frac{1}{64\sqrt{2}\,d}\,(-11\,A-24\,C)\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}$$
$$\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+$$
$$\frac{A\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{24\,d\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+\frac{3\,A\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Sin}\left[\frac{d\,x}{2}\right]}{16\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$
$$\left((a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(11\,A\,\text{Cos}\left[\frac{c}{2}\right]+8\,C\,\text{Cos}\left[\frac{c}{2}\right]-5\,A\,\text{Sin}\left[\frac{c}{2}\right]-8\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(32\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\right)-$$
$$\frac{A\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{24\,d\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3}+\frac{3\,A\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Sin}\left[\frac{d\,x}{2}\right]}{16\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$
$$\left((a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(-11\,A\,\text{Cos}\left[\frac{c}{2}\right]-8\,C\,\text{Cos}\left[\frac{c}{2}\right]-5\,A\,\text{Sin}\left[\frac{c}{2}\right]-8\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(32\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\right)$$

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

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

Optimal (type 3, 200 leaves, 6 steps):

$$\frac{a^{3/2}\,(75A+112C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{64d}+\frac{a^2\,(75A+112C)\,\text{Tan}[c+dx]}{64d\sqrt{a+a\,\text{Cos}[c+dx]}}+\frac{a^2\,(13A+16C)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{32d\sqrt{a+a\,\text{Cos}[c+dx]}}+\frac{aA\sqrt{a+a\,\text{Cos}[c+dx]}\,\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]}{8d}+\frac{A\,(a+a\,\text{Cos}[c+dx])^{3/2}\,\text{Sec}[c+dx]^3\,\text{Tan}[c+dx]}{4d}$$

Result (type 3, 1379 leaves):

$$\frac{1}{256\sqrt{2}\,d}\,i\,(-75A-112C)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}\right]$$
$$(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3+\frac{1}{256\sqrt{2}\,d}\,i\,(-75A-112C)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}\right]\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3+$$
$$\frac{1}{256\sqrt{2}\,d}(75A+112C)\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3+$$
$$\frac{1}{512\sqrt{2}\,d}(-75A-112C)\,(a\,(1+\text{Cos}[c+dx]))^{3/2}$$
$$\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3+\frac{1}{512\sqrt{2}\,d}$$
$$(-75A-112C)\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3+\frac{A\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\,\text{Sin}\left[\frac{dx}{2}\right]}{32d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^4}+$$
$$\frac{A\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(5\,\text{Cos}\left[\frac{c}{2}\right]-3\,\text{Sin}\left[\frac{c}{2}\right]\right)}{64d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+$$
$$\frac{(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(19A\,\text{Sin}\left[\frac{dx}{2}\right]+16C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{128d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}+\Bigg((a\,(1+\text{Cos}[c+dx]))^{3/2}$$
$$\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(75A\,\text{Cos}\left[\frac{c}{2}\right]+112C\,\text{Cos}\left[\frac{c}{2}\right]-37A\,\text{Sin}\left[\frac{c}{2}\right]-80C\,\text{Sin}\left[\frac{c}{2}\right]\right)\Bigg)\Bigg/$$
$$\left(256d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\right)+$$
$$\frac{A\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\,\text{Sin}\left[\frac{dx}{2}\right]}{32d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^4}+$$

$$\frac{\left(a\left(1+\mathrm{Cos}[c+d x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(-5\,A\,\mathrm{Cos}\left[\frac{c}{2}\right]-3\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)}{64\,d\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$

$$\frac{\left(a\left(1+\mathrm{Cos}[c+d x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(19\,A\,\mathrm{Sin}\left[\frac{d x}{2}\right]+16\,C\,\mathrm{Sin}\left[\frac{d x}{2}\right]\right)}{128\,d\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$

$$\left(\left(a\left(1+\mathrm{Cos}[c+d x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(-75\,A\,\mathrm{Cos}\left[\frac{c}{2}\right]-112\,C\,\mathrm{Cos}\left[\frac{c}{2}\right]-37\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]-80\,C\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/\left(256\,d\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)$$

Problem 91: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\mathrm{Cos}[c+d x]\right)^{3/2}\left(A+C\,\mathrm{Cos}[c+d x]^2\right)\mathrm{Sec}[c+d x]^6\,dx$$

Optimal (type 3, 245 leaves, 7 steps):

$$\frac{a^{3/2}\left(133\,A+176\,C\right)\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d x]}{\sqrt{a+a\,\mathrm{Cos}[c+d x]}}\right]}{128\,d}+\frac{a^2\left(133\,A+176\,C\right)\mathrm{Tan}[c+d x]}{128\,d\sqrt{a+a\,\mathrm{Cos}[c+d x]}}+\frac{a^2\left(133\,A+176\,C\right)\mathrm{Sec}[c+d x]\,\mathrm{Tan}[c+d x]}{192\,d\sqrt{a+a\,\mathrm{Cos}[c+d x]}}+\frac{a^2\left(67\,A+80\,C\right)\mathrm{Sec}[c+d x]^2\,\mathrm{Tan}[c+d x]}{240\,d\sqrt{a+a\,\mathrm{Cos}[c+d x]}}+\frac{3\,a\,A\sqrt{a+a\,\mathrm{Cos}[c+d x]}\,\mathrm{Sec}[c+d x]^3\,\mathrm{Tan}[c+d x]}{40\,d}+\frac{A\left(a+a\,\mathrm{Cos}[c+d x]\right)^{3/2}\mathrm{Sec}[c+d x]^4\,\mathrm{Tan}[c+d x]}{5\,d}$$

Result (type 3, 1550 leaves):

$$\frac{1}{512\sqrt{2}\,d}\,i\left(-133\,A-176\,C\right)\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\mathrm{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]\left(a\left(1+\mathrm{Cos}[c+d x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3+\frac{1}{512\sqrt{2}\,d}\,i\left(-133\,A-176\,C\right)\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\mathrm{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{\mathrm{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]\left(a\left(1+\mathrm{Cos}[c+d x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3+$$

$$\frac{1}{512\sqrt{2}\,d}\left(133\,A+176\,C\right)\left(a\left(1+\mathrm{Cos}[c+d x]\right)\right)^{3/2}\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3+$$

$$\frac{1}{1024\sqrt{2}\,d}\left(-133\,A-176\,C\right)\left(a\left(1+\mathrm{Cos}[c+d x]\right)\right)^{3/2}$$

$$\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+\frac{1}{1024\,\sqrt{2}\,d}$$

$$(-133\,A-176\,C)\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+\frac{A\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{80\,d\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^5}+$$

$$\frac{3\,A\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Sin}\left[\frac{d\,x}{2}\right]}{64\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^4}+\left(\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(29\,A\,\text{Cos}\left[\frac{c}{2}\right]+16\,C\,\text{Cos}\left[\frac{c}{2}\right]-11\,A\,\text{Sin}\left[\frac{c}{2}\right]-16\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(384\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3\right)+$$

$$\frac{\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(37\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+48\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{256\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$

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

$$\left.\left(133\,A\,\text{Cos}\left[\frac{c}{2}\right]+176\,C\,\text{Cos}\left[\frac{c}{2}\right]-59\,A\,\text{Sin}\left[\frac{c}{2}\right]-80\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(512\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\right)-$$

$$\frac{A\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{80\,d\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^5}+\frac{3\,A\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Sin}\left[\frac{d\,x}{2}\right]}{64\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^4}+$$

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

$$\left.\left(-29\,A\,\text{Cos}\left[\frac{c}{2}\right]-16\,C\,\text{Cos}\left[\frac{c}{2}\right]-11\,A\,\text{Sin}\left[\frac{c}{2}\right]-16\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(384\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3\right)+$$

$$\frac{\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(37\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+48\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{256\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$

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

$$\left.\left(-133\,A\,\text{Cos}\left[\frac{c}{2}\right]-176\,C\,\text{Cos}\left[\frac{c}{2}\right]-59\,A\,\text{Sin}\left[\frac{c}{2}\right]-80\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(512\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\right)$$

Problem 95: Result unnecessarily involves complex numbers and more than

twice size of optimal antiderivative.

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

Optimal (type 3, 170 leaves, 6 steps):

$$\frac{2\,a^{5/2}\,A\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{d} + \frac{2\,a^3\,(49\,A + 32\,C)\,\text{Sin}[c + d\,x]}{21\,d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}} + \frac{2\,a^2\,(7\,A + 8\,C)\,\sqrt{a + a\,\text{Cos}[c + d\,x]}\,\text{Sin}[c + d\,x]}{21\,d} + \frac{2\,a\,C\,(a + a\,\text{Cos}[c + d\,x])^{3/2}\,\text{Sin}[c + d\,x]}{7\,d} + \frac{2\,C\,(a + a\,\text{Cos}[c + d\,x])^{5/2}\,\text{Sin}[c + d\,x]}{7\,d}$$

Result (type 3, 1748 leaves):

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

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

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

$$\frac{1}{8\,\sqrt{2}\,d}\,A\,\left(a\,(1 + \text{Cos}[c + d\,x])\right)^{5/2}$$

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

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5-$$

$$\frac{1}{8\sqrt{2}\,d}A\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}$$

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

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+$$

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

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

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

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

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

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

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

$$\frac{(4A+11C)\,\mathrm{Cos}\left[\frac{3dx}{2}\right]\,(a\,(1+\mathrm{Cos}[c+dx]))^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\mathrm{Sin}\left[\frac{3c}{2}\right]}{48d}+$$
$$\frac{C\,\mathrm{Cos}\left[\frac{5dx}{2}\right]\,(a\,(1+\mathrm{Cos}[c+dx]))^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\mathrm{Sin}\left[\frac{5c}{2}\right]}{16d}+$$
$$\frac{C\,\mathrm{Cos}\left[\frac{7dx}{2}\right]\,(a\,(1+\mathrm{Cos}[c+dx]))^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\mathrm{Sin}\left[\frac{7c}{2}\right]}{112d}+$$
$$\frac{5\,(4A+3C)\,\mathrm{Cos}\left[\frac{c}{2}\right]\,(a\,(1+\mathrm{Cos}[c+dx]))^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\mathrm{Sin}\left[\frac{dx}{2}\right]}{16d}+$$
$$\frac{(4A+11C)\,\mathrm{Cos}\left[\frac{3c}{2}\right]\,(a\,(1+\mathrm{Cos}[c+dx]))^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\mathrm{Sin}\left[\frac{3dx}{2}\right]}{48d}+$$
$$\frac{C\,\mathrm{Cos}\left[\frac{5c}{2}\right]\,(a\,(1+\mathrm{Cos}[c+dx]))^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\mathrm{Sin}\left[\frac{5dx}{2}\right]}{16d}+$$
$$\frac{C\,\mathrm{Cos}\left[\frac{7c}{2}\right]\,(a\,(1+\mathrm{Cos}[c+dx]))^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\mathrm{Sin}\left[\frac{7dx}{2}\right]}{112d}$$

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

$$\int (a+a\,\mathrm{Cos}[c+dx])^{5/2}\,\left(A+C\,\mathrm{Cos}[c+dx]^2\right)\,\mathrm{Sec}[c+dx]^2\,dx$$

Optimal (type 3, 173 leaves, 6 steps):

$$\frac{5\,a^{5/2}\,A\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+dx]}{\sqrt{a+a\,\mathrm{Cos}[c+dx]}}\right]}{d}+\frac{a^3\,(15A+64C)\,\mathrm{Sin}[c+dx]}{15d\,\sqrt{a+a\,\mathrm{Cos}[c+dx]}}-$$
$$\frac{a^2\,(15A-16C)\,\sqrt{a+a\,\mathrm{Cos}[c+dx]}\,\mathrm{Sin}[c+dx]}{15d}-$$
$$\frac{a\,(5A-2C)\,(a+a\,\mathrm{Cos}[c+dx])^{3/2}\,\mathrm{Sin}[c+dx]}{5d}+\frac{A\,(a+a\,\mathrm{Cos}[c+dx])^{5/2}\,\mathrm{Tan}[c+dx]}{d}$$

Result (type 3, 1770 leaves):

$$-\Bigg(\Bigg(\Bigg(\left(\frac{5}{32}-\frac{5\,i}{32}\right)A\,\left(1+e^{i c}\right)$$
$$\Big(\sqrt{2}-(1-i)\,e^{\frac{i c}{2}}+(16-16\,i)\,e^{\frac{3 i c}{2}+i d x}+(20+20\,i)\,\sqrt{2}\,e^{2 i c+\frac{3 i d x}{2}}-(34-34\,i)\,e^{\frac{5 i c}{2}+2 i d x}-$$
$$(20+20\,i)\,\sqrt{2}\,e^{3 i c+\frac{5 i d x}{2}}+(16-16\,i)\,e^{\frac{7 i c}{2}+3 i d x}+(4+4\,i)\,\sqrt{2}\,e^{4 i c+\frac{7 i d x}{2}}-$$
$$(1-i)\,e^{\frac{9 i c}{2}+4 i d x}+8\,i\,e^{\frac{1}{2} i (c+d x)}-16\,\sqrt{2}\,e^{i (c+d x)}-40\,i\,e^{\frac{3}{2} i (c+d x)}+34\,\sqrt{2}\,e^{2 i (c+d x)}+$$
$$40\,i\,e^{\frac{5}{2} i (c+d x)}-16\,\sqrt{2}\,e^{3 i (c+d x)}-8\,i\,e^{\frac{7}{2} i (c+d x)}+\sqrt{2}\,e^{4 i (c+d x)}-(4+4\,i)\,\sqrt{2}\,e^{\frac{1}{2} i (2 c+d x)}\Big)$$
$$\mathrm{x}\,\left(a\,(1+\mathrm{Cos}[c+dx])\right)^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\Bigg)\Bigg/\left(\left(\left(-1-i\right)+\sqrt{2}\,e^{\frac{i c}{2}}\right)\,\left(-1+e^{i c}\right)\right.$$

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

$$\frac{1}{8\sqrt{2}\ d}5\,\mathrm{i}\,A\,\mathrm{ArcTan}\Big[\frac{\mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]-\mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]-\sqrt{2}\ \mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]}{-\mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]+\sqrt{2}\ \mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]-\mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]}\Big]$$

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

$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5-$$

$$\frac{1}{8\sqrt{2}\ d}$$

$$5$$

$$\mathrm{i}$$

$$A$$

$$\mathrm{ArcTan}\Big[\frac{\mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]+\mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]-\sqrt{2}\ \mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]}{\mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]+\sqrt{2}\ \mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]-\mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]}\Big]$$

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

$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5-$$

$$\frac{1}{16\sqrt{2}\ d}5\,A\,\left(a\,\left(1+\mathrm{Cos}\,[c+d\,x]\right)\right)^{5/2}$$

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

$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5-$$

$$\frac{1}{16\sqrt{2}\ d}5\,A\,\left(a\,\left(1+\mathrm{Cos}\,[c+d\,x]\right)\right)^{5/2}$$

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

$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5+$$

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

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

$$\left.\mathrm{Cot}\Big[\frac{c}{2}\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5\right)\Big/\left(4\,d\,\sqrt{-2+4\,\mathrm{Cos}\Big[\frac{c}{2}\Big]^2+4\,\mathrm{Sin}\Big[\frac{c}{2}\Big]^2}\right)+$$

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

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

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

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

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

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

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

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

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

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

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

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

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

Optimal (type 3, 184 leaves, 6 steps):

$$\frac{a^{5/2}\,(19\,A + 8\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,d} - \frac{a^3\,(27\,A - 56\,C)\,\text{Sin}[c + d\,x]}{12\,d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}} - \frac{a^2\,(21\,A - 8\,C)\,\sqrt{a + a\,\text{Cos}[c + d\,x]}\,\text{Sin}[c + d\,x]}{12\,d} + \frac{5\,a\,A\,(a + a\,\text{Cos}[c + d\,x])^{3/2}\,\text{Tan}[c + d\,x]}{4\,d} + \frac{A\,(a + a\,\text{Cos}[c + d\,x])^{5/2}\,\text{Sec}[c + d\,x]\,\text{Tan}[c + d\,x]}{2\,d}$$

Result (type 3, 1134 leaves):

$$\frac{1}{32\sqrt{2}\,d}\,i\,(-19A-8C)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}\right]$$

$$(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5+\frac{1}{32\sqrt{2}\,d}\,i\,(-19A-8C)$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}\right]\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5+$$

$$\frac{1}{32\sqrt{2}\,d}(19A+8C)\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5+\frac{1}{64\sqrt{2}\,d}$$

$$(-19A-8C)\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5+$$

$$\frac{1}{64\sqrt{2}\,d}(-19A-8C)\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]$$

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

$$\frac{C\,\text{Cos}\left[\frac{3dx}{2}\right]\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\text{Sin}\left[\frac{3c}{2}\right]}{12\,d}+$$

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

$$\frac{C\,\text{Cos}\left[\frac{3c}{2}\right]\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\text{Sin}\left[\frac{3dx}{2}\right]}{12\,d}+$$

$$\frac{A\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\text{Sin}\left[\frac{dx}{2}\right]}{16\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}+$$

$$\frac{A\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\left(11\,\text{Cos}\left[\frac{c}{2}\right]-9\,\text{Sin}\left[\frac{c}{2}\right]\right)}{32\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}+$$

$$\frac{A\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\text{Sin}\left[\frac{dx}{2}\right]}{16\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}-$$

$$\frac{A\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\left(11\,\text{Cos}\left[\frac{c}{2}\right]+9\,\text{Sin}\left[\frac{c}{2}\right]\right)}{32\,d\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}$$

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

$$\int (a+a\,\text{Cos}[c+dx])^{5/2}\,\left(A+C\,\text{Cos}[c+dx]^2\right)\,\text{Sec}[c+dx]^4\,dx$$

Optimal (type 3, 192 leaves, 6 steps):

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

$$\frac{a^3\,(49\,A-24\,C)\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a^2\,(31\,A+24\,C)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\,\text{Tan}[c+d\,x]}{24\,d}+$$

$$\frac{5\,a\,A\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]\,\,\text{Tan}[c+d\,x]}{12\,d}+$$

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

Result (type 3, 1206 leaves) :

$$-\frac{1}{64\sqrt{2}\,d}5\,i\,(5A+8C)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}\right]$$

$$(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5-\frac{1}{64\sqrt{2}\,d}5\,i\,(5A+8C)$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}\right]\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5+$$

$$\frac{1}{64\sqrt{2}\,d}5\,(5A+8C)\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5-$$

$$\frac{1}{128\sqrt{2}\,d}5\,(5A+8C)\,(a\,(1+\text{Cos}[c+dx]))^{5/2}$$

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

$$5\,(5A+8C)\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5+$$

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

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

$$\frac{A\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5}{48d\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+\frac{5A\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\text{Sin}\left[\frac{dx}{2}\right]}{32d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}+$$

$$\left((a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(25A\,\text{Cos}\left[\frac{c}{2}\right]+8C\,\text{Cos}\left[\frac{c}{2}\right]-15A\,\text{Sin}\left[\frac{c}{2}\right]-8C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(64d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\right)-$$

$$\frac{A\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5}{48d\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+\frac{5A\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\text{Sin}\left[\frac{dx}{2}\right]}{32d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}+$$

$$\left((a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(-25A\,\text{Cos}\left[\frac{c}{2}\right]-8C\,\text{Cos}\left[\frac{c}{2}\right]-15A\,\text{Sin}\left[\frac{c}{2}\right]-8C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(64d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\right)$$

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

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

Optimal (type 3, 200 leaves, 6 steps):

$$\frac{a^{5/2}\left(163 A+304 C\right) \text{ArcTanh}\left[\frac{\sqrt{a}\, \text{Sin}[c+d x]}{\sqrt{a+a \text{Cos}[c+d x]}}\right]}{64 d}+\frac{a^3\left(299 A+432 C\right) \text{Tan}[c+d x]}{192 d \sqrt{a+a \text{Cos}[c+d x]}}+$$

$$\frac{a^2\left(17 A+16 C\right) \sqrt{a+a \text{Cos}[c+d x]}\, \text{Sec}[c+d x]\, \text{Tan}[c+d x]}{32 d}+$$

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

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

Result (type 3, 1379 leaves):

$$\frac{1}{512 \sqrt{2}\, d} i \left(-163 A-304 C\right) \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\, \text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\, \text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]$$

$$\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5+\frac{1}{512 \sqrt{2}\, d} i \left(-163 A-304 C\right)$$

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

$$\frac{1}{512 \sqrt{2}\, d}\left(163 A+304 C\right) \left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Log}\left[\sqrt{2}+2 \text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5+$$

$$\frac{1}{1024 \sqrt{2}\, d}\left(-163 A-304 C\right) \left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}$$

$$\text{Log}\left[2-\sqrt{2}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\, \text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5+\frac{1}{1024 \sqrt{2}\, d}$$

$$\left(-163 A-304 C\right) \left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Log}\left[2+\sqrt{2}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\, \text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5+\frac{A\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \text{Sin}\left[\frac{d x}{2}\right]}{64 d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^4}+$$

$$\frac{A\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(23 \text{Cos}\left[\frac{c}{2}\right]-17 \text{Sin}\left[\frac{c}{2}\right]\right)}{384 d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$

$$\frac{\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(43 A \text{Sin}\left[\frac{d x}{2}\right]+16 C \text{Sin}\left[\frac{d x}{2}\right]\right)}{256 d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+\left(\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(163 A \text{Cos}\left[\frac{c}{2}\right]+176 C \text{Cos}\left[\frac{c}{2}\right]-77 A \text{Sin}\left[\frac{c}{2}\right]-144 C \text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(512 d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)+$$

$$\frac{A\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \text{Sin}\left[\frac{d x}{2}\right]}{64 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^4}+$$

$$\frac{\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(-23 A\operatorname{Cos}\left[\frac{c}{2}\right]-17 A\operatorname{Sin}\left[\frac{c}{2}\right]\right)}{384 d\left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$

$$\frac{\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(43 A\operatorname{Sin}\left[\frac{d x}{2}\right]+16 C\operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{256 d\left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$

$$\left(\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(-163 A\operatorname{Cos}\left[\frac{c}{2}\right]-176 C\operatorname{Cos}\left[\frac{c}{2}\right]-77 A\operatorname{Sin}\left[\frac{c}{2}\right]-144 C\operatorname{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/\left(512 d\left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)$$

Problem 100: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 245 leaves, 7 steps):

$$\frac{a^{5/2}\left(283 A+400 C\right)\operatorname{ArcTanh}\left[\frac{\sqrt{a}\operatorname{Sin}[c+d x]}{\sqrt{a+a\operatorname{Cos}[c+d x]}}\right]}{128 d}+\frac{a^3\left(283 A+400 C\right)\operatorname{Tan}[c+d x]}{128 d\sqrt{a+a\operatorname{Cos}[c+d x]}}+\frac{a^3\left(787 A+1040 C\right)\operatorname{Sec}[c+d x]\operatorname{Tan}[c+d x]}{960 d\sqrt{a+a\operatorname{Cos}[c+d x]}}+$$

$$\frac{a^2\left(79 A+80 C\right)\sqrt{a+a\operatorname{Cos}[c+d x]}\operatorname{Sec}[c+d x]^2\operatorname{Tan}[c+d x]}{240 d}+\frac{a A\left(a+a\operatorname{Cos}[c+d x]\right)^{3/2}\operatorname{Sec}[c+d x]^3\operatorname{Tan}[c+d x]}{8 d}+$$

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

Result (type 3, 1550 leaves):

$$\frac{1}{1024\sqrt{2}\,d}\,i\left(-283 A-400 C\right)\operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]$$

$$\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5+\frac{1}{1024\sqrt{2}\,d}\,i\left(-283 A-400 C\right)$$

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

$$\frac{1}{1024\sqrt{2}\,d}\left(283 A+400 C\right)\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2}\operatorname{Log}\left[\sqrt{2}+2\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5+$$

$$\frac{1}{2048\sqrt{2}\,d}(-283A-400C)\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+\frac{1}{2048\sqrt{2}\,d}$$
$$(-283A-400C)\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+\frac{A\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5}{160\,d\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^5}+$$
$$\frac{5A\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\text{Sin}\left[\frac{dx}{2}\right]}{128\,d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^4}+\Bigg((a\,(1+\text{Cos}[c+d\,x]))^{5/2}$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(59\,A\,\text{Cos}\left[\frac{c}{2}\right]+16\,C\,\text{Cos}\left[\frac{c}{2}\right]-29\,A\,\text{Sin}\left[\frac{c}{2}\right]-16\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\Bigg)\Bigg/$$
$$\left(768\,d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3\right)+$$
$$\left(5\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(15\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+16\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Bigg/$$
$$\left(512\,d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2\right)+\Bigg((a\,(1+\text{Cos}[c+d\,x]))^{5/2}$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(283\,A\,\text{Cos}\left[\frac{c}{2}\right]+400\,C\,\text{Cos}\left[\frac{c}{2}\right]-133\,A\,\text{Sin}\left[\frac{c}{2}\right]-240\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\Bigg)\Bigg/$$
$$\left(1024\,d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\right)-$$
$$\frac{A\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5}{160\,d\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^5}+\frac{5A\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\,\text{Sin}\left[\frac{dx}{2}\right]}{128\,d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^4}+$$
$$\Bigg((a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5$$
$$\left(-59\,A\,\text{Cos}\left[\frac{c}{2}\right]-16\,C\,\text{Cos}\left[\frac{c}{2}\right]-29\,A\,\text{Sin}\left[\frac{c}{2}\right]-16\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\Bigg)\Bigg/$$
$$\left(768\,d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3\right)+$$
$$\left(5\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(15\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+16\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Bigg/$$
$$\left(512\,d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2\right)+\Bigg((a\,(1+\text{Cos}[c+d\,x]))^{5/2}$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(-283\,A\,\text{Cos}\left[\frac{c}{2}\right]-400\,C\,\text{Cos}\left[\frac{c}{2}\right]-133\,A\,\text{Sin}\left[\frac{c}{2}\right]-240\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\Bigg)\Bigg/$$
$$\left(1024\,d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\right)$$

Problem 101: Result unnecessarily involves complex numbers and more than

twice size of optimal antiderivative.

$$\int (a + a \operatorname{Cos}[c + d x])^{5/2} \left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^7 \, dx$$

Optimal (type 3, 290 leaves, 8 steps):

$$\frac{a^{5/2} (1015 A + 1304 C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{512 d} + \frac{a^3 (1015 A + 1304 C) \operatorname{Tan}[c + d x]}{512 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{a^3 (1015 A + 1304 C) \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{768 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{a^3 (109 A + 136 C) \operatorname{Sec}[c + d x]^2 \operatorname{Tan}[c + d x]}{192 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{a^2 (23 A + 24 C) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sec}[c + d x]^3 \operatorname{Tan}[c + d x]}{96 d} + \frac{a A (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sec}[c + d x]^4 \operatorname{Tan}[c + d x]}{12 d} + \frac{A (a + a \operatorname{Cos}[c + d x])^{5/2} \operatorname{Sec}[c + d x]^5 \operatorname{Tan}[c + d x]}{6 d}$$

Result (type 3, 791 leaves):

$$\frac{1}{4096\sqrt{2}\,d}\,\mathrm{i}\,(-1015\,A-1304\,C)\,\mathrm{ArcTan}\Big[\frac{\mathrm{Cos}[\frac{c}{4}+\frac{d\,x}{4}]-\mathrm{Sin}[\frac{c}{4}+\frac{d\,x}{4}]-\sqrt{2}\,\mathrm{Sin}[\frac{c}{4}+\frac{d\,x}{4}]}{-\mathrm{Cos}[\frac{c}{4}+\frac{d\,x}{4}]+\sqrt{2}\,\mathrm{Cos}[\frac{c}{4}+\frac{d\,x}{4}]-\mathrm{Sin}[\frac{c}{4}+\frac{d\,x}{4}]}\Big]$$
$$(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5+\frac{1}{4096\sqrt{2}\,d}\,\mathrm{i}\,(-1015\,A-1304\,C)$$
$$\mathrm{ArcTan}\Big[\frac{\mathrm{Cos}[\frac{c}{4}+\frac{d\,x}{4}]+\mathrm{Sin}[\frac{c}{4}+\frac{d\,x}{4}]-\sqrt{2}\,\mathrm{Sin}[\frac{c}{4}+\frac{d\,x}{4}]}{\mathrm{Cos}[\frac{c}{4}+\frac{d\,x}{4}]+\sqrt{2}\,\mathrm{Cos}[\frac{c}{4}+\frac{d\,x}{4}]-\mathrm{Sin}[\frac{c}{4}+\frac{d\,x}{4}]}\Big]\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5+$$
$$\frac{1}{4096\sqrt{2}\,d}(1015\,A+1304\,C)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Log}\Big[\sqrt{2}+2\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5+$$
$$\frac{1}{8192\sqrt{2}\,d}(-1015\,A-1304\,C)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}$$
$$\mathrm{Log}\Big[2-\sqrt{2}\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]-\sqrt{2}\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5+\frac{1}{8192\sqrt{2}\,d}$$
$$(-1015\,A-1304\,C)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Log}\Big[2+\sqrt{2}\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]-\sqrt{2}\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big]$$
$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5+\frac{1}{196\,608\,d}\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5\,\mathrm{Sec}[c+d\,x]^6$$
$$\Big(-9450\,A\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]-19\,344\,C\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]+36\,898\,A\,\mathrm{Sin}\Big[\frac{3\,c}{2}+\frac{3\,d\,x}{2}\Big]+$$
$$32\,848\,C\,\mathrm{Sin}\Big[\frac{3\,c}{2}+\frac{3\,d\,x}{2}\Big]+5655\,A\,\mathrm{Sin}\Big[\frac{5\,c}{2}+\frac{5\,d\,x}{2}\Big]-1512\,C\,\mathrm{Sin}\Big[\frac{5\,c}{2}+\frac{5\,d\,x}{2}\Big]+$$
$$17\,661\,A\,\mathrm{Sin}\Big[\frac{7\,c}{2}+\frac{7\,d\,x}{2}\Big]+20\,232\,C\,\mathrm{Sin}\Big[\frac{7\,c}{2}+\frac{7\,d\,x}{2}\Big]+1015\,A\,\mathrm{Sin}\Big[\frac{9\,c}{2}+\frac{9\,d\,x}{2}\Big]+$$
$$1304\,C\,\mathrm{Sin}\Big[\frac{9\,c}{2}+\frac{9\,d\,x}{2}\Big]+3045\,A\,\mathrm{Sin}\Big[\frac{11\,c}{2}+\frac{11\,d\,x}{2}\Big]+3912\,C\,\mathrm{Sin}\Big[\frac{11\,c}{2}+\frac{11\,d\,x}{2}\Big]\Big)$$

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

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

Optimal (type 3, 115 leaves, 6 steps):

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

Result (type 3, 2199 leaves):

$$-\Big(\Big(\Big((1-\mathrm{i})\,A\,(1+e^{\mathrm{i}\,c})$$
$$\Big(\sqrt{2}-(1-\mathrm{i})\,e^{\frac{\mathrm{i}\,c}{2}}+(16-16\,\mathrm{i})\,e^{\frac{3\,\mathrm{i}\,c}{2}+\mathrm{i}\,d\,x}+(20+20\,\mathrm{i})\,\sqrt{2}\,e^{2\,\mathrm{i}\,c+\frac{3\,\mathrm{i}\,d\,x}{2}}-(34-34\,\mathrm{i})\,e^{\frac{5\,\mathrm{i}\,c}{2}+2\,\mathrm{i}\,d\,x}-$$
$$(20+20\,\mathrm{i})\,\sqrt{2}\,e^{3\,\mathrm{i}\,c+\frac{5\,\mathrm{i}\,d\,x}{2}}+(16-16\,\mathrm{i})\,e^{\frac{7\,\mathrm{i}\,c}{2}+3\,\mathrm{i}\,d\,x}+(4+4\,\mathrm{i})\,\sqrt{2}\,e^{4\,\mathrm{i}\,c+\frac{7\,\mathrm{i}\,d\,x}{2}}-$$

$$\left((1-i)\, e^{\frac{9 i c}{2}+4 i d x}+8 i\, e^{\frac{1}{2} i (c+d x)}-16\sqrt{2}\, e^{i (c+d x)}-40 i\, e^{\frac{3}{2} i (c+d x)}+34\sqrt{2}\, e^{2 i (c+d x)}+40 i\, e^{\frac{5}{2} i (c+d x)}-16\sqrt{2}\, e^{3 i (c+d x)}-8 i\, e^{\frac{7}{2} i (c+d x)}+\sqrt{2}\, e^{4 i (c+d x)}-(4+4 i)\sqrt{2}\, e^{\frac{1}{2} i (2 c+d x)}\right)$$

$$x \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Cos}[c+d x] \left(C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)\Bigg)\Bigg/\Bigg(\left(\left((-1-i)+\sqrt{2}\, e^{\frac{i c}{2}}\right)\left(-1+e^{i c}\right)\left(i-2\sqrt{2}\, e^{\frac{1}{2} i (c+d x)}-4 i\, e^{i (c+d x)}+2\sqrt{2}\, e^{\frac{3}{2} i (c+d x)}+i\, e^{2 i (c+d x)}\right)^2\right.$$

$$\left.\sqrt{a\,(1+\operatorname{Cos}[c+d x])}\,\left(2 A+C+C \operatorname{Cos}[2 c+2 d x]\right)\right)\Bigg)-$$

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

$$\left.\operatorname{Cos}[c+d x] \left(C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)\right)\Big/$$

$$\left(d \sqrt{a\,(1+\operatorname{Cos}[c+d x])}\,\left(2 A+C+C \operatorname{Cos}[2 c+2 d x]\right)\right)+$$

$$\left(4 (A+C) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Cos}[c+d x] \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right]\right.$$

$$\left.\left(C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)\right)\Big/$$

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

$$\left(4 (A+C) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Cos}[c+d x] \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right]\right.$$

$$\left.\left(C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)\right)\Big/$$

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

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

$$\left.\left(C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)\right)\Big/$$

$$\left(d \sqrt{a\,(1+\operatorname{Cos}[c+d x])}\,\left(2 A+C+C \operatorname{Cos}[2 c+2 d x]\right)\right)+$$

$$\left(8 C \operatorname{Cos}\left[\frac{d x}{2}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Cos}[c+d x] \left(C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right) \operatorname{Sin}\left[\frac{c}{2}\right]\right)\Big/$$

$$\left(d \sqrt{a\,(1+\operatorname{Cos}[c+d x])}\,\left(2 A+C+C \operatorname{Cos}[2 c+2 d x]\right)\right)+$$

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

$$\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Cos}[c+d x] \left(C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)$$

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

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

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

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

$$\left(8\,i\,A\,\text{ArcTan}\left[\frac{2\,i\,\text{Cos}\left[\frac{c}{2}\right]-i\left(-\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}\right]\right)\text{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right]\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right.$$
$$\left.\text{Cos}[c+d\,x]\,\text{Cot}\left[\frac{c}{2}\right]\,(C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x])\right)\Big/$$
$$\left(d\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x])\,\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}\right)+$$

$$\left(4\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,(C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x])\right.$$
$$\left(-d\,x\,\text{Cos}\left[\frac{c}{2}\right]+2\,\text{Log}\left[\sqrt{2}+2\,\text{Cos}\left[\frac{d\,x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]+2\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]\right]\text{Sin}\left[\frac{c}{2}\right]+\right.$$
$$\left.\left.\frac{4\,i\sqrt{2}\,\text{ArcTan}\left[\frac{2\,i\,\text{Cos}\left[\frac{c}{2}\right]-i\left(-\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}\right]\right)\text{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right]\text{Cos}\left[\frac{c}{2}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right)\right)\Big/$$
$$\left(d\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x])\,\left(4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2\right)\right)+$$
$$\left(8\,C\,\text{Cos}\left[\frac{c}{2}\right]\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Cos}[c+d\,x]\,(C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x])\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\Big/$$

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

Problem 107: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 113 leaves, 6 steps):

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

Result (type 3, 1968 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Problem 108: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 159 leaves, 7 steps):

$$\frac{(7\,A+8\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,\sqrt{a}\,d}-\frac{\sqrt{2}\,(A+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{\sqrt{a}\,d}-$$
$$\frac{A\,\text{Tan}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 1608 leaves):

$$\left(4\,(A+C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\sqrt{a\left(1+\text{Cos}[c+d\,x]\right)}\;\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)-$$
$$\left(4\,(A+C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\sqrt{a\left(1+\text{Cos}[c+d\,x]\right)}\;\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\left((7\,A+8\,C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Cos}[c+d\,x]^2\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(2\,\sqrt{2}\,d\sqrt{a\left(1+\text{Cos}[c+d\,x]\right)}\;\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\left(i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Cos}[c+d\,x]^2\right.$$
$$\left.\left(C+A\,\text{Sec}[c+d\,x]^2\right)\left(7\,\sqrt{2}\,A+8\,\sqrt{2}\,C-14\,A\,\text{Sin}\left[\frac{c}{2}\right]-16\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(4\,d\sqrt{a\left(1+\text{Cos}[c+d\,x]\right)}\;\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)+$$

$$\left(i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Cos}[c+d x]^2\right.$$
$$\left.\left(C+A\,\text{Sec}[c+d x]^2\right)\left(7\sqrt{2}\,A+8\sqrt{2}\,C-14\,A\,\text{Sin}\left[\frac{c}{2}\right]-16\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(4\,d\sqrt{a\left(1+\text{Cos}[c+d x]\right)}\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d x]\right)\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Cos}[c+d x]^2\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\right.$$
$$\left.\left(C+A\,\text{Sec}[c+d x]^2\right)\left(7\sqrt{2}\,A+8\sqrt{2}\,C-14\,A\,\text{Sin}\left[\frac{c}{2}\right]-16\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(8\,d\sqrt{a\left(1+\text{Cos}[c+d x]\right)}\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d x]\right)\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Cos}[c+d x]^2\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\right.$$
$$\left.\left(C+A\,\text{Sec}[c+d x]^2\right)\left(7\sqrt{2}\,A+8\sqrt{2}\,C-14\,A\,\text{Sin}\left[\frac{c}{2}\right]-16\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(8\,d\sqrt{a\left(1+\text{Cos}[c+d x]\right)}\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d x]\right)\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)+$$
$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Cos}[c+d x]^2\left(C+A\,\text{Sec}[c+d x]^2\right)\text{Sin}\left[\frac{d x}{2}\right]\right)\Big/\left(d\sqrt{a\left(1+\text{Cos}[c+d x]\right)}\right.$$
$$\left.\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d x]\right)\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2\right)-$$
$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Cos}[c+d x]^2\left(C+A\,\text{Sec}[c+d x]^2\right)\left(\text{Cos}\left[\frac{c}{2}\right]-3\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(2\,d\sqrt{a\left(1+\text{Cos}[c+d x]\right)}\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d x]\right)\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)+$$
$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Cos}[c+d x]^2\left(C+A\,\text{Sec}[c+d x]^2\right)\text{Sin}\left[\frac{d x}{2}\right]\right)\Big/\left(d\sqrt{a\left(1+\text{Cos}[c+d x]\right)}\right.$$
$$\left.\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d x]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2\right)+$$
$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Cos}[c+d x]^2\left(C+A\,\text{Sec}[c+d x]^2\right)\left(\text{Cos}\left[\frac{c}{2}\right]+3\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(2\,d\sqrt{a\left(1+\text{Cos}[c+d x]\right)}\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d x]\right)\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)$$

Problem 109: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 200 leaves, 8 steps):

$$-\frac{(9 A+8 C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{8 \sqrt{a} d}+\frac{\sqrt{2} (A+C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{\sqrt{a} d}+\frac{(7 A+8 C) \operatorname{Tan}[c+d x]}{8 d \sqrt{a+a \operatorname{Cos}[c+d x]}}-\frac{A \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{12 d \sqrt{a+a \operatorname{Cos}[c+d x]}}+\frac{A \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 d \sqrt{a+a \operatorname{Cos}[c+d x]}}$$

Result (type 3, 1212 leaves):

$$\frac{i\,(9A+8C)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]}{8\sqrt{2}\,d\sqrt{a\,(1+\text{Cos}[c+dx])}}+$$

$$\frac{i\,(9A+8C)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]}{8\sqrt{2}\,d\sqrt{a\,(1+\text{Cos}[c+dx])}}-$$

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

$$\frac{2\,(A+C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]\right]}{d\sqrt{a\,(1+\text{Cos}[c+dx])}}+$$

$$\frac{(-9A-8C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]}{8\sqrt{2}\,d\sqrt{a\,(1+\text{Cos}[c+dx])}}+$$

$$\frac{(9A+8C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]}{16\sqrt{2}\,d\sqrt{a\,(1+\text{Cos}[c+dx])}}+$$

$$\frac{(9A+8C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]}{16\sqrt{2}\,d\sqrt{a\,(1+\text{Cos}[c+dx])}}+$$

$$\frac{A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]}{6\,d\sqrt{a\,(1+\text{Cos}[c+dx])}\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}-\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]\right)\Big/$$
$$\left(4\,d\sqrt{a\,(1+\text{Cos}[c+dx])}\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(7A\,\text{Cos}\left[\frac{c}{2}\right]+8C\,\text{Cos}\left[\frac{c}{2}\right]-9A\,\text{Sin}\left[\frac{c}{2}\right]-8C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(8\,d\sqrt{a\,(1+\text{Cos}[c+dx])}\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\right)-$$
$$\frac{A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]}{6\,d\sqrt{a\,(1+\text{Cos}[c+dx])}\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}-\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]\right)\Big/$$
$$\left(4\,d\sqrt{a\,(1+\text{Cos}[c+dx])}\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(-7A\,\text{Cos}\left[\frac{c}{2}\right]-8C\,\text{Cos}\left[\frac{c}{2}\right]-9A\,\text{Sin}\left[\frac{c}{2}\right]-8C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(8\,d\sqrt{a\,(1+\text{Cos}[c+dx])}\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\right)$$

Problem 110: Result unnecessarily involves complex numbers and more than

twice size of optimal antiderivative.

$$\int \frac{\left(A + C \cos[c + d x]^2\right) \sec[c + d x]^5}{\sqrt{a + a \cos[c + d x]}} \, dx$$

Optimal (type 3, 243 leaves, 9 steps):

$$\frac{(107 A + 112 C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sin[c+d x]}{\sqrt{a+a \cos[c+d x]}}\right]}{64 \sqrt{a} d} - \frac{\sqrt{2} (A + C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sin[c+d x]}{\sqrt{2} \sqrt{a+a \cos[c+d x]}}\right]}{\sqrt{a} d} - \frac{(21 A + 16 C) \tan[c + d x]}{64 d \sqrt{a + a \cos[c + d x]}} + \frac{(43 A + 48 C) \sec[c + d x] \tan[c + d x]}{96 d \sqrt{a + a \cos[c + d x]}} - \frac{A \sec[c + d x]^2 \tan[c + d x]}{24 d \sqrt{a + a \cos[c + d x]}} + \frac{A \sec[c + d x]^3 \tan[c + d x]}{4 d \sqrt{a + a \cos[c + d x]}}$$

Result (type 3, 1479 leaves):

$$\left(i (-107 A - 112 C) \operatorname{ArcTan}\left[\frac{\cos\left[\frac{c}{4} + \frac{d x}{4}\right] - \sin\left[\frac{c}{4} + \frac{d x}{4}\right] - \sqrt{2} \sin\left[\frac{c}{4} + \frac{d x}{4}\right]}{-\cos\left[\frac{c}{4} + \frac{d x}{4}\right] + \sqrt{2} \cos\left[\frac{c}{4} + \frac{d x}{4}\right] - \sin\left[\frac{c}{4} + \frac{d x}{4}\right]}\right] \cos\left[\frac{c}{2} + \frac{d x}{2}\right]\right) \Big/ \left(64 \sqrt{2} d \sqrt{a (1 + \cos[c + d x])}\right) +$$
$$\left(i (-107 A - 112 C) \operatorname{ArcTan}\left[\frac{\cos\left[\frac{c}{4} + \frac{d x}{4}\right] + \sin\left[\frac{c}{4} + \frac{d x}{4}\right] - \sqrt{2} \sin\left[\frac{c}{4} + \frac{d x}{4}\right]}{\cos\left[\frac{c}{4} + \frac{d x}{4}\right] + \sqrt{2} \cos\left[\frac{c}{4} + \frac{d x}{4}\right] - \sin\left[\frac{c}{4} + \frac{d x}{4}\right]}\right] \cos\left[\frac{c}{2} + \frac{d x}{2}\right]\right) \Big/$$
$$\left(64 \sqrt{2} d \sqrt{a (1 + \cos[c + d x])}\right) + \frac{2 (A + C) \cos\left[\frac{c}{2} + \frac{d x}{2}\right] \operatorname{Log}\left[\cos\left[\frac{c}{4} + \frac{d x}{4}\right] - \sin\left[\frac{c}{4} + \frac{d x}{4}\right]\right]}{d \sqrt{a (1 + \cos[c + d x])}} -$$
$$\frac{2 (A + C) \cos\left[\frac{c}{2} + \frac{d x}{2}\right] \operatorname{Log}\left[\cos\left[\frac{c}{4} + \frac{d x}{4}\right] + \sin\left[\frac{c}{4} + \frac{d x}{4}\right]\right]}{d \sqrt{a (1 + \cos[c + d x])}} +$$
$$\frac{(107 A + 112 C) \cos\left[\frac{c}{2} + \frac{d x}{2}\right] \operatorname{Log}\left[\sqrt{2} + 2 \sin\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{64 \sqrt{2} d \sqrt{a (1 + \cos[c + d x])}} +$$
$$\left((-107 A - 112 C) \cos\left[\frac{c}{2} + \frac{d x}{2}\right] \operatorname{Log}\left[2 - \sqrt{2} \cos\left[\frac{c}{2} + \frac{d x}{2}\right] - \sqrt{2} \sin\left[\frac{c}{2} + \frac{d x}{2}\right]\right]\right) \Big/$$
$$\left(128 \sqrt{2} d \sqrt{a (1 + \cos[c + d x])}\right) +$$
$$\left((-107 A - 112 C) \cos\left[\frac{c}{2} + \frac{d x}{2}\right] \operatorname{Log}\left[2 + \sqrt{2} \cos\left[\frac{c}{2} + \frac{d x}{2}\right] - \sqrt{2} \sin\left[\frac{c}{2} + \frac{d x}{2}\right]\right]\right) \Big/$$
$$\left(128 \sqrt{2} d \sqrt{a (1 + \cos[c + d x])}\right) + \left(A \cos\left[\frac{c}{2} + \frac{d x}{2}\right] \sin\left[\frac{d x}{2}\right]\right) \Big/$$
$$\left(8 d \sqrt{a (1 + \cos[c + d x])} \left(\cos\left[\frac{c}{2}\right] - \sin\left[\frac{c}{2}\right]\right) \left(\cos\left[\frac{c}{2} + \frac{d x}{2}\right] - \sin\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^4\right) +$$
$$\left(\cos\left[\frac{c}{2} + \frac{d x}{2}\right] \left(-A \cos\left[\frac{c}{2}\right] + 7 A \sin\left[\frac{c}{2}\right]\right)\right) \Big/$$

$$\left(48\,d\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(19\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+16\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Big/$$

$$\left(32\,d\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(-21\,A\,\text{Cos}\left[\frac{c}{2}\right]-16\,C\,\text{Cos}\left[\frac{c}{2}\right]+59\,A\,\text{Sin}\left[\frac{c}{2}\right]+48\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(64\,d\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\right)+$$

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

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

$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(\text{Cos}\left[\frac{c}{2}\right]+7\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(48\,d\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(19\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+16\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Big/$$

$$\left(32\,d\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(21\,A\,\text{Cos}\left[\frac{c}{2}\right]+16\,C\,\text{Cos}\left[\frac{c}{2}\right]+59\,A\,\text{Sin}\left[\frac{c}{2}\right]+48\,C\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(64\,d\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\right)$$

Problem 111: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 259 leaves, 8 steps):

$$\frac{(11\,A+19\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{(A+C)\,\text{Cos}[c+d\,x]^4\,\text{Sin}[c+d\,x]}{2\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}}-$$

$$\frac{(455\,A+799\,C)\,\text{Sin}[c+d\,x]}{105\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{(35\,A+67\,C)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{70\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$

$$\frac{(7\,A+11\,C)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{14\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{(245\,A+397\,C)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{210\,a^2\,d}$$

Result (type 3, 701 leaves):

$$\frac{(-11 A-19 C) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right]}{d\,(a\,(1+\operatorname{Cos}[c+d x]))^{3/2}}+$$
$$\frac{(11 A+19 C) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right]}{d\,(a\,(1+\operatorname{Cos}[c+d x]))^{3/2}}-$$
$$\frac{(12 A+25 C) \operatorname{Cos}\left[\frac{d x}{2}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Sin}\left[\frac{c}{2}\right]}{d\,(a\,(1+\operatorname{Cos}[c+d x]))^{3/2}}+\frac{(4 A+11 C) \operatorname{Cos}\left[\frac{3 d x}{2}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Sin}\left[\frac{3 c}{2}\right]}{3 d\,(a\,(1+\operatorname{Cos}[c+d x]))^{3/2}}-$$
$$\frac{3 C \operatorname{Cos}\left[\frac{5 d x}{2}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Sin}\left[\frac{5 c}{2}\right]}{5 d\,(a\,(1+\operatorname{Cos}[c+d x]))^{3/2}}+\frac{C \operatorname{Cos}\left[\frac{7 d x}{2}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Sin}\left[\frac{7 c}{2}\right]}{7 d\,(a\,(1+\operatorname{Cos}[c+d x]))^{3/2}}-$$
$$\frac{(12 A+25 C) \operatorname{Cos}\left[\frac{c}{2}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Sin}\left[\frac{d x}{2}\right]}{d\,(a\,(1+\operatorname{Cos}[c+d x]))^{3/2}}+\frac{(4 A+11 C) \operatorname{Cos}\left[\frac{3 c}{2}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Sin}\left[\frac{3 d x}{2}\right]}{3 d\,(a\,(1+\operatorname{Cos}[c+d x]))^{3/2}}-$$
$$\frac{3 C \operatorname{Cos}\left[\frac{5 c}{2}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Sin}\left[\frac{5 d x}{2}\right]}{5 d\,(a\,(1+\operatorname{Cos}[c+d x]))^{3/2}}+\frac{C \operatorname{Cos}\left[\frac{7 c}{2}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Sin}\left[\frac{7 d x}{2}\right]}{7 d\,(a\,(1+\operatorname{Cos}[c+d x]))^{3/2}}+$$
$$\frac{(-A-C) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3}{2 d\,(a\,(1+\operatorname{Cos}[c+d x]))^{3/2}\left(\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right)^2}+$$
$$\frac{(A+C) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3}{2 d\,(a\,(1+\operatorname{Cos}[c+d x]))^{3/2}\left(\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right)^2}$$

Problem 115: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

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

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

Result (type 3, 2265 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\left(8 \sqrt{2} A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{c}{2}\right] \left(C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)\right.$$

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

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

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

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

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

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

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

Problem 116: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 158 leaves, 7 steps):

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

Result (type 3, 2438 leaves):

$$\Big((3-3\,i)\,A\,\left(1+e^{i\,c}\right)$$
$$\Big(\sqrt{2}-(1-i)\,e^{\frac{i\,c}{2}}+(16-16\,i)\,e^{\frac{3\,i\,c}{2}+i\,d\,x}+(20+20\,i)\,\sqrt{2}\,e^{2\,i\,c+\frac{3\,i\,d\,x}{2}}-(34-34\,i)\,e^{\frac{5\,i\,c}{2}+2\,i\,d\,x}-$$
$$(20+20\,i)\,\sqrt{2}\,e^{3\,i\,c+\frac{5\,i\,d\,x}{2}}+(16-16\,i)\,e^{\frac{7\,i\,c}{2}+3\,i\,d\,x}+(4+4\,i)\,\sqrt{2}\,e^{4\,i\,c+\frac{7\,i\,d\,x}{2}}-$$
$$(1-i)\,e^{\frac{9\,i\,c}{2}+4\,i\,d\,x}+8\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}-16\,\sqrt{2}\,e^{i\,(c+d\,x)}-40\,i\,e^{\frac{3}{2}\,i\,(c+d\,x)}+34\,\sqrt{2}\,e^{2\,i\,(c+d\,x)}+$$
$$40\,i\,e^{\frac{5}{2}\,i\,(c+d\,x)}-16\,\sqrt{2}\,e^{3\,i\,(c+d\,x)}-8\,i\,e^{\frac{7}{2}\,i\,(c+d\,x)}+\sqrt{2}\,e^{4\,i\,(c+d\,x)}-(4+4\,i)\,\sqrt{2}\,e^{\frac{1}{2}\,i\,(2\,c+d\,x)}\Big)$$
$$\times\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\Big)\Big/\Big(\Big(\left(-1-i\right)+\sqrt{2}\,e^{\frac{i\,c}{2}}\Big)$$
$$\left(-1+e^{i\,c}\right)\,\left(i-2\,\sqrt{2}\,e^{\frac{1}{2}\,i\,(c+d\,x)}-4\,i\,e^{i\,(c+d\,x)}+2\,\sqrt{2}\,e^{\frac{3}{2}\,i\,(c+d\,x)}+i\,e^{2\,i\,(c+d\,x)}\right)^2$$
$$\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\Big)+$$
$$\left(6\,i\,\sqrt{2}\,A\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\right.$$
$$\left.\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)-$$
$$\left(2\,(9\,A+C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\left(2\,(9\,A+C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\Big(3\,\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]$$

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

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

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

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

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

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

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

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

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

$$\Bigg(24\,i\,A\,\text{ArcTan}\Big[\frac{2\,i\,\text{Cos}\left[\frac{c}{2}\right]-i\left(-\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}\right]\right)\text{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\Big]$$

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

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

$$\Bigg(12\,\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\text{Cos}[c+d\,x]^2\,\text{Csc}\left[\frac{c}{2}\right]\left(C+A\,\text{Sec}[c+d\,x]^2\right)$$

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

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

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

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

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

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

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

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

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

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

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

Problem 117: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 217 leaves, 8 steps):

$$\frac{\left(19\,A+8\,C\right)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,a^{3/2}\,d}-\frac{\left(13\,A+5\,C\right)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-$$

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

Result (type 3, 1792 leaves):

$$\left(2\,\left(13\,A+5\,C\right)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$

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

$$\left(2\,\left(13\,A+5\,C\right)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\right.$$

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

$$\left(\left(19\,A+8\,C\right)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(\sqrt{2}\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$

$$\left(\text{i}\,\left(19\,A+8\,C\right)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\right.$$
$$\left.\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\,\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(2\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)+$$

$$\left(\text{i}\,\left(19\,A+8\,C\right)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\right.$$
$$\left.\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\,\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(2\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)+$$

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

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

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

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

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

$$\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3 \operatorname{Cos}[c+d\,x]^2 \left(C+A \operatorname{Sec}[c+d\,x]^2\right) \left(-5 A \operatorname{Cos}\left[\frac{c}{2}\right]+7 A \operatorname{Sin}\left[\frac{c}{2}\right]\right)\right) \Big/ \left(d \left(a \left(1+\operatorname{Cos}[c+d\,x]\right)\right)^{3/2} \left(2 A+C+C \operatorname{Cos}[2 c+2 d\,x]\right) \left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\right)+$$

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

$$\left(A \operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3 \operatorname{Cos}[c+d\,x]^2 \left(C+A \operatorname{Sec}[c+d\,x]^2\right) \left(5 \operatorname{Cos}\left[\frac{c}{2}\right]+7 \operatorname{Sin}\left[\frac{c}{2}\right]\right)\right) \Big/ \left(d \left(a \left(1+\operatorname{Cos}[c+d\,x]\right)\right)^{3/2} \left(2 A+C+C \operatorname{Cos}[2 c+2 d\,x]\right) \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\right)$$

Problem 118: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 266 leaves, 9 steps):

$$-\frac{(47 A+24 C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d\,x]}{\sqrt{a+a \operatorname{Cos}[c+d\,x]}}\right]}{8 a^{3/2} d}+\frac{(17 A+9 C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d\,x]}{\sqrt{2} \sqrt{a+a \operatorname{Cos}[c+d\,x]}}\right]}{2 \sqrt{2}\, a^{3/2} d}+\frac{3 (7 A+4 C) \operatorname{Tan}[c+d\,x]}{8 a d \sqrt{a+a \operatorname{Cos}[c+d\,x]}}-\frac{(13 A+6 C) \operatorname{Sec}[c+d\,x] \operatorname{Tan}[c+d\,x]}{12 a d \sqrt{a+a \operatorname{Cos}[c+d\,x]}}-\frac{(A+C) \operatorname{Sec}[c+d\,x]^2 \operatorname{Tan}[c+d\,x]}{2 d \left(a+a \operatorname{Cos}[c+d\,x]\right)^{3/2}}+\frac{(5 A+3 C) \operatorname{Sec}[c+d\,x]^2 \operatorname{Tan}[c+d\,x]}{6 a d \sqrt{a+a \operatorname{Cos}[c+d\,x]}}$$

Result (type 3, 1019 leaves):

$$\frac{(-17\,A-9\,C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]}{d\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}}+$$

$$\frac{(17\,A+9\,C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]}{d\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}}+$$

$$\frac{(-47\,A-24\,C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{4\,\sqrt{2}\,d\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}}+$$

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

$$\left.\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(-47\,\sqrt{2}\,A-24\,\sqrt{2}\,C+94\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]+48\,C\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

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

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

$$\left.\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(-47\,\sqrt{2}\,A-24\,\sqrt{2}\,C+94\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]+48\,C\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

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

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

$$\left.\left(-47\,\sqrt{2}\,A-24\,\sqrt{2}\,C+94\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]+48\,C\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(16\,d\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}\,\left(-1+\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)+$$

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

$$\left.\left(-47\,\sqrt{2}\,A-24\,\sqrt{2}\,C+94\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]+48\,C\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(16\,d\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}\,\left(-1+\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)+$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\mathrm{Sec}[c+d\,x]^3\,\left(47\,A\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-12\,C\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+91\,A\,\mathrm{Sin}\left[\frac{3\,c}{2}+\frac{3\,d\,x}{2}\right]+\right.\right.$$

$$60\,C\,\mathrm{Sin}\left[\frac{3\,c}{2}+\frac{3\,d\,x}{2}\right]+11\,A\,\mathrm{Sin}\left[\frac{5\,c}{2}+\frac{5\,d\,x}{2}\right]+12\,C\,\mathrm{Sin}\left[\frac{5\,c}{2}+\frac{5\,d\,x}{2}\right]+$$

$$\left.\left.63\,A\,\mathrm{Sin}\left[\frac{7\,c}{2}+\frac{7\,d\,x}{2}\right]+36\,C\,\mathrm{Sin}\left[\frac{7\,c}{2}+\frac{7\,d\,x}{2}\right]\right)\right)\Big/\left(96\,d\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}\right)$$

Problem 123: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

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

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

Result (type 3, 2503 leaves):

$$-\Bigg(\Bigg((4 - 4 i) A \left(1 + e^{i c}\right)$$
$$\Bigg(\sqrt{2} - (1 - i) e^{\frac{i c}{2}} + (16 - 16 i) e^{\frac{3 i c}{2} + i d x} + (20 + 20 i) \sqrt{2} e^{2 i c + \frac{3 i d x}{2}} - (34 - 34 i) e^{\frac{5 i c}{2} + 2 i d x} -$$
$$(20 + 20 i) \sqrt{2} e^{3 i c + \frac{5 i d x}{2}} + (16 - 16 i) e^{\frac{7 i c}{2} + 3 i d x} + (4 + 4 i) \sqrt{2} e^{4 i c + \frac{7 i d x}{2}} -$$
$$(1 - i) e^{\frac{9 i c}{2} + 4 i d x} + 8 i e^{\frac{1}{2} i (c+d x)} - 16 \sqrt{2} e^{i (c+d x)} - 40 i e^{\frac{3}{2} i (c+d x)} + 34 \sqrt{2} e^{2 i (c+d x)} +$$
$$40 i e^{\frac{5}{2} i (c+d x)} - 16 \sqrt{2} e^{3 i (c+d x)} - 8 i e^{\frac{7}{2} i (c+d x)} + \sqrt{2} e^{4 i (c+d x)} - (4 + 4 i) \sqrt{2} e^{\frac{1}{2} i (2 c+d x)}\Bigg) \times$$
$$\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^5 \operatorname{Cos}[c + d x] \left(C \operatorname{Cos}[c + d x] + A \operatorname{Sec}[c + d x]\right)\Bigg) \Bigg/ \Bigg(\left((-1 - i) + \sqrt{2} e^{\frac{i c}{2}}\right)$$
$$\left(-1 + e^{i c}\right) \left(i - 2 \sqrt{2} e^{\frac{1}{2} i (c+d x)} - 4 i e^{i (c+d x)} + 2 \sqrt{2} e^{\frac{3}{2} i (c+d x)} + i e^{2 i (c+d x)}\right)^2$$
$$\left(a \left(1 + \operatorname{Cos}[c + d x]\right)\right)^{5/2} \left(2 A + C + C \operatorname{Cos}[2 c + 2 d x]\right)\Bigg)\Bigg) -$$
$$\Bigg(8 i \sqrt{2} A \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{c}{4} + \frac{d x}{4}\right] - \operatorname{Sin}\left[\frac{c}{4} + \frac{d x}{4}\right] - \sqrt{2} \operatorname{Sin}\left[\frac{c}{4} + \frac{d x}{4}\right]}{-\operatorname{Cos}\left[\frac{c}{4} + \frac{d x}{4}\right] + \sqrt{2} \operatorname{Cos}\left[\frac{c}{4} + \frac{d x}{4}\right] - \operatorname{Sin}\left[\frac{c}{4} + \frac{d x}{4}\right]}\right] \operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^5$$
$$\operatorname{Cos}[c + d x] \left(C \operatorname{Cos}[c + d x] + A \operatorname{Sec}[c + d x]\right)\Bigg) \Bigg/$$
$$\left(d \left(a \left(1 + \operatorname{Cos}[c + d x]\right)\right)^{5/2} \left(2 A + C + C \operatorname{Cos}[2 c + 2 d x]\right)\right) +$$
$$\Bigg((43 A - 5 C) \operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^5 \operatorname{Cos}[c + d x] \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{4} + \frac{d x}{4}\right] - \operatorname{Sin}\left[\frac{c}{4} + \frac{d x}{4}\right]\right]$$
$$\left(C \operatorname{Cos}[c + d x] + A \operatorname{Sec}[c + d x]\right)\Bigg) \Bigg/$$
$$\left(2 d \left(a \left(1 + \operatorname{Cos}[c + d x]\right)\right)^{5/2} \left(2 A + C + C \operatorname{Cos}[2 c + 2 d x]\right)\right) +$$
$$\Bigg((-43 A + 5 C) \operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^5 \operatorname{Cos}[c + d x]$$
$$\operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{4} + \frac{d x}{4}\right] + \operatorname{Sin}\left[\frac{c}{4} + \frac{d x}{4}\right]\right] \left(C \operatorname{Cos}[c + d x] + A \operatorname{Sec}[c + d x]\right)\Bigg) \Bigg/$$

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

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

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

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

$$\left(32\,i\,A\,\text{ArcTan}\left[\frac{2\,i\,\text{Cos}\left[\frac{c}{2}\right]-i\,\left(-\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\text{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right]\right.$$
$$\left.\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]\,\text{Cot}\left[\frac{c}{2}\right]\,\left(C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\right)\Big/$$
$$\left(d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\,\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}\right)+$$

$$\left(16\sqrt{2}\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\left(C\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x]\right)\right.$$

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

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

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

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

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

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

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

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

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

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

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

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

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

Optimal (type 3, 199 leaves, 8 steps):

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

Result (type 3, 2191 leaves):

$$\Big((10-10\,i)\,A\,(1+e^{i\,c})\Big(\sqrt{2}-(1-i)\,e^{\frac{i\,c}{2}}+(16-16\,i)\,e^{\frac{3\,i\,c}{2}+i\,d\,x}+(20+20\,i)\,\sqrt{2}\,e^{2\,i\,c+\frac{3\,i\,d\,x}{2}}-(34-34\,i)\,e^{\frac{5\,i\,c}{2}+2\,i\,d\,x}-(20+20\,i)\,\sqrt{2}\,e^{3\,i\,c+\frac{5\,i\,d\,x}{2}}+(16-16\,i)\,e^{\frac{7\,i\,c}{2}+3\,i\,d\,x}+(4+4\,i)\,\sqrt{2}\,e^{4\,i\,c+\frac{7\,i\,d\,x}{2}}-(1-i)\,e^{\frac{9\,i\,c}{2}+4\,i\,d\,x}+8\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}-16\,\sqrt{2}\,e^{i\,(c+d\,x)}-40\,i\,e^{\frac{3}{2}\,i\,(c+d\,x)}+34\,\sqrt{2}\,e^{2\,i\,(c+d\,x)}+40\,i\,e^{\frac{5}{2}\,i\,(c+d\,x)}-16\,\sqrt{2}\,e^{3\,i\,(c+d\,x)}-8\,i\,e^{\frac{7}{2}\,i\,(c+d\,x)}+\sqrt{2}\,e^{4\,i\,(c+d\,x)}-(4+4\,i)\,\sqrt{2}\,e^{\frac{1}{2}\,i\,(2\,c+d\,x)}\Big)\times\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]^2\,(C+A\,\text{Sec}[c+d\,x]^2)\Big)\Big/\Big(\Big(\big(-1-i\big)+\sqrt{2}\,e^{\frac{i\,c}{2}}\Big)(-1+e^{i\,c})\Big(i-2\,\sqrt{2}\,e^{\frac{1}{2}\,i\,(c+d\,x)}-4\,i\,e^{i\,(c+d\,x)}+2\,\sqrt{2}\,e^{\frac{3}{2}\,i\,(c+d\,x)}+i\,e^{2\,i\,(c+d\,x)}\Big)^2(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x])\Big)+$$

$$\Big(20\,i\,\sqrt{2}\,A\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]^2\,(C+A\,\text{Sec}[c+d\,x]^2)\Big)\Big/\Big(d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x])\Big)+$$

$$\Big((-115\,A-3\,C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right](C+A\,\text{Sec}[c+d\,x]^2)\Big)\Big/\Big(2\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x])\Big)+$$

$$\Big((115\,A+3\,C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right](C+A\,\text{Sec}[c+d\,x]^2)\Big)\Big/\Big(2\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x])\Big)+$$

$$\Big(10\,\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right](C+A\,\text{Sec}[c+d\,x]^2)\Big)\Big/\Big(d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x])\Big)-$$

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

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

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

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

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

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

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

$$\left(80\,i\,A\,\text{ArcTan}\left[\frac{2\,i\,\text{Cos}\left[\frac{c}{2}\right]-i\,\left(-\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\text{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right]\right.$$

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

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

$$\left(40\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right.$$

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

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

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

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Cos}[c+d\,x]\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\,\left(24\,A\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-8\,C\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+75\,A\,\text{Sin}\left[\frac{3\,c}{2}+\frac{3\,d\,x}{2}\right]+11\,C\,\text{Sin}\left[\frac{3\,c}{2}+\frac{3\,d\,x}{2}\right]+35\,A\,\text{Sin}\left[\frac{5\,c}{2}+\frac{5\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[\frac{5\,c}{2}+\frac{5\,d\,x}{2}\right]\right)\right)\Big/\left(16\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)$$

Problem 125: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 262 leaves, 9 steps):

$$\frac{\left(39\,A+8\,C\right)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,a^{5/2}\,d}-\frac{\left(219\,A+43\,C\right)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{\left(63\,A+11\,C\right)\,\text{Tan}[c+d\,x]}{16\,a^2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{\left(A+C\right)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{4\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}}-\frac{\left(19\,A+3\,C\right)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{16\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}}+\frac{\left(31\,A+7\,C\right)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{16\,a^2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 1250 leaves):

$$\left(\left(219\,A+43\,C\right)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\,\left(C+A\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(2\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\left(\left(-219\,A-43\,C\right)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\right.$$
$$\left.\left(C+A\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/\left(2\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\left(\sqrt{2}\,\left(39\,A+8\,C\right)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\left(C+A\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\left(\mathrm{i}\,\left(39\,A+8\,C\right)\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\right.$$
$$\left.\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Cos}[c+d\,x]^2\,\left(C+A\,\mathrm{Sec}[c+d\,x]^2\right)\,\left(\sqrt{2}-2\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(-1+\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)+$$
$$\left(\mathrm{i}\,\left(39\,A+8\,C\right)\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\right.$$
$$\left.\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Cos}[c+d\,x]^2\,\left(C+A\,\mathrm{Sec}[c+d\,x]^2\right)\,\left(\sqrt{2}-2\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(-1+\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)+$$
$$\left(\left(39\,A+8\,C\right)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Log}\left[2-\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\right.$$
$$\left.\left(C+A\,\mathrm{Sec}[c+d\,x]^2\right)\,\left(\sqrt{2}-2\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(2\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(-1+\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)+$$
$$\left(\left(39\,A+8\,C\right)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Log}\left[2+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\right.$$
$$\left.\left(C+A\,\mathrm{Sec}[c+d\,x]^2\right)\,\left(\sqrt{2}-2\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(2\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\,\left(-1+\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)-$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(C+A\,\mathrm{Sec}[c+d\,x]^2\right)\,\left(47\,A\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+27\,C\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+79\,A\,\mathrm{Sin}\left[\frac{3\,c}{2}+\frac{3\,d\,x}{2}\right]+\right.\right.$$
$$3\,C\,\mathrm{Sin}\left[\frac{3\,c}{2}+\frac{3\,d\,x}{2}\right]+127\,A\,\mathrm{Sin}\left[\frac{5\,c}{2}+\frac{5\,d\,x}{2}\right]+19\,C\,\mathrm{Sin}\left[\frac{5\,c}{2}+\frac{5\,d\,x}{2}\right]+63\,A\,\mathrm{Sin}\left[\frac{7\,c}{2}+\frac{7\,d\,x}{2}\right]+$$
$$\left.\left.11\,C\,\mathrm{Sin}\left[\frac{7\,c}{2}+\frac{7\,d\,x}{2}\right]\right)\right)\Big/\left(32\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\right)$$

Problem 126: Result unnecessarily involves higher level functions and more

than twice size of optimal antiderivative.

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

Optimal (type 4, 196 leaves, 8 steps):

$$\frac{2 a (9 A+7 C) \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{15 d}+\frac{10 a (11 A+9 C) \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{231 d}+\frac{10 a (11 A+9 C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{231 d}+\frac{2 a (9 A+7 C) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{45 d}+\frac{2 a (11 A+9 C) \text{Cos}[c+d x]^{5/2} \text{Sin}[c+d x]}{77 d}+\frac{2 a C \text{Cos}[c+d x]^{7/2} \text{Sin}[c+d x]}{9 d}+\frac{2 a C \text{Cos}[c+d x]^{9/2} \text{Sin}[c+d x]}{11 d}$$

Result (type 5, 964 leaves):

$$a \left(\sqrt{\text{Cos}[c+d x]} \left(1+\text{Cos}[c+d x]\right) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \left(-\frac{(9 A+7 C) \text{Cot}[c]}{15 d}+\frac{(506 A+435 C) \text{Cos}[d x] \text{Sin}[c]}{1848 d}+\frac{(18 A+19 C) \text{Cos}[2 d x] \text{Sin}[2 c]}{180 d}+\frac{(44 A+57 C) \text{Cos}[3 d x] \text{Sin}[3 c]}{1232 d}+\frac{C \text{Cos}[4 d x] \text{Sin}[4 c]}{72 d}+\frac{C \text{Cos}[5 d x] \text{Sin}[5 c]}{176 d}+\frac{(506 A+435 C) \text{Cos}[c] \text{Sin}[d x]}{1848 d}+\frac{(18 A+19 C) \text{Cos}[2 c] \text{Sin}[2 d x]}{180 d}+\frac{(44 A+57 C) \text{Cos}[3 c] \text{Sin}[3 d x]}{1232 d}+\frac{C \text{Cos}[4 c] \text{Sin}[4 d x]}{72 d}+\frac{C \text{Cos}[5 c] \text{Sin}[5 d x]}{176 d}\right)-\right.$$

$$\left(5 A \left(1+\text{Cos}[c+d x]\right) \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right) \Big/ \left(21 d \sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(15 C \left(1+\text{Cos}[c+d x]\right) \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right.$$

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

$$\left(77\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{10\,d}3\,A\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

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

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

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

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

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

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

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

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

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

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

Problem 127: Result unnecessarily involves higher level functions and more

than twice size of optimal antiderivative.

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

Optimal (type 4, 165 leaves, 7 steps):

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

Result (type 5, 918 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Optimal (type 4, 134 leaves, 6 steps):

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

Result (type 5, 872 leaves):

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

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

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

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

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

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

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

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

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

Optimal (type 4, 101 leaves, 5 steps):

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

Result (type 5, 824 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Optimal (type 4, 95 leaves, 5 steps):

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

Result (type 5, 813 leaves):

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

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

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

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

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

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

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

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

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

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

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

$$C\ (1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^2\ \Bigg(\Bigg(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},$$

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

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

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

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

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

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

Optimal (type 4, 95 leaves, 5 steps):

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

Result (type 5, 817 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Optimal (type 4, 132 leaves, 6 steps):

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

Result (type 5, 851 leaves) :

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,\,(1+\text{Cos}[c+d\,x])\,\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\frac{(3\,A+5\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{5\,d}+\right.\right.$$
$$\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{5\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(3\,A\,\text{Sin}[c]+5\,A\,\text{Sin}[d\,x])}{15\,d}+$$
$$\left.\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(5\,A\,\text{Sin}[c]+9\,A\,\text{Sin}[d\,x]+15\,C\,\text{Sin}[d\,x])}{15\,d}\right)-$$
$$\left(A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+$$
$$\frac{1}{10\,d}3\,A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$
$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$
$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

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

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

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

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

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

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

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

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

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

Optimal (type 4, 165 leaves, 7 steps):

$$-\frac{2\,a\,(3\,A+5\,C)\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{2\,a\,(5\,A+7\,C)\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+$$

$$\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,a\,(5\,A+7\,C)\ \text{Sin}[c+d\,x]}{21\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,(3\,A+5\,C)\ \text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 895 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+5 C)\,\text{Csc}[c]\,\text{Sec}[c]}{5 d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d x]^4\,\text{Sin}[d x]}{7 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^3\,(5 A\,\text{Sin}[c]+7 A\,\text{Sin}[d x])}{35 d}+\frac{1}{105 d}\text{Sec}[c]\,\text{Sec}[c+d x]^2\,(21 A\,\text{Sin}[c]+25 A\,\text{Sin}[d x]+35 C\,\text{Sin}[d x])+\frac{1}{105 d}\text{Sec}[c]\,\text{Sec}[c+d x]\,(25 A\,\text{Sin}[c]+35 C\,\text{Sin}[c]+63 A\,\text{Sin}[d x]+105 C\,\text{Sin}[d x])\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]\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)-\left(C\,(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]]]}\right)\Big/\left(3 d\sqrt{1+\text{Cot}[c]^2}\right)+\frac{1}{10 d}3 A\,(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\},\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.$$

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

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

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

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

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

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

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

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

Optimal (type 4, 230 leaves, 9 steps):

$$\frac{4\,a^2\,(9\,A+7\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+\frac{8\,a^2\,(33\,A+25\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{231\,d}+$$
$$\frac{8\,a^2\,(33\,A+25\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{231\,d}+\frac{4\,a^2\,(9\,A+7\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{45\,d}+$$
$$\frac{2\,a^2\,(99\,A+89\,C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{693\,d}+\frac{2\,C\,\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{11\,d}+$$
$$\frac{8\,C\,\text{Cos}[c+d\,x]^{5/2}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{99\,d}$$

Result (type 5, 982 leaves):

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

$$\left(-\frac{(9A+7C)\,\text{Cot}[c]}{15\,d}+\frac{(1122A+941C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3696\,d}+\frac{(18A+19C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{180\,d}+\frac{(44A+101C)\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{2464\,d}+\frac{C\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{72\,d}+\frac{C\,\text{Cos}[5\,d\,x]\,\text{Sin}[5\,c]}{352\,d}+\frac{(1122A+941C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3696\,d}+\frac{(18A+19C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{180\,d}+\frac{(44A+101C)\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{2464\,d}+\frac{C\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{72\,d}+\frac{C\,\text{Cos}[5\,c]\,\text{Sin}[5\,d\,x]}{352\,d}\right)-$$

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

$$\left(50\,C\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(231\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{10\,d}3\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

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

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

$$\frac{1}{30\,d}7\,C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

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

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

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

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

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

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

Optimal (type 4, 197 leaves, 8 steps):

$$\frac{16\,a^2\,\left(3\,A+2\,C\right)\,\text{EllipticE}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]}{15\,d}+\frac{4\,a^2\,\left(7\,A+5\,C\right)\,\text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]}{21\,d}+$$
$$\frac{4\,a^2\,\left(7\,A+5\,C\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+\frac{2\,a^2\,\left(21\,A+19\,C\right)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{105\,d}+$$
$$\frac{2\,C\,\text{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{9\,d}+$$
$$\frac{8\,C\,\text{Cos}[c+d\,x]^{3/2}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{63\,d}$$

Result (type 5, 936 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(-\frac{4\,\left(3\,A+2\,C\right)\,\text{Cot}[c]}{15\,d}+\frac{\left(28\,A+23\,C\right)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{84\,d}+\frac{\left(18\,A+37\,C\right)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{360\,d}+\right.$$
$$\frac{C\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{28\,d}+\frac{C\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{144\,d}+\frac{\left(28\,A+23\,C\right)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{84\,d}+$$
$$\left.\frac{\left(18\,A+37\,C\right)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{360\,d}+\frac{C\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{28\,d}+\frac{C\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{144\,d}\right)-$$

$$\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\text{Csc}[c]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$
$$\left(5\,C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(21\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{5\,d}2\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$
$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$
$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$
$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$
$$\frac{1}{15\,d}4\,C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

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

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

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

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

Optimal (type 4, 164 leaves, 7 steps):

$$\frac{4 a^2 (5 A+3 C)\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5 d}+\frac{8 a^2 (7 A+3 C)\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{21 d}+\frac{2 a^2 (35 A+33 C)\ \sqrt{\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{105 d}+\frac{2 C\sqrt{\text{Cos}[c+d x]}\ (a+a\,\text{Cos}[c+d x])^2\ \text{Sin}[c+d x]}{7 d}+\frac{8 C\sqrt{\text{Cos}[c+d x]}\ (a^2+a^2\,\text{Cos}[c+d x])\ \text{Sin}[c+d x]}{35 d}$$

Result (type 5, 890 leaves):

$$\sqrt{\text{Cos}[c+d x]}\ (a+a\,\text{Cos}[c+d x])^2\ \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\left(-\frac{(5 A+3 C)\ \text{Cot}[c]}{5 d}+\frac{(28 A+51 C)\ \text{Cos}[d x]\ \text{Sin}[c]}{168 d}+\frac{C\,\text{Cos}[2 d x]\ \text{Sin}[2 c]}{10 d}+\frac{C\,\text{Cos}[3 d x]\ \text{Sin}[3 c]}{56 d}+\frac{(28 A+51 C)\ \text{Cos}[c]\ \text{Sin}[d x]}{168 d}+\frac{C\,\text{Cos}[2 c]\ \text{Sin}[2 d x]}{10 d}+\frac{C\,\text{Cos}[3 c]\ \text{Sin}[3 d x]}{56 d}\right)-\frac{1}{3 d\sqrt{1+\text{Cot}[c]^2}}$$

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

$$2\,C\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$
$$\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$
$$\frac{1}{2\,d}A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4$$
$$\left(\left(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$
$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$
$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$
$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$
$$\frac{1}{10\,d}3\,C\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4$$
$$\left(\left(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$
$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$
$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$
$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 137: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 160 leaves, 7 steps):

$$\frac{16 a^2 C \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right]}{5 d} + \frac{4 a^2 (3 A + C) \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right]}{3 d} - \frac{2 a^2 (15 A - 7 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{15 d} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^2 \operatorname{Sin}[c + d x]}{d \sqrt{\operatorname{Cos}[c + d x]}} - \frac{2 (5 A - C) \sqrt{\operatorname{Cos}[c + d x]} \left(a^2 + a^2 \operatorname{Cos}[c + d x]\right) \operatorname{Sin}[c + d x]}{5 d}$$

Result (type 5, 658 leaves):

$$\sqrt{\text{Cos}[c+d x]}\,\left(a+a\,\text{Cos}[c+d x]\right)^2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$
$$\left(-\frac{\left(-5 A+8 C+5 A\,\text{Cos}[2 c]+8 C\,\text{Cos}[2 c]\right)\,\text{Csc}[c]\,\text{Sec}[c]}{20 d}+\frac{C\,\text{Cos}[d x]\,\text{Sin}[c]}{3 d}+\frac{C\,\text{Cos}[2 d x]\,\text{Sin}[2 c]}{20 d}+\frac{C\,\text{Cos}[c]\,\text{Sin}[d x]}{3 d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d x]\,\text{Sin}[d x]}{2 d}+\frac{C\,\text{Cos}[2 c]\,\text{Sin}[2 d x]}{20 d}\right)-\frac{1}{d\sqrt{1+\text{Cot}[c]^2}}$$
$$A\left(a+a\,\text{Cos}[c+d x]\right)^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3 d\sqrt{1+\text{Cot}[c]^2}}$$
$$C\left(a+a\,\text{Cos}[c+d x]\right)^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{5 d}2 C\left(a+a\,\text{Cos}[c+d x]\right)^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$
$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$
$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$
$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 138: Result unnecessarily involves higher level functions and more

than twice size of optimal antiderivative.

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

Optimal (type 4, 156 leaves, 7 steps):

$$-\frac{4 a^2 (A - C) \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right]}{d} + \frac{8 a^2 (A + C) \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right]}{3 d} - \frac{2 a^2 (5 A - C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{3 d} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^2 \operatorname{Sin}[c + d x]}{3 d \operatorname{Cos}[c + d x]^{3/2}} + \frac{8 A (a^2 + a^2 \operatorname{Cos}[c + d x]) \operatorname{Sin}[c + d x]}{3 d \sqrt{\operatorname{Cos}[c + d x]}}$$

Result (type 5, 865 leaves):

$$\sqrt{\operatorname{Cos}[c + d x]} (a + a \operatorname{Cos}[c + d x])^2 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(-\frac{(-2 A + C + C \operatorname{Cos}[2 c]) \operatorname{Csc}[c] \operatorname{Sec}[c]}{2 d} + \frac{C \operatorname{Cos}[d x] \operatorname{Sin}[c]}{6 d} + \frac{C \operatorname{Cos}[c] \operatorname{Sin}[d x]}{6 d} + \frac{A \operatorname{Sec}[c] \operatorname{Sec}[c + d x]^2 \operatorname{Sin}[d x]}{6 d} + \frac{\operatorname{Sec}[c] \operatorname{Sec}[c + d x] (A \operatorname{Sin}[c] + 6 A \operatorname{Sin}[d x])}{6 d}\right) -$$

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

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

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

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

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

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

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

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

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

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

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

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

Problem 139: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 156 leaves, 7 steps):

$$-\frac{16\,a^2\,A\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+\frac{4\,a^2\,(A+3\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,d}+\frac{2\,a^2\,(17\,A+15\,C)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{8\,A\,(a^2+a^2\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{15\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 5, 656 leaves) :

$$\sqrt{\text{Cos}[c+d x]}\,\left(a+a\,\text{Cos}[c+d x]\right)^2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\left(-\frac{\left(-16 A-5 C+5 C\,\text{Cos}[2 c]\right)\,\text{Csc}[c]\,\text{Sec}[c]}{20 d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d x]^3\,\text{Sin}[d x]}{10 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\left(3 A\,\text{Sin}[c]+10 A\,\text{Sin}[d x]\right)}{30 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]\,\left(10 A\,\text{Sin}[c]+24 A\,\text{Sin}[d x]+15 C\,\text{Sin}[d x]\right)}{30 d}\right)-\frac{1}{3 d\sqrt{1+\text{Cot}[c]^2}}$$

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

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

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

Problem 140: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 197 leaves, 8 steps):

$$-\frac{4\,a^2\,(3\,A+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+\frac{8\,a^2\,(3\,A+7\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+\frac{2\,a^2\,(33\,A+35\,C)\,\text{Sin}[c+d\,x]}{105\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{4\,a^2\,(3\,A+5\,C)\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{8\,A\,(a^2+a^2\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{35\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 913 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\left(\frac{(3\,A+5\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{5\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,\text{Sin}[d\,x]}{14\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(5\,A\,\text{Sin}[c]+14\,A\,\text{Sin}[d\,x])}{70\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(42\,A\,\text{Sin}[c]+60\,A\,\text{Sin}[d\,x]+35\,C\,\text{Sin}[d\,x])}{210\,d}+\frac{1}{210\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(60\,A\,\text{Sin}[c]+35\,C\,\text{Sin}[c]+126\,A\,\text{Sin}[d\,x]+210\,C\,\text{Sin}[d\,x])\right)-$$

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

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

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

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

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

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

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

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

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

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

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

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

Problem 141: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^2\ \left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 230 leaves, 9 steps):

$$-\frac{16\,a^2\,(2\,A+3\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{15\,d}+\frac{4\,a^2\,(5\,A+7\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+$$
$$\frac{2\,a^2\,(19\,A+21\,C)\,\text{Sin}[c+d\,x]}{105\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{4\,a^2\,(5\,A+7\,C)\,\text{Sin}[c+d\,x]}{21\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{16\,a^2\,(2\,A+3\,C)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}}+$$
$$\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{9\,d\,\text{Cos}[c+d\,x]^{9/2}}+\frac{8\,A\,(a^2+a^2\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{63\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 955 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(\frac{4\,(2\,A+3\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{15\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^5\,\text{Sin}[d\,x]}{18\,d}+\right.$$
$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,(7\,A\,\text{Sin}[c]+18\,A\,\text{Sin}[d\,x])}{126\,d}+\frac{1}{630\,d}$$
$$\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(90\,A\,\text{Sin}[c]+112\,A\,\text{Sin}[d\,x]+63\,C\,\text{Sin}[d\,x])+\frac{1}{105\,d}$$
$$\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(25\,A\,\text{Sin}[c]+35\,C\,\text{Sin}[c]+56\,A\,\text{Sin}[d\,x]+84\,C\,\text{Sin}[d\,x])+\frac{1}{630\,d}$$
$$\left.\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(112\,A\,\text{Sin}[c]+63\,C\,\text{Sin}[c]+150\,A\,\text{Sin}[d\,x]+210\,C\,\text{Sin}[d\,x])\right)-$$
$$\left(5\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(21\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}C\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+$$
$$\frac{1}{15\,d}4\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

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

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

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

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

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

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

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

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

Problem 142: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 279 leaves, 10 steps) :

$$\frac{4 a^3 (221 A + 175 C)\, \text{EllipticE}\left[\frac{1}{2}(c + d x), 2\right]}{195 d} + \frac{4 a^3 (121 A + 95 C)\, \text{EllipticF}\left[\frac{1}{2}(c + d x), 2\right]}{231 d} + \frac{4 a^3 (121 A + 95 C) \sqrt{\text{Cos}[c + d x]}\, \text{Sin}[c + d x]}{231 d} + \frac{4 a^3 (221 A + 175 C)\, \text{Cos}[c + d x]^{3/2}\, \text{Sin}[c + d x]}{585 d} + \frac{40 a^3 (143 A + 118 C)\, \text{Cos}[c + d x]^{5/2}\, \text{Sin}[c + d x]}{9009 d} + \frac{2 C\, \text{Cos}[c + d x]^{5/2} (a + a\, \text{Cos}[c + d x])^3\, \text{Sin}[c + d x]}{13 d} + \frac{12 C\, \text{Cos}[c + d x]^{5/2} (a^2 + a^2\, \text{Cos}[c + d x])^2\, \text{Sin}[c + d x]}{143 a d} + \frac{2 (143 A + 145 C)\, \text{Cos}[c + d x]^{5/2} (a^3 + a^3\, \text{Cos}[c + d x])\, \text{Sin}[c + d x]}{1287 d}$$

Result (type 5, 1028 leaves):

$$\sqrt{\text{Cos}[c + d x]}\, (a + a\, \text{Cos}[c + d x])^3\, \text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \left(-\frac{(221 A + 175 C)\, \text{Cot}[c]}{390 d} + \frac{(2134 A + 1811 C)\, \text{Cos}[d x]\, \text{Sin}[c]}{7392 d} + \frac{(7592 A + 7825 C)\, \text{Cos}[2 d x]\, \text{Sin}[2 c]}{74880 d} + \frac{(132 A + 215 C)\, \text{Cos}[3 d x]\, \text{Sin}[3 c]}{4928 d} + \frac{(13 A + 59 C)\, \text{Cos}[4 d x]\, \text{Sin}[4 c]}{3744 d} + \frac{3 C\, \text{Cos}[5 d x]\, \text{Sin}[5 c]}{704 d} + \frac{C\, \text{Cos}[6 d x]\, \text{Sin}[6 c]}{1664 d} + \frac{(2134 A + 1811 C)\, \text{Cos}[c]\, \text{Sin}[d x]}{7392 d} + \frac{(7592 A + 7825 C)\, \text{Cos}[2 c]\, \text{Sin}[2 d x]}{74880 d} + \frac{(132 A + 215 C)\, \text{Cos}[3 c]\, \text{Sin}[3 d x]}{4928 d} + \frac{(13 A + 59 C)\, \text{Cos}[4 c]\, \text{Sin}[4 d x]}{3744 d} + \frac{3 C\, \text{Cos}[5 c]\, \text{Sin}[5 d x]}{704 d} + \frac{C\, \text{Cos}[6 c]\, \text{Sin}[6 d x]}{1664 d}\right) -$$

$$\left(11 A\, (a + a\, \text{Cos}[c + d x])^3\, \text{Csc}[c]\, \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/ \left(42 d \sqrt{1 + \text{Cot}[c]^2}\right) -$$

$$\left(95 C\, (a + a\, \text{Cos}[c + d x])^3\, \text{Csc}[c]\, \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$

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

$$\left(462\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{60\,d}17\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

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

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

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

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

$$\frac{1}{156\,d}35\,C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

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

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

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

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

Problem 143: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 246 leaves, 9 steps):

$$\frac{4\,a^3\,(7\,A+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{4\,a^3\,(143\,A+105\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{231\,d}+\frac{4\,a^3\,(143\,A+105\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{231\,d}+\frac{8\,a^3\,(44\,A+35\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{385\,d}+\frac{2\,C\,\text{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Sin}[c+d\,x]}{11\,d}+\frac{4\,C\,\text{Cos}[c+d\,x]^{3/2}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{33\,a\,d}+\frac{2\,(33\,A+35\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{231\,d}$$

Result (type 5, 982 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(-\frac{(7\,A+5\,C)\,\text{Cot}[c]}{10\,d}+\frac{(2354\,A+1953\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{7392\,d}+\frac{(18\,A+25\,C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{240\,d}+\frac{(44\,A+189\,C)\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{4928\,d}+\frac{C\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{96\,d}+\frac{C\,\text{Cos}[5\,d\,x]\,\text{Sin}[5\,c]}{704\,d}+\frac{(2354\,A+1953\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{7392\,d}+\frac{(18\,A+25\,C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{240\,d}+\frac{(44\,A+189\,C)\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{4928\,d}+\frac{C\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{96\,d}+\frac{C\,\text{Cos}[5\,c]\,\text{Sin}[5\,d\,x]}{704\,d}\right)-$$

$$\left(13\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(42\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

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

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

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

$$\left(22\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{20\,d}7\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

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

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

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

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

$$\frac{1}{4\,d}C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

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

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

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

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

Problem 144: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

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

$$\frac{4\,a^3\,(27\,A+17\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+\frac{4\,a^3\,(21\,A+11\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+\frac{8\,a^3\,(21\,A+16\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,d}+\frac{2\,C\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{9\,d}+\frac{4\,C\,\sqrt{\text{Cos}[c+d\,x]}\,(a^2+a^2\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{21\,a\,d}+\frac{2\,(63\,A+73\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,(a^3+a^3\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{315\,d}$$

Result (type 5, 936 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(-\frac{(27\,A+17\,C)\,\text{Cot}[c]}{30\,d}+\frac{(84\,A+97\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{336\,d}+\frac{(18\,A+73\,C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{720\,d}+\frac{3\,C\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{112\,d}+\frac{C\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{288\,d}+\frac{(84\,A+97\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{336\,d}+\frac{(18\,A+73\,C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{720\,d}+\frac{3\,C\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{112\,d}+\frac{C\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{288\,d}\right)-$$

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

$$\left(11\,C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(42\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{20\,d}9\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

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

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

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

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

$$\frac{1}{60\,d}17\,C\,(a+a\,\text{Cos}[c+d x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$

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

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

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

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

Problem 145: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 217 leaves, 8 steps):

$$\frac{4 a^3 (5 A+7 C) \text{EllipticE}\left[\frac{1}{2}(c+d x), 2\right]}{5 d}+\frac{4 a^3 (35 A+13 C) \text{EllipticF}\left[\frac{1}{2}(c+d x), 2\right]}{21 d}-\frac{4 a^3 (35 A-41 C) \sqrt{\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{105 d}+\frac{2 A (a+a \text{Cos}[c+d x])^3 \text{Sin}[c+d x]}{d \sqrt{\text{Cos}[c+d x]}}-\frac{2 (7 A-C) \sqrt{\text{Cos}[c+d x]}\left(a^2+a^2 \text{Cos}[c+d x]\right)^2 \text{Sin}[c+d x]}{7 a d}-\frac{2 (35 A-11 C) \sqrt{\text{Cos}[c+d x]}\left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{35 d}$$

Result (type 5, 926 leaves):

$$\sqrt{\text{Cos}[c+d x]}\,(a+a \text{Cos}[c+d x])^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(-\frac{(5 A+14 C+15 A \text{Cos}[2 c]+14 C \text{Cos}[2 c]) \text{Csc}[c] \text{Sec}[c]}{40 d}+\frac{(28 A+107 C) \text{Cos}[d x] \text{Sin}[c]}{336 d}+\frac{3 C \text{Cos}[2 d x] \text{Sin}[2 c]}{40 d}+\frac{C \text{Cos}[3 d x] \text{Sin}[3 c]}{112 d}+\frac{(28 A+107 C) \text{Cos}[c] \text{Sin}[d x]}{336 d}+\frac{A \text{Sec}[c] \text{Sec}[c+d x] \text{Sin}[d x]}{4 d}+\frac{3 C \text{Cos}[2 c] \text{Sin}[2 d x]}{40 d}+\frac{C \text{Cos}[3 c] \text{Sin}[3 d x]}{112 d}\right)-$$

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

$$\left(13 C (a+a \text{Cos}[c+d x])^3 \text{Csc}[c]\, \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2}\, \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(42 d \sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{4 d} A (a+a \text{Cos}[c+d x])^3 \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$

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

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

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

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

$$\frac{1}{20\,d}7\,C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\;\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

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

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

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

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

Problem 146: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 211 leaves, 8 steps):

$$-\frac{4 a^3 (5 A-9 C) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{5 d}+\frac{4 a^3 (5 A+3 C) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{3 d}-\frac{8 a^3 (10 A-3 C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{15 d}+\frac{2 A (a+a \text{Cos}[c+d x])^3 \text{Sin}[c+d x]}{3 d \text{Cos}[c+d x]^{3/2}}+\frac{4 A \left(a^2+a^2 \text{Cos}[c+d x]\right)^2 \text{Sin}[c+d x]}{a d \sqrt{\text{Cos}[c+d x]}}-\frac{2 (35 A-3 C) \sqrt{\text{Cos}[c+d x]} \left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{15 d}$$

Result (type 5, 909 leaves):

$$\sqrt{\text{Cos}[c+d x]} (a+a \text{Cos}[c+d x])^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(-\frac{(-25 A+18 C+5 A \text{Cos}[2 c]+18 C \text{Cos}[2 c]) \text{Csc}[c] \text{Sec}[c]}{40 d}+\frac{C \text{Cos}[d x] \text{Sin}[c]}{4 d}+\frac{C \text{Cos}[2 d x] \text{Sin}[2 c]}{40 d}+\frac{C \text{Cos}[c] \text{Sin}[d x]}{4 d}+\frac{A \text{Sec}[c] \text{Sec}[c+d x]^2 \text{Sin}[d x]}{12 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x] (A \text{Sin}[c]+9 A \text{Sin}[d x])}{12 d}+\frac{C \text{Cos}[2 c] \text{Sin}[2 d x]}{40 d}\right)-\frac{1}{6 d \sqrt{1+\text{Cot}[c]^2}}$$

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

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

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

$$\frac{1}{20\,d}9\,C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

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

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

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

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

Problem 147: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+a\,\text{Cos}[c+d\,x]\right)^3\ \left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{7/2}}\,dx$$

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

$$-\frac{4\,a^3\ (9\,A-5\,C)\ \text{EllipticE}\left[\frac{1}{2}\ (c+d\,x),2\right]}{5\,d}+\frac{4\,a^3\ (3\,A+5\,C)\ \text{EllipticF}\left[\frac{1}{2}\ (c+d\,x),2\right]}{3\,d}-$$

$$\frac{4\,a^3\ (21\,A+5\,C)\ \sqrt{\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{15\,d}+\frac{2\,A\ \left(a+a\,\text{Cos}[c+d\,x]\right)^3\ \text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+$$

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

Result (type 5, 905 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\;(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(-\frac{(-36\,A+5\,C+15\,C\,\text{Cos}[2\,c])\;\text{Csc}[c]\;\text{Sec}[c]}{40\,d}+\frac{C\,\text{Cos}[d\,x]\;\text{Sin}[c]}{12\,d}+\frac{C\,\text{Cos}[c]\;\text{Sin}[d\,x]}{12\,d}+\right.$$

$$\frac{A\,\text{Sec}[c]\;\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{20\,d}+\frac{\text{Sec}[c]\;\text{Sec}[c+d\,x]^2\,(A\,\text{Sin}[c]+5\,A\,\text{Sin}[d\,x])}{20\,d}+$$

$$\left.\frac{\text{Sec}[c]\;\text{Sec}[c+d\,x]\;(5\,A\,\text{Sin}[c]+18\,A\,\text{Sin}[d\,x]+5\,C\,\text{Sin}[d\,x])}{20\,d}\right)-\frac{1}{2\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

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

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\;\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

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

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{6\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

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

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\;\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

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

$$\frac{1}{20\,d}9\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\;\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

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

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

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

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

$$\frac{1}{4\,d}C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\;\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

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

Problem 148: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^3\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{9/2}}\,dx$$

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

$$-\frac{4\,a^3\,(7\,A+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{4\,a^3\,(13\,A+35\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+\frac{8\,a^3\,(53\,A+70\,C)\,\text{Sin}[c+d\,x]}{105\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{12\,A\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{35\,a\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,(7\,A+5\,C)\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{15\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 5, 920 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(-\frac{(-28\,A-25\,C+5\,C\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{40\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,\text{Sin}[d\,x]}{28\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(5\,A\,\text{Sin}[c]+21\,A\,\text{Sin}[d\,x])}{140\,d}+\frac{1}{420\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(63\,A\,\text{Sin}[c]+130\,A\,\text{Sin}[d\,x]+35\,C\,\text{Sin}[d\,x])+\frac{1}{420\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(130\,A\,\text{Sin}[c]+35\,C\,\text{Sin}[c]+294\,A\,\text{Sin}[d\,x]+315\,C\,\text{Sin}[d\,x])\right)-$$

$$\left(13\,A\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$
$$\left(42\,d\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-\frac{1}{6\,d\,\sqrt{1+\mathrm{Cot}[c]^2}}5\,C\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Csc}[c]$$
$$\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}+$$
$$\frac{1}{20\,d}7\,A\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$
$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\right.\right.$$
$$\left.\mathrm{Tan}[c]\right)\Big/\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\right.$$
$$\left.\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$
$$\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\right)+$$
$$\frac{1}{4\,d}C\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$
$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\right.\right.$$

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

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

Problem 149: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\text{Cos}[c+d\,x])^3\,(A+C\,\text{Cos}[c+d\,x]^2)}{\text{Cos}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 246 leaves, 9 steps):

$$-\frac{4\,a^3\,(17\,A+27\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+\frac{4\,a^3\,(11\,A+21\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+\frac{8\,a^3\,(16\,A+21\,C)\,\text{Sin}[c+d\,x]}{105\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{4\,a^3\,(17\,A+27\,C)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{9\,d\,\text{Cos}[c+d\,x]^{9/2}}+\frac{4\,A\,(a^2+a^2\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{21\,a\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,(73\,A+63\,C)\,(a^3+a^3\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{315\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 955 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(\frac{(17\,A+27\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{30\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^5\,\text{Sin}[d\,x]}{36\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,(7\,A\,\text{Sin}[c]+27\,A\,\text{Sin}[d\,x])}{252\,d}+\frac{1}{1260\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(135\,A\,\text{Sin}[c]+238\,A\,\text{Sin}[d\,x]+63\,C\,\text{Sin}[d\,x])+\frac{1}{1260\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(238\,A\,\text{Sin}[c]+63\,C\,\text{Sin}[c]+330\,A\,\text{Sin}[d\,x]+315\,C\,\text{Sin}[d\,x])+\frac{1}{420\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(110\,A\,\text{Sin}[c]+105\,C\,\text{Sin}[c]+238\,A\,\text{Sin}[d\,x]+378\,C\,\text{Sin}[d\,x])\right)-$$

$$\left(11\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

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

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

$$\left(42\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{2\,d\,\sqrt{1+\text{Cot}[c]^2}}C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]$$

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

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

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

$$\frac{1}{60\,d}17\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

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

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

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

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

$$\frac{1}{20\,d}9\,C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

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

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

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

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

Problem 150: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\text{Cos}[c+d\,x])^3\,(A+C\,\text{Cos}[c+d\,x]^2)}{\text{Cos}[c+d\,x]^{13/2}}\,dx$$

Optimal (type 4, 279 leaves, 10 steps):

$$-\frac{4\,a^3\,(5\,A+7\,C)\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+\frac{4\,a^3\,(105\,A+143\,C)\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{231\,d}+$$

$$\frac{8\,a^3\,(35\,A+44\,C)\ \text{Sin}[c+d\,x]}{385\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{4\,a^3\,(105\,A+143\,C)\ \text{Sin}[c+d\,x]}{231\,d\,\text{Cos}[c+d\,x]^{3/2}}+$$

$$\frac{4\,a^3\,(5\,A+7\,C)\ \text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{11\,d\,\text{Cos}[c+d\,x]^{11/2}}+$$

$$\frac{4\,A\,(a^2+a^2\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{33\,a\,d\,\text{Cos}[c+d\,x]^{9/2}}+\frac{2\,(35\,A+33\,C)\,(a^3+a^3\,\text{Cos}[c+d\,x])\ \text{Sin}[c+d\,x]}{231\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 997 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\ (a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(\frac{(5\,A+7\,C)\ \text{Csc}[c]\ \text{Sec}[c]}{10\,d}+\right.$$

$$\frac{A\,\text{Sec}[c]\ \text{Sec}[c+d\,x]^6\,\text{Sin}[d\,x]}{44\,d}+\frac{\text{Sec}[c]\ \text{Sec}[c+d\,x]^5\,(3\,A\,\text{Sin}[c]+11\,A\,\text{Sin}[d\,x])}{132\,d}+$$

$$\frac{1}{924\,d}\text{Sec}[c]\ \text{Sec}[c+d\,x]^4\,(77\,A\,\text{Sin}[c]+126\,A\,\text{Sin}[d\,x]+33\,C\,\text{Sin}[d\,x])+\frac{1}{4620\,d}$$

$$\text{Sec}[c]\ \text{Sec}[c+d\,x]^3\,(630\,A\,\text{Sin}[c]+165\,C\,\text{Sin}[c]+770\,A\,\text{Sin}[d\,x]+693\,C\,\text{Sin}[d\,x])+\frac{1}{4620\,d}$$

$$\text{Sec}[c]\ \text{Sec}[c+d\,x]^2\,(770\,A\,\text{Sin}[c]+693\,C\,\text{Sin}[c]+1050\,A\,\text{Sin}[d\,x]+1430\,C\,\text{Sin}[d\,x])+$$

$$\left.\frac{1}{2310\,d}\text{Sec}[c]\ \text{Sec}[c+d\,x]\,(525\,A\,\text{Sin}[c]+715\,C\,\text{Sin}[c]+1155\,A\,\text{Sin}[d\,x]+1617\,C\,\text{Sin}[d\,x])\right)-$$

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

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 \mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\ \sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

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

$$\left.\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/\left(22\,d\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-$$

$$\left(13\,C\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}[c]\ \mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 \mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\ \sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

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

$$\left(42\,d\,\sqrt{1+\mathrm{Cot}[c]^2}\right)+\frac{1}{4\,d}A\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}[c]\ \mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

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

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

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

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

$$\frac{1}{20\,d}7\,C\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}[c]\ \mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

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

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

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

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

Problem 151: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 192 leaves, 7 steps):

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

Result (type 5, 1219 leaves):

$$-\Bigg(\Bigg(3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$
$$\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$(4\,(a+a\,\text{Cos}[c+d\,x]))\Bigg)-\Bigg(21\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$
$$\text{Csc}\Big[$$
$$\frac{c}{2}\Big]\,\text{Sec}\Big[$$

$$\frac{c}{2}\Big]$$

$$\Bigg(\Bigg(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]$$

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

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2\,c]+i\,e^{2 i d x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$

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

$$\Bigg(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]$$

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

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2\,c]+i\,e^{2 i d x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$

$$\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$(20\,(a+a\,\text{Cos}[c+d\,x]))+\frac{1}{a+a\,\text{Cos}[c+d\,x]}$$

$$\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^2$$

$$\sqrt{\text{Cos}[c+d\,x]}$$

$$\Bigg(\frac{2\,(5\,A+5\,C+10\,A\,\text{Cos}[c]+16\,C\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}+$$

$$\frac{(28\,A+51\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{21\,d}-$$

$$\frac{2\,C\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}+$$

$$\frac{C\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{7\,d}+$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+$$

$$\frac{(28\,A+51\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{21\,d}-$$

$$\frac{2\,C\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}+$$

$$\frac{C\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{7\,d}\Bigg)-$$

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

$$\text{Sec}\Big[\frac{c}{2}\Big]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

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

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

$$\Bigg(15\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/\left(7\,d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

Problem 152: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 159 leaves, 6 steps):

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

Result (type 5, 1170 leaves):

$$\Bigg(3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/$$
$$\left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\Bigg(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/$$
$$\left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg) \Bigg/$$
$$(4\, (a+a \text{Cos}[c+d x]))+\Bigg(21 i C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/$$
$$\left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\Bigg(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/$$
$$\left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg) \Bigg/$$
$$(20\, (a+a \text{Cos}[c+d x]))+\frac{1}{a+a \text{Cos}[c+d x]}$$
$$\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$
$$\sqrt{\text{Cos}[c+d x]}$$
$$\Bigg(-\frac{2\, (5 A+5 C+10 A \text{Cos}[c]+16 C \text{Cos}[c]) \text{Csc}[c]}{5 d}-$$
$$\frac{4 C \text{Cos}[d x] \text{Sin}[c]}{3 d}+$$
$$\frac{2 C \text{Cos}[2 d x] \text{Sin}[2 c]}{5 d}-$$
$$\frac{2 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(A \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{d}-$$
$$\frac{4 C \text{Cos}[c] \text{Sin}[d x]}{3 d}+\frac{2 C \text{Cos}[2 c] \text{Sin}[2 d x]}{5 d}\Bigg)+$$
$$\Bigg(A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

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

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

Problem 153: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 122 leaves, 5 steps):

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

Result (type 5, 1126 leaves):

$$-\left(\left(\left(i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.\right.\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Bigg/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$(4\,(a+a\,\text{Cos}[c+d x]))\Bigg)-\Bigg(3\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Bigg)\Big/$$

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

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/$$

$$\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$(4\,(a+a\,\text{Cos}[c+d x]))+\frac{1}{a+a\,\text{Cos}[c+d x]}$$

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

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

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

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

Problem 154: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 83 leaves, 4 steps):

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

Result (type 5, 1095 leaves):

$$\Bigg(i\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\,\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\right)\Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\right)\Big/$$
$$\left.\left.\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)\right)\Big/$$
$$\left(4\left(a+a\,\text{Cos}[c+d x]\right)\right)+\left(3 i C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(2 e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\right)\Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\right)\Big/$$
$$\left.\left.\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)\right)\Big/$$
$$\left(4\left(a+a\,\text{Cos}[c+d x]\right)\right)+\frac{1}{a+a\,\text{Cos}[c+d x]}$$
$$\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$
$$\sqrt{\text{Cos}[c+d x]}$$
$$\left(-\frac{2\left(A+C+2 C\,\text{Cos}[c]\right)\text{Csc}[c]}{d}-\right.$$
$$\left.\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(A\,\text{Sin}\left[\frac{d x}{2}\right]+C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{d}\right)-$$
$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

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

Problem 155: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 113 leaves, 5 steps):

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

Result (type 5, 1128 leaves):

$$-\left(\left(3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\right.\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$

$$\left(-i\, d\, \left(1+e^{2 i d x}\right) \text{Cos}[c]+d\, \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Big)\Big) \Big/$$

$$\left(4\, \left(a+a\, \text{Cos}[c+d\, x]\right)\right)\Big)-\Big(i\, C\, \text{Cos}\left[\frac{c}{2}+\frac{d\, x}{2}\right]^2$$

$$\text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]$$

$$\Big(\Big(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} \left(\text{Cos}[c]+i\, \text{Sin}[c]\right)^2\right]$$

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

$$\sqrt{1+e^{2 i d x}\, \text{Cos}[2\, c]+i\, e^{2 i d x}\, \text{Sin}[2\, c]}\Big) \Big/$$

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

$$\Big(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} \left(\text{Cos}[c]+i\, \text{Sin}[c]\right)^2\right]$$

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

$$\sqrt{1+e^{2 i d x}\, \text{Cos}[2\, c]+i\, e^{2 i d x}\, \text{Sin}[2\, c]}\Big) \Big/$$

$$\left(-i\, d\, \left(1+e^{2 i d x}\right) \text{Cos}[c]+d\, \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Big)\Big) \Big/$$

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

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

$$\sqrt{\text{Cos}[c+d\, x]}$$

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

$$\frac{2\, \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d\, x}{2}\right] \left(A\, \text{Sin}\left[\frac{d\, x}{2}\right]+C\, \text{Sin}\left[\frac{d\, x}{2}\right]\right)}{d}+$$

$$\left.\frac{4\, A\, \text{Sec}[c]\, \text{Sec}[c+d\, x]\, \text{Sin}[d\, x]}{d}\right)+$$

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

$$\left.\text{Sin}[d\, x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right] \text{Sec}[d\, x-\text{ArcTan}[\text{Cot}[c]]]$$

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

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

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

$$\left(C\operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\operatorname{Csc}\left[\frac{c}{2}\right]\right.$$

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

$$\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}[d\,x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]$$

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

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

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

Problem 156: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 150 leaves, 6 steps):

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

Result (type 5, 1163 leaves):

$$\left(3\,i\,A\operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(\left(2\,e^{2\,i\,d\,x}\operatorname{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\operatorname{Cos}[c]+i\operatorname{Sin}[c])^2\right]\right.\right.$$

$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\operatorname{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\operatorname{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\operatorname{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\operatorname{Sin}[2\,c]}\right)\Big/$$

$$\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\operatorname{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\operatorname{Sin}[c]\right)-$$

$$\left(2\operatorname{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\operatorname{Cos}[c]+i\operatorname{Sin}[c])^2\right]\right.$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

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

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

$$\left(\left(2 e^{2 i d x}\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.\right.$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\right)\Big/$$

$$\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\right)\Big/$$

$$\left.\left.\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)\right)\Big/$$

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

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

$$\sqrt{\text{Cos}[c+d x]}$$

$$\left(-\frac{\left(2 A+A\,\text{Cos}[c]+C\,\text{Cos}[c]\right)\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]}{d}-\right.$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(A\,\text{Sin}\left[\frac{d x}{2}\right]+C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{d}+$$

$$\frac{4 A\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\text{Sin}[d x]}{3 d}+$$

$$\left.\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d x]\left(A\,\text{Sin}[c]-3 A\,\text{Sin}[d x]\right)}{3 d}\right)-$$

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

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$

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

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

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

Problem 157: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 192 leaves, 7 steps):

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

Result (type 5, 1207 leaves):

$$-\Bigg(\Bigg(21\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\left(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/$$
$$\left(3\,i\,d\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]-3\,d\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\left(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\operatorname{Cos}[2 c]+i e^{2 i d x}\operatorname{Sin}[2 c]}\Bigg)\Bigg/$$

$$\left(-i d\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)\Bigg)\Bigg)\Bigg/$$

$$\left(20\left(a+a\operatorname{Cos}[c+d x]\right)\right)\Bigg)-\Bigg(3 i C\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2 e^{2 i d x}\operatorname{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\operatorname{Cos}[c]+i\operatorname{Sin}[c]\right)^2\right]$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\operatorname{Cos}[2 c]+i e^{2 i d x}\operatorname{Sin}[2 c]}\Bigg)\Bigg/$$

$$\left(3 i d\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)-$$

$$\Bigg(2\operatorname{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\operatorname{Cos}[c]+i\operatorname{Sin}[c]\right)^2\right]$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\operatorname{Cos}[2 c]+i e^{2 i d x}\operatorname{Sin}[2 c]}\Bigg)\Bigg/$$

$$\left(-i d\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)\Bigg)\Bigg)\Bigg/$$

$$\left(4\left(a+a\operatorname{Cos}[c+d x]\right)\right)+\frac{1}{a+a\operatorname{Cos}[c+d x]}$$

$$\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\sqrt{\operatorname{Cos}[c+d x]}$$

$$\Bigg(\frac{\left(16 A+10 C+5 A\operatorname{Cos}[c]+5 C\operatorname{Cos}[c]\right)\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}[c]}{5 d}+$$

$$\frac{2\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(A\operatorname{Sin}\left[\frac{d x}{2}\right]+C\operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{d}+$$

$$\frac{4 A\operatorname{Sec}[c]\operatorname{Sec}[c+d x]^3\operatorname{Sin}[d x]}{5 d}+$$

$$\frac{4\operatorname{Sec}[c]\operatorname{Sec}[c+d x]^2\left(3 A\operatorname{Sin}[c]-5 A\operatorname{Sin}[d x]\right)}{15 d}-$$

$$\frac{4\operatorname{Sec}[c]\operatorname{Sec}[c+d x]\left(5 A\operatorname{Sin}[c]-24 A\operatorname{Sin}[d x]-15 C\operatorname{Sin}[d x]\right)}{15 d}\Bigg)+$$

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

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

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

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

Problem 158: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 196 leaves, 7 steps):

$$\frac{4\,(5\,A+14\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,a^2\,d}-\frac{5\,(A+3\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a^2\,d}-\frac{5\,(A+3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a^2\,d}+\frac{4\,(5\,A+14\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{15\,a^2\,d}-\frac{(A+3\,C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{a^2\,d\,(1+\text{Cos}[c+d\,x])}-\frac{(A+C)\,\text{Cos}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 1248 leaves):

$$\Bigg(2\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\right)\Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\right)\Big/$$
$$\left.\left.\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)\right)\Big/$$
$$\left(a+a\,\text{Cos}[c+d x]\right)^2+\left(28 i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(2 e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\right)\Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\right)\Big/$$
$$\left.\left.\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)\right)\Big/\left(5\left(a+a\,\text{Cos}[c+d x]\right)^2\right)+$$
$$\left(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.\right.$$
$$\left.\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3 d\left(a+a\,\text{Cos}[c+d x]\right)^2\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(10\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$
$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\left.\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\sqrt{1+\mathrm{Cot}[c]^2}\right)+$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Cos}[c+d\,x]}\right.$$
$$\left(-\frac{8\,(5\,A+10\,C+5\,A\,\mathrm{Cos}[c]+18\,C\,\mathrm{Cos}[c])\,\mathrm{Csc}[c]}{5\,d}-\frac{16\,C\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{3\,d}+\right.$$
$$\frac{4\,C\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{5\,d}+\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-$$
$$\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+2\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}-\frac{16\,C\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{3\,d}+$$
$$\left.\left.\frac{4\,C\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{5\,d}+\frac{2\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/(a+a\,\mathrm{Cos}[c+d\,x])^2$$

Problem 159: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 161 leaves, 6 steps):

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

Result (type 5, 1209 leaves):

$$-\left(\left(\mathrm{i}\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\right.\right.$$
$$\left(\left(2\,e^{2\,\mathrm{i}\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,\mathrm{i}\,d\,x}\,(\mathrm{Cos}[c]+\mathrm{i}\,\mathrm{Sin}[c])^2\right]\right.\right.$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\mathrm{Cos}[2c]+i e^{2 i d x}\mathrm{Sin}[2c]}\right)\Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]\right)-$$
$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\mathrm{Cos}[2c]+i e^{2 i d x}\mathrm{Sin}[2c]}\right)\Big/$$
$$\left.\left.\left(-i d\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+d\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]\right)\right)\right)\Big/$$
$$\left(2\left(a+a\,\mathrm{Cos}[c+d x]\right)^2\right)-\left(7 i C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\right.$$
$$\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]$$
$$\left(\left(2 e^{2 i d x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c]\right)^2\right]\right.\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\mathrm{Cos}[2c]+i e^{2 i d x}\mathrm{Sin}[2c]}\right)\Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]\right)-$$
$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\mathrm{Cos}[2c]+i e^{2 i d x}\mathrm{Sin}[2c]}\right)\Big/$$
$$\left.\left.\left(-i d\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+d\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]\right)\right)\right)\Big/$$
$$\left(2\left(a+a\,\mathrm{Cos}[c+d x]\right)^2\right)-\left(4 A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\right.$$
$$\mathrm{Csc}\left[\frac{c}{2}\right]$$
$$\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$
$$\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$
$$\sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

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

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

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

Problem 160: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 126 leaves, 5 steps):

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

Result (type 5, 814 leaves):

$$\Bigg(2\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$
$$\left(3\,i\,d\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]-3\,d\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$
$$\left(-i\,d\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+d\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/\,(a+a\,\text{Cos}[c+d\,x])^2-$$

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

$$\Bigg(10\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(3\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\left(-\frac{8\,C\,\text{Cot}\left[\frac{c}{2}\right]}{d}-\frac{8\,C\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]}{d}+\right.\right.$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+$$
$$\left.\left.\frac{2\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d\,x]\right)^2$$

Problem 161: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 125 leaves, 5 steps):

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

Result (type 5, 1176 leaves):

$$\left(i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left.\left.\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)\right)\Big/$$
$$\left(2\left(a+a\,\text{Cos}[c+d\,x]\right)^2\right)-\left(i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.\right.$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i\,e^{2 i d x}\text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i\,e^{2 i d x}\text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/\left(2\left(a+a\,\text{Cos}[c+d x]\right)^2\right)-$$
$$\Bigg(4 A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.$$
$$\left.\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$
$$\left(3 d\left(a+a\,\text{Cos}[c+d x]\right)^2\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\Bigg(4 C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$
$$\left(3 d\left(a+a\,\text{Cos}[c+d x]\right)^2\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Cos}[c+d x]}$$

$$\left(-\frac{4\,(A-C)\,\mathrm{Csc}[c]}{d}-\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}-\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{2\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\Bigg)\Bigg/\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2$$

Problem 162: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 155 leaves, 6 steps):

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

Result (type 5, 834 leaves):

$$-\Bigg(\Bigg(2\,i\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,\left(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\Bigg)\Bigg/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)-$$
$$\Bigg(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,\left(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\Bigg)\Bigg/$$
$$\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)\Bigg)\Bigg)\Bigg/\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2\Bigg)+$$
$$\Bigg(10\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.$$
$$\left.\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$
$$\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

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

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

$$\Bigg(2\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]$$

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

$$\mathrm{Sec}\left[\frac{c}{2}\right]\;\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

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

$$\left(3\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2\sqrt{1+\mathrm{Cot}[c]^2}\right)+$$

$$\Bigg(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Cos}[c+d\,x]}$$

$$\Bigg(\frac{8\,A\,\mathrm{Cot}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c]}{d}+\frac{8\,A\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{d}+$$

$$\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{8\,A\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,\mathrm{Sin}[d\,x]}{d}+$$

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

Problem 163: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 189 leaves, 7 steps):

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

Result (type 5, 1245 leaves):

$$\Bigg(7\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\Bigg(\Bigg(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2(1+e^{2idx})\text{Cos}[c]+2i(-1+e^{2idx})\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\text{Cos}[2c]+i\,e^{2idx}\text{Sin}[2c]}\Bigg)\Big/\left(3\,i\,d(1+e^{2idx})\text{Cos}[c]-3d(-1+e^{2idx})\text{Sin}[c]\right)-\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2(1+e^{2idx})\text{Cos}[c]+2i(-1+e^{2idx})\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\text{Cos}[2c]+i\,e^{2idx}\text{Sin}[2c]}\Bigg)\Big/\left(-i\,d(1+e^{2idx})\text{Cos}[c]+d(-1+e^{2idx})\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(2(a+a\,\text{Cos}[c+dx])^2\right)+\Bigg(i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\Bigg(\Bigg(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2(1+e^{2idx})\text{Cos}[c]+2i(-1+e^{2idx})\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\text{Cos}[2c]+i\,e^{2idx}\text{Sin}[2c]}\Bigg)\Big/\left(3\,i\,d(1+e^{2idx})\text{Cos}[c]-3d(-1+e^{2idx})\text{Sin}[c]\right)-\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2(1+e^{2idx})\text{Cos}[c]+2i(-1+e^{2idx})\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\text{Cos}[2c]+i\,e^{2idx}\text{Sin}[2c]}\Bigg)\Big/\left(-i\,d(1+e^{2idx})\text{Cos}[c]+d(-1+e^{2idx})\text{Sin}[c]\right)\Bigg)\Bigg)\Big/\left(2(a+a\,\text{Cos}[c+dx])^2\right)-$$

$$\Bigg(20\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]$$

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

$$\left(4\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

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

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$

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

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

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

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(3 A\,\text{Sin}\left[\frac{d x}{2}\right]+C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{d}+$$

$$\frac{8 A\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\text{Sin}[d x]}{3 d}+\frac{8\,\text{Sec}[c]\,\text{Sec}[c+d x]\left(A\,\text{Sin}[c]-6 A\,\text{Sin}[d x]\right)}{3 d}-$$

$$\left.\left.\frac{2\left(A+C\right)\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3 d}\right)\right)\Bigg/\left(a+a\,\text{Cos}[c+d x]\right)^2$$

Problem 164: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d x]^{7/2}\left(A+C\,\text{Cos}[c+d x]^2\right)}{\left(a+a\,\text{Cos}[c+d x]\right)^3}\,dx$$

Optimal (type 4, 250 leaves, 8 steps):

$$\frac{7\,(7A+33C)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{10a^3d}-\frac{(13A+63C)\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{6a^3d}-\frac{(13A+63C)\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{6a^3d}+\frac{7\,(7A+33C)\,\text{Cos}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{30a^3d}-\frac{(A+C)\,\text{Cos}[c+dx]^{9/2}\,\text{Sin}[c+dx]}{5d\,(a+a\,\text{Cos}[c+dx])^3}-\frac{2\,(A+6C)\,\text{Cos}[c+dx]^{7/2}\,\text{Sin}[c+dx]}{15ad\,(a+a\,\text{Cos}[c+dx])^2}-\frac{(13A+63C)\,\text{Cos}[c+dx]^{5/2}\,\text{Sin}[c+dx]}{10d\,(a^3+a^3\,\text{Cos}[c+dx])}$$

Result (type 5, 1333 leaves):

$$\Bigg(49\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\Bigg(\Bigg(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\,(1+e^{2idx})\,\text{Cos}[c]+2\,i\,(-1+e^{2idx})\,\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(3\,i\,d\,(1+e^{2idx})\,\text{Cos}[c]-3\,d\,(-1+e^{2idx})\,\text{Sin}[c]\right)-\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\,(1+e^{2idx})\,\text{Cos}[c]+2\,i\,(-1+e^{2idx})\,\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(-i\,d\,(1+e^{2idx})\,\text{Cos}[c]+d\,(-1+e^{2idx})\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(10\,(a+a\,\text{Cos}[c+dx])^3\right)+\Bigg(231\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\Bigg(\Bigg(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\,(1+e^{2idx})\,\text{Cos}[c]+2\,i\,(-1+e^{2idx})\,\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(3\,i\,d\,(1+e^{2idx})\,\text{Cos}[c]-3\,d\,(-1+e^{2idx})\,\text{Sin}[c]\right)-\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\,(1+e^{2idx})\,\text{Cos}[c]+2\,i\,(-1+e^{2idx})\,\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(-i\,d\,(1+e^{2idx})\,\text{Cos}[c]+d\,(-1+e^{2idx})\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/\left(10\,(a+a\,\text{Cos}[c+dx])^3\right)+$$

$$\Bigg(26\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

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

$$\left(3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^3\sqrt{1+\mathrm{Cot}[c]^2}\right)+$$

$$\Bigg(42\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]$$

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

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

$$\left(d\,(a+a\,\mathrm{Cos}[c+d\,x])^3\sqrt{1+\mathrm{Cot}[c]^2}\right)+$$

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

$$\Bigg(-\frac{4\,(29\,A+99\,C+20\,A\,\mathrm{Cos}[c]+132\,C\,\mathrm{Cos}[c])\,\mathrm{Csc}[c]}{5\,d}-\frac{16\,C\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{d}+$$

$$\frac{8\,C\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{5\,d}-\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$

$$\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(7\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+12\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-$$

$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(29\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+99\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\frac{16\,C\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{d}+$$

$$\frac{8\,C\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{5\,d}+\frac{8\,(7\,A+12\,C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{2\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\Bigg)$$

Problem 165: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 209 leaves, 7 steps):

$$-\frac{(9 A+119 C) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{10 a^3 d}+\frac{(A+11 C) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{2 a^3 d}+\frac{(A+11 C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{2 a^3 d}-\frac{(A+C) \text{Cos}[c+d x]^{7/2} \text{Sin}[c+d x]}{5 d (a+a \text{Cos}[c+d x])^3}-\frac{2 C \text{Cos}[c+d x]^{5/2} \text{Sin}[c+d x]}{3 a d (a+a \text{Cos}[c+d x])^2}-\frac{(9 A+119 C) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{30 d \left(a^3+a^3 \text{Cos}[c+d x]\right)}$$

Result (type 5, 1296 leaves):

$$-\left(\left(9 i A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)\right) \Big/ \left(10 (a+a \text{Cos}[c+d x])^3\right)\right)-\left(119 i C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-\right.\right.$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Big)\Big)\Big/$$
$$\left(10\left(a+a\,\text{Cos}[c+d\,x]\right)^3\right)-\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\right.$$
$$\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\right.$$
$$\left.\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\left(a+a\,\text{Cos}[c+d\,x]\right)^3\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(22\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\left(a+a\,\text{Cos}[c+d\,x]\right)^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\left(\frac{4\,(9\,A+59\,C+60\,C\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}+\frac{16\,C\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\right.$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+19\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+59\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{16\,C\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}-$$
$$\left.\left.\frac{4\,(9\,A+19\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{2\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d\,x]\right)^3$$

Problem 166: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 178 leaves, 6 steps):

$$-\frac{(A-49\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{10\,a^3\,d}+$$
$$\frac{(A-13\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{6\,a^3\,d}-\frac{(A+C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}+$$
$$\frac{2\,(A-4\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}+\frac{(A-13\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{6\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1271 leaves):

$$-\left(\left(\left(i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.\right.\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$

$$\left(-\mathrm{i}\, d \left(1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Cos}[c] + d \left(-1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Sin}[c]\right)\Bigg)\Bigg) \Big/$$

$$\left(10 \left(a + a\,\mathrm{Cos}[c+d\,x]\right)^3\right)\Bigg) + \Bigg(49\,\mathrm{i}\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\mathrm{Csc}\left[\frac{c}{2}\right] \mathrm{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\,e^{2\,\mathrm{i}\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,\mathrm{i}\,d\,x}\left(\mathrm{Cos}[c]+\mathrm{i}\,\mathrm{Sin}[c]\right)^2\right]$$

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

$$\sqrt{1+e^{2\,\mathrm{i}\,d\,x}\,\mathrm{Cos}[2\,c]+\mathrm{i}\,e^{2\,\mathrm{i}\,d\,x}\,\mathrm{Sin}[2\,c]}\Bigg)\Big/$$

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

$$\Bigg(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,\mathrm{i}\,d\,x}\left(\mathrm{Cos}[c]+\mathrm{i}\,\mathrm{Sin}[c]\right)^2\right]$$

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

$$\sqrt{1+e^{2\,\mathrm{i}\,d\,x}\,\mathrm{Cos}[2\,c]+\mathrm{i}\,e^{2\,\mathrm{i}\,d\,x}\,\mathrm{Sin}[2\,c]}\Bigg)\Big/$$

$$\left(-\mathrm{i}\,d\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Cos}[c]+d\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(10\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\right) - \Bigg(2\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\mathrm{Csc}\left[\frac{c}{2}\right]$$

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

$$\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

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

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

$$\left(3\,d\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\sqrt{1+\mathrm{Cot}[c]^2}\right) +$$

$$\Bigg(26\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]$$

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

$$\mathrm{Sec}\left[\frac{c}{2}\right]$$

$$\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\ \sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

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

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

$$\left(3\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\sqrt{1+\mathrm{Cot}[c]^2}\right)+$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\mathrm{Cos}[c+d\,x]}\right.$$

$$\left(-\frac{4\left(-A+29\,C+20\,C\,\mathrm{Cos}[c]\right)\mathrm{Csc}[c]}{5\,d}+\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-29\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\right.$$

$$\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$

$$\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(2\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+7\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+\frac{8\,(2\,A+7\,C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}-$$

$$\left.\left.\frac{2\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3$$

Problem 167: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 180 leaves, 6 steps):

$$\frac{(A-9\,C)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{10\,a^3\,d}+$$

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

$$\frac{2\,(2\,A-3\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\ \mathrm{Sin}[c+d\,x]}{15\,a\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2}-\frac{(A-9\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\ \mathrm{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\mathrm{Cos}[c+d\,x]\right)}$$

Result (type 5, 1259 leaves):

$$\left(i\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2c]+i\,e^{2 i d x}\,\text{Sin}[2c]}\right)\Big/\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2c]+i\,e^{2 i d x}\,\text{Sin}[2c]}\right)\Big/\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)\Big/$$

$$\left(10\left(a+a\,\text{Cos}[c+d x]\right)^3\right)-\left(9 i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\left(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2c]+i\,e^{2 i d x}\,\text{Sin}[2c]}\right)\Big/\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2c]+i\,e^{2 i d x}\,\text{Sin}[2c]}\right)\Big/\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)\right)\Big/\left(10\left(a+a\,\text{Cos}[c+d x]\right)^3\right)-$$

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

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

$$\left(2\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\left(a+a\,\text{Cos}[c+d\,x]\right)^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\right.$$
$$\left(-\frac{4\,(A-9\,C)\,\text{Csc}[c]}{5\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-9\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-9\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{4\,(A-9\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+$$
$$\left.\left.\frac{2\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d\,x]\right)^3$$

Problem 168: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 184 leaves, 6 steps):

$$\frac{(9\,A-C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{10\,a^3\,d}+$$
$$\frac{(3\,A+C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{6\,a^3\,d}-\frac{(A+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3}-$$
$$\frac{2\,(3\,A-2\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}-\frac{(9\,A-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1265 leaves):

$$\Bigg(9\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]$$

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

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$

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

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]$$

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

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$

$$\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(10\left(a+a\,\text{Cos}[c+d\,x]\right)^3\right)-\Bigg(i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]$$

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

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$

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

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]$$

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

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$

$$\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/\left(10\left(a+a\,\text{Cos}[c+d\,x]\right)^3\right)-$$

$$\Bigg(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.$$

$$\left.\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

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

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

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

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

$$\left(2\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^3\,\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\sqrt{\text{Cos}[c+d\,x]}\right.$$
$$\left(-\frac{4\,(9\,A-C)\,\text{Csc}[c]}{5\,d}-\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-2\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\frac{8\,(3\,A-2\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-$$
$$\left.\left.\frac{2\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\,(a+a\,\text{Cos}[c+d\,x])^3$$

Problem 169: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 219 leaves, 7 steps):

$$-\frac{(49\,A-C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{10\,a^3\,d}-\frac{(13\,A-C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{6\,a^3\,d}+$$
$$\frac{(49\,A-C)\,\text{Sin}[c+d\,x]}{10\,a^3\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\,(a+a\,\text{Cos}[c+d\,x])^3}-$$
$$\frac{2\,(4\,A-C)\,\text{Sin}[c+d\,x]}{15\,a\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{(13\,A-C)\,\text{Sin}[c+d\,x]}{6\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\,(a^3+a^3\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1301 leaves) :

$$-\left(\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] \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] \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]}\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] \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]}\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)\right)\right) \Big/ \left(10 \left(a+a\, \text{Cos}[c+d x]\right)^3\right)\right) + \left(i\, C\, \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] \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] \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]}\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] \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]}\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)\right)\right) \Big/ \left(10 \left(a+a\, \text{Cos}[c+d x]\right)^3\right) + \left(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]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right] \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$
$$\left(3 d \left(a + a \text{Cos}[c + d x]\right)^3 \sqrt{1+\text{Cot}[c]^2}\right) -$$
$$\left(2 C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$
$$\left(3 d \left(a + a \text{Cos}[c + d x]\right)^3 \sqrt{1+\text{Cot}[c]^2}\right) +$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \sqrt{\text{Cos}[c + d x]}\right.$$
$$\left(\frac{2 \left(20 A + 29 A \text{Cos}[c] - C \text{Cos}[c]\right) \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c]}{5 d} + \right.$$
$$\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(29 A \text{Sin}\left[\frac{d x}{2}\right] - C \text{Sin}\left[\frac{d x}{2}\right]\right)}{5 d} +$$
$$\frac{2 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \left(A \text{Sin}\left[\frac{d x}{2}\right] + C \text{Sin}\left[\frac{d x}{2}\right]\right)}{5 d} +$$
$$\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(11 A \text{Sin}\left[\frac{d x}{2}\right] + C \text{Sin}\left[\frac{d x}{2}\right]\right)}{15 d} + \frac{16 A \text{Sec}[c] \text{Sec}[c + d x] \text{Sin}[d x]}{d} +$$
$$\left.\left.\frac{4 \left(11 A + C\right) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Tan}\left[\frac{c}{2}\right]}{15 d} + \frac{2 \left(A + C\right) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Tan}\left[\frac{c}{2}\right]}{5 d}\right)\right) \Big/ \left(a + a \text{Cos}[c + d x]\right)^3$$

Problem 170: Result unnecessarily involves higher level functions and more

than twice size of optimal antiderivative.

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

Optimal (type 4, 242 leaves, 8 steps):

$$\frac{(119 A + 9 C) \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right]}{10 a^3 d} + \frac{(11 A + C) \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right]}{2 a^3 d} + \frac{(11 A + C) \operatorname{Sin}[c + d x]}{2 a^3 d \operatorname{Cos}[c + d x]^{3/2}} - \frac{(119 A + 9 C) \operatorname{Sin}[c + d x]}{10 a^3 d \sqrt{\operatorname{Cos}[c + d x]}} - \frac{(A + C) \operatorname{Sin}[c + d x]}{5 d \operatorname{Cos}[c + d x]^{3/2} \left(a + a \operatorname{Cos}[c + d x]\right)^3} - \frac{2 A \operatorname{Sin}[c + d x]}{3 a d \operatorname{Cos}[c + d x]^{3/2} \left(a + a \operatorname{Cos}[c + d x]\right)^2} - \frac{(119 A + 9 C) \operatorname{Sin}[c + d x]}{30 d \operatorname{Cos}[c + d x]^{3/2} \left(a^3 + a^3 \operatorname{Cos}[c + d x]\right)}$$

Result (type 5, 1331 leaves):

$$\Bigg(119 i A \operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \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} (\operatorname{Cos}[c] + i \operatorname{Sin}[c])^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} (\operatorname{Cos}[c] + i \operatorname{Sin}[c])^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(10 \left(a + a \operatorname{Cos}[c + d x]\right)^3\right) + \Bigg(9 i C \operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \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} (\operatorname{Cos}[c] + i \operatorname{Sin}[c])^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} (\operatorname{Cos}[c] + i \operatorname{Sin}[c])^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(10 \left(a + a \operatorname{Cos}[c + d x]\right)^3\right) -$$

$$\left(22\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/\left(d\,(a+a\,\mathrm{Cos}[c+d\,x])^3\sqrt{1+\mathrm{Cot}[c]^2}\right)-$$

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

$$\frac{1}{(a+a\,\mathrm{Cos}[c+d\,x])^3}\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\mathrm{Cos}[c+d\,x]}\left(-\frac{2\,(60\,A+59\,A\,\mathrm{Cos}[c]+9\,C\,\mathrm{Cos}[c])\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c]}{5\,d}-\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(8\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+3\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(59\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+9\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\right.$$

$$\frac{16\,A\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}[d\,x]}{3\,d}+\frac{16\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,\left(A\,\mathrm{Sin}[c]-9\,A\,\mathrm{Sin}[d\,x]\right)}{3\,d}-$$
$$\left.\frac{8\,(8\,A+3\,C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{2\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

Problem 171: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 214 leaves, 6 steps):

$$\frac{\sqrt{a}\,(48\,A+35\,C)\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{64\,d}+$$
$$\frac{a\,(48\,A+35\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{64\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+\frac{a\,(48\,A+35\,C)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{96\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+$$
$$\frac{a\,C\,\mathrm{Cos}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{24\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+\frac{C\,\mathrm{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{4\,d}$$

Result (type 3, 991 leaves):

$$\frac{1}{128}\,(48\,A+35\,C)\,\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(\frac{1}{2}\,i\,\mathrm{Sin}\left[\frac{c}{2}\right]\,\left(-\left(\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\mathrm{Log}\left[2\,\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.\right.$$
$$\left.\left.i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\right)\right]$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]-i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}\Bigg)\Bigg/$$
$$\left(d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\right)\Bigg)-$$
$$\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\,\right]\right.$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}\Bigg)\Bigg/$$
$$\left(d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\right)\Bigg)+$$
$$\frac{1}{2}\,\mathrm{Cos}\left[\frac{c}{2}\right]\,\left(-\left(\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\mathrm{Log}\left[2\,\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.$$
$$\left.\left.\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\right)\right]$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]-i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}\Bigg)\Bigg/$$
$$\left(d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\right)\Bigg)+$$

$$\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right]\right.$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i\,d\,x}\left(\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\Bigg/$$
$$\left.\left(d\,\sqrt{2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\right)+$$
$$\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a\left(1+\text{Cos}[c+d\,x]\right)}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]$$
$$\left(\frac{(6\,A+5\,C)\,\text{Cos}\left[\frac{d\,x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{12\,d}+\frac{(16\,A+13\,C)\,\text{Cos}\left[\frac{3\,d\,x}{2}\right]\text{Sin}\left[\frac{3\,c}{2}\right]}{64\,d}+\frac{C\,\text{Cos}\left[\frac{5\,d\,x}{2}\right]\text{Sin}\left[\frac{5\,c}{2}\right]}{24\,d}+\frac{C\,\text{Cos}\left[\frac{7\,d\,x}{2}\right]\text{Sin}\left[\frac{7\,c}{2}\right]}{32\,d}+\right.$$
$$\left.\frac{(6\,A+5\,C)\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]}{12\,d}+\frac{(16\,A+13\,C)\,\text{Cos}\left[\frac{3\,c}{2}\right]\text{Sin}\left[\frac{3\,d\,x}{2}\right]}{64\,d}+\frac{C\,\text{Cos}\left[\frac{5\,c}{2}\right]\text{Sin}\left[\frac{5\,d\,x}{2}\right]}{24\,d}+\frac{C\,\text{Cos}\left[\frac{7\,c}{2}\right]\text{Sin}\left[\frac{7\,d\,x}{2}\right]}{32\,d}\right)$$

Problem 172: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 169 leaves, 5 steps):

$$\frac{\sqrt{a}\,(8\,A+5\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{8\,d}+\frac{a\,(8\,A+5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{8\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a\,C\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{C\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 3, 578 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}\,(c+d\,x)\right]\,\left(-3\,i\,(8\,A+5\,C)\,\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{\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\,(8\,A+5\,C)\,\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)+24\,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[\frac{d\,x}{2}\right]+15\,C\,\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]+48\,\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]+28\,\sqrt{2}\,C\,\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]+6\,\sqrt{2}\,C\,\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]+4\,\sqrt{2}\,C\,\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 173: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 124 leaves, 4 steps):

$$\frac{\sqrt{a}\,(8\,A+3\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,d}+\frac{a\,C\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 3, 494 leaves):

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

Problem 174: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

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

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

Result (type 3, 615 leaves):

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

Problem 175: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 116 leaves, 4 steps):

$$\frac{2\sqrt{a}\,C\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{3\,d\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{2\,A\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 3, 468 leaves):

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

Problem 179: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 265 leaves, 7 steps):

$$\frac{a^{3/2}\,(176\,A+133\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{128\,d}+\frac{a^2\,(176\,A+133\,C)\sqrt{\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{128\,d\sqrt{a+a\,\text{Cos}[c+d x]}}+$$
$$\frac{a^2\,(176\,A+133\,C)\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{192\,d\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{a^2\,(80\,A+67\,C)\,\text{Cos}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{240\,d\sqrt{a+a\,\text{Cos}[c+d x]}}+$$
$$\frac{3\,a\,C\,\text{Cos}[c+d x]^{5/2}\sqrt{a+a\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{40\,d}+$$
$$\frac{C\,\text{Cos}[c+d x]^{5/2}\,(a+a\,\text{Cos}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{5\,d}$$

Result (type 3, 367 leaves):

$$-\frac{1}{7680\, d \sqrt{2\left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \text{Sin}[c]}}\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2} \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 \left(-15 i\,(176 A+133 C)\, e^{\frac{i d x}{2}} \left(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i\left(-1+e^{2 i d x}\right) \text{Sin}[c]}\,\right]- \text{Log}\left[2\left(e^{i d x} \text{Cos}\left[\frac{c}{2}\right]+i e^{i d x} \text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i\left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right]\right) \sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right) \text{Cos}[c]+i\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}- 4\sqrt{\text{Cos}[c+d x]}\,\left(2960 A+2671 C+2\,(880 A+1007 C) \text{Cos}[c+d x]+ 4\,(80 A+181 C) \text{Cos}[2(c+d x)]+228 C \text{Cos}[3(c+d x)]+48 C \text{Cos}[4(c+d x)]\right) \sqrt{\text{Cos}[c+d x]\,(\text{Cos}[d x]+i \text{Sin}[d x])}\, \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)$$

Problem 180: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 218 leaves, 6 steps):

$$\frac{a^{3/2}(112 A+75 C) \text{ArcSin}\left[\frac{\sqrt{a}\, \text{Sin}[c+d x]}{\sqrt{a+a \text{Cos}[c+d x]}}\right]}{64 d}+\frac{a^2(112 A+75 C) \sqrt{\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{64 d \sqrt{a+a \text{Cos}[c+d x]}}+ \frac{a^2(16 A+13 C) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{32 d \sqrt{a+a \text{Cos}[c+d x]}}+\frac{a C \text{Cos}[c+d x]^{3/2} \sqrt{a+a \text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{8 d}+ \frac{C \text{Cos}[c+d x]^{3/2}\left(a+a \text{Cos}[c+d x]\right)^{3/2} \text{Sin}[c+d x]}{4 d}$$

Result (type 3, 995 leaves):

$$\frac{1}{256}(112 A+75 C)\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(\frac{1}{2} i \text{Sin}\left[\frac{c}{2}\right]\left(-\left(\left(2 i e^{\frac{i d x}{2}} \text{Log}\left[2\left(e^{i d x} \text{Cos}\left[\frac{c}{2}\right]+ i e^{i d x} \text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i\left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right] \left(\text{Cos}\left[\frac{c}{2}\right]-i \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right) \text{Cos}[c]+i\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right) \Big/ \left(d \sqrt{2\left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right)- \left(2 i e^{\frac{i d x}{2}} \text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i\left(-1+e^{2 i d x}\right) \text{Sin}[c]}\,\right] \left(\text{Cos}\left[\frac{c}{2}\right]+i \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right) \text{Cos}[c]+i\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right) \Big/ \left(d \sqrt{2\left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)+$$

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

$$\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(\frac{(3\,A+2\,C)\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\mathrm{Sin}\left[\frac{c}{2}\right]}{4\,d}+\frac{(16\,A+21\,C)\,\mathrm{Cos}\left[\frac{3\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{3\,c}{2}\right]}{128\,d}+\frac{C\,\mathrm{Cos}\left[\frac{5\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{5\,c}{2}\right]}{16\,d}+\frac{C\,\mathrm{Cos}\left[\frac{7\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{7\,c}{2}\right]}{64\,d}+\frac{(3\,A+2\,C)\,\mathrm{Cos}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{4\,d}+\frac{(16\,A+21\,C)\,\mathrm{Cos}\left[\frac{3\,c}{2}\right]\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]}{128\,d}+\frac{C\,\mathrm{Cos}\left[\frac{5\,c}{2}\right]\mathrm{Sin}\left[\frac{5\,d\,x}{2}\right]}{16\,d}+\frac{C\,\mathrm{Cos}\left[\frac{7\,c}{2}\right]\mathrm{Sin}\left[\frac{7\,d\,x}{2}\right]}{64\,d}\right)$$

Problem 181: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 171 leaves, 5 steps):

$$\frac{a^{3/2}\,(24A+11C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{8d}+\frac{a^2\,(24A+19C)\,\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{24d\sqrt{a+a\,\text{Cos}[c+dx]}}+\frac{a\,C\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{4d}+\frac{C\sqrt{\text{Cos}[c+dx]}\,(a+a\,\text{Cos}[c+dx])^{3/2}\,\text{Sin}[c+dx]}{3d}$$

Result (type 3, 579 leaves):

$$\frac{1}{48d\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}}\,a\sqrt{\text{Cos}[c+dx]}\,\sqrt{a\,(1+\text{Cos}[c+dx])}\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]\Bigg(-3i\,(24A+11C)\,\text{Cos}\left[\frac{dx}{2}\right]$$
$$\text{Log}\left[2\left(e^{idx}\text{Cos}\left[\frac{c}{2}\right]+i\,e^{idx}\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right]+$$
$$3i\,(24A+11C)\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right]$$
$$\left(\text{Cos}\left[\frac{dx}{2}\right]+i\,\text{Sin}\left[\frac{dx}{2}\right]\right)+72A\,\text{Log}\Big[$$
$$2\left(e^{idx}\text{Cos}\left[\frac{c}{2}\right]+i\,e^{idx}\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\Big]\,\text{Sin}\left[\frac{dx}{2}\right]+$$
$$33C\,\text{Log}\left[2\left(e^{idx}\text{Cos}\left[\frac{c}{2}\right]+i\,e^{idx}\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right]$$
$$\text{Sin}\left[\frac{dx}{2}\right]+48\sqrt{2}\,A\sqrt{\text{Cos}[c+dx]\,(\text{Cos}[dx]+i\,\text{Sin}[dx])}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+$$
$$52\sqrt{2}\,C\sqrt{\text{Cos}[c+dx]\,(\text{Cos}[dx]+i\,\text{Sin}[dx])}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+$$
$$18\sqrt{2}\,C\sqrt{\text{Cos}[c+dx]\,(\text{Cos}[dx]+i\,\text{Sin}[dx])}\,\text{Sin}\left[\frac{3}{2}(c+dx)\right]+$$
$$4\sqrt{2}\,C\sqrt{\text{Cos}[c+dx]\,(\text{Cos}[dx]+i\,\text{Sin}[dx])}\,\text{Sin}\left[\frac{5}{2}(c+dx)\right]\Bigg)$$

Problem 182: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 175 leaves, 5 steps):

$$\frac{a^{3/2}\,(8A+7C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{4d}-\frac{a^2\,(8A-5C)\,\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{4d\sqrt{a+a\,\text{Cos}[c+dx]}}-\frac{a\,(4A-C)\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{2d}+\frac{2A\,(a+a\,\text{Cos}[c+dx])^{3/2}\,\text{Sin}[c+dx]}{d\sqrt{\text{Cos}[c+dx]}}$$

Result (type 3, 911 leaves):

$$\frac{1}{16}(8A+7C)\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]+\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)}\right)\Big/\left(d\sqrt{2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right)-\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]\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)}\right)\Big/\left(d\sqrt{2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right)+\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]+\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)}\right)\Big/\left(d\sqrt{2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right)+\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]\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)}\right)\Big/\left(d\sqrt{2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right)\right)+$$

$$\sqrt{\text{Cos}[c+dx]}\left(a\left(1+\text{Cos}[c+dx]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(\frac{3\,C\,\text{Cos}\left[\frac{dx}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{4d}+\frac{C\,\text{Cos}\left[\frac{3dx}{2}\right]\text{Sin}\left[\frac{3c}{2}\right]}{8d}+\frac{3\,C\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]}{4d}+\frac{C\,\text{Cos}\left[\frac{3c}{2}\right]\text{Sin}\left[\frac{3dx}{2}\right]}{8d}+\frac{A\,\text{Sec}[c+dx]\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]}{d}\right)$$

Problem 183: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 161 leaves, 5 steps):

$$\frac{3 a^{3/2} C \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{d} - \frac{a^2 (8 A - 3 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{3 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{2 a A \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{d \sqrt{\operatorname{Cos}[c + d x]}} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{3 d \operatorname{Cos}[c + d x]^{3/2}}$$

Result (type 3, 895 leaves):

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

Problem 184: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\operatorname{Cos}[c+d x])^{3/2}\left(A+C\operatorname{Cos}[c+d x]^2\right)}{\operatorname{Cos}[c+d x]^{7/2}}\,dx$$

Optimal (type 3, 163 leaves, 5 steps):

$$\frac{2 a^{3/2} C \operatorname{ArcSin}\left[\frac{\sqrt{a}\operatorname{Sin}[c+d x]}{\sqrt{a+a\operatorname{Cos}[c+d x]}}\right]}{d}+\frac{2 a^2 (4 A+5 C)\operatorname{Sin}[c+d x]}{5 d\sqrt{\operatorname{Cos}[c+d x]}\sqrt{a+a\operatorname{Cos}[c+d x]}}+\frac{2 a A\sqrt{a+a\operatorname{Cos}[c+d x]}\operatorname{Sin}[c+d x]}{5 d\operatorname{Cos}[c+d x]^{3/2}}+\frac{2 A (a+a\operatorname{Cos}[c+d x])^{3/2}\operatorname{Sin}[c+d x]}{5 d\operatorname{Cos}[c+d x]^{5/2}}$$

Result (type 3, 747 leaves):

$$\frac{1}{20\sqrt{2}\, d\operatorname{Cos}[c+d x]^{5/2}\sqrt{\operatorname{Cos}[c+d x]\left(\operatorname{Cos}[d x]+i\operatorname{Sin}[d x]\right)}}$$
$$(a(1+\operatorname{Cos}[c+d x]))^{3/2}\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3\left(\frac{5}{4}C e^{-\frac{5}{2} i d x}\operatorname{Cos}\left[\frac{c}{2}\right]^2\right.$$
$$\operatorname{Log}\left[2\left(e^{i d x}\operatorname{Cos}\left[\frac{c}{2}\right]+i e^{i d x}\operatorname{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\right)\right]$$
$$\left(i\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]-\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)^3+\frac{5}{4}C e^{-\frac{5}{2} i d x}$$
$$\operatorname{Log}\left[2\left(e^{i d x}\operatorname{Cos}\left[\frac{c}{2}\right]+i e^{i d x}\operatorname{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\right)\right]$$
$$\operatorname{Sin}\left[\frac{c}{2}\right]^2\left(i\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]-\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)^3+$$
$$\frac{5}{4} i C e^{-\frac{5}{2} i d x}\operatorname{ArcTanh}\left[\left(\operatorname{Cos}\left[\frac{c}{2}\right]+i\operatorname{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\right]$$
$$\operatorname{Cos}\left[\frac{c}{2}\right]^2\left(\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)^3+$$
$$\frac{5}{4} i C e^{-\frac{5}{2} i d x}\operatorname{ArcTanh}\left[\left(\operatorname{Cos}\left[\frac{c}{2}\right]+i\operatorname{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\right]$$
$$\operatorname{Sin}\left[\frac{c}{2}\right]^2\left(\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)^3+$$
$$4 A\sqrt{\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+$$
$$12 A\operatorname{Cos}[c+d x]\sqrt{\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+$$
$$24\sqrt{2} A\operatorname{Cos}[c+d x]^2\sqrt{\operatorname{Cos}[c+d x]\left(\operatorname{Cos}[d x]+i\operatorname{Sin}[d x]\right)}\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+$$
$$\left.20\sqrt{2} C\operatorname{Cos}[c+d x]^2\sqrt{\operatorname{Cos}[c+d x]\left(\operatorname{Cos}[d x]+i\operatorname{Sin}[d x]\right)}\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)$$

Problem 188: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 312 leaves, 8 steps):

$$\frac{a^{5/2}\,(1304\,A+1015\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{512\,d}+\frac{a^3\,(1304\,A+1015\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{512\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a^3\,(1304\,A+1015\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{768\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a^3\,(136\,A+109\,C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{192\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a^2\,(24\,A+23\,C)\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{96\,d}+$$
$$\frac{a\,C\,\text{Cos}[c+d\,x]^{5/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Sin}[c+d\,x]}{12\,d}+$$
$$\frac{C\,\text{Cos}[c+d\,x]^{5/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\,\text{Sin}[c+d\,x]}{6\,d}$$

Result (type 3, 1103 leaves):

$$\frac{1}{4096}\,(1304\,A+1015\,C)\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(\frac{1}{2}\,i\,\text{Sin}\left[\frac{c}{2}\right]\,\left(-\left(\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.\right.$$
$$\left.\left.i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left(d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right)-$$
$$\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right]\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left(d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right)+$$
$$\frac{1}{2}\,\text{Cos}\left[\frac{c}{2}\right]\,\left(-\left(\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.$$
$$\left.\left.\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left(d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right)+$$
$$\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right]\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left.\left(d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right)\right)+$$

$$\sqrt{\text{Cos}[c+d x]}\ (a\ (1+\text{Cos}[c+d x]))^{5/2}\ \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \left(\frac{(200 A+161 C)\ \text{Cos}\left[\frac{d x}{2}\right] \text{Sin}\left[\frac{c}{2}\right]}{384 d}+\frac{(360 A+329 C)\ \text{Cos}\left[\frac{3 d x}{2}\right] \text{Sin}\left[\frac{3 c}{2}\right]}{2048 d}+\frac{(10 A+13 C)\ \text{Cos}\left[\frac{5 d x}{2}\right] \text{Sin}\left[\frac{5 c}{2}\right]}{192 d}+\frac{(24 A+79 C)\ \text{Cos}\left[\frac{7 d x}{2}\right] \text{Sin}\left[\frac{7 c}{2}\right]}{3072 d}+\frac{C\ \text{Cos}\left[\frac{9 d x}{2}\right] \text{Sin}\left[\frac{9 c}{2}\right]}{128 d}+\frac{C\ \text{Cos}\left[\frac{11 d x}{2}\right] \text{Sin}\left[\frac{11 c}{2}\right]}{768 d}+\frac{(200 A+161 C)\ \text{Cos}\left[\frac{c}{2}\right] \text{Sin}\left[\frac{d x}{2}\right]}{384 d}+\frac{(360 A+329 C)\ \text{Cos}\left[\frac{3 c}{2}\right] \text{Sin}\left[\frac{3 d x}{2}\right]}{2048 d}+\frac{(10 A+13 C)\ \text{Cos}\left[\frac{5 c}{2}\right] \text{Sin}\left[\frac{5 d x}{2}\right]}{192 d}+\frac{(24 A+79 C)\ \text{Cos}\left[\frac{7 c}{2}\right] \text{Sin}\left[\frac{7 d x}{2}\right]}{3072 d}+\frac{C\ \text{Cos}\left[\frac{9 c}{2}\right] \text{Sin}\left[\frac{9 d x}{2}\right]}{128 d}+\frac{C\ \text{Cos}\left[\frac{11 c}{2}\right] \text{Sin}\left[\frac{11 d x}{2}\right]}{768 d}\right)$$

Problem 189: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 265 leaves, 7 steps):

$$\frac{a^{5/2}\,(400\,A+283\,C)\,\text{ArcSin}\Big[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\Big]}{128\,d}+$$
$$\frac{a^3\,(400\,A+283\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{128\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a^3\,(1040\,A+787\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{960\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a^2\,(80\,A+79\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{240\,d}+$$
$$\frac{a\,C\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{8\,d}+$$
$$\frac{C\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 3, 366 leaves):

$$-\frac{1}{15\,360\,d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}$$
$$\Bigg(a\,(1+\text{Cos}[c+d\,x])\Bigg)^{5/2}\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5\,\Bigg(-15\,i\,(400\,A+283\,C)\,e^{\frac{i\,d\,x}{2}}$$
$$\Bigg(\text{ArcTanh}\Big[\Big(\text{Cos}\Big[\frac{c}{2}\Big]+i\,\text{Sin}\Big[\frac{c}{2}\Big]\Big)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\Big]-$$
$$\text{Log}\Big[2\,\Big(e^{i\,d\,x}\,\text{Cos}\Big[\frac{c}{2}\Big]+i\,e^{i\,d\,x}\,\text{Sin}\Big[\frac{c}{2}\Big]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\Big)\Big]\Bigg)$$
$$\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\,-$$
$$4\,\sqrt{\text{Cos}[c+d\,x]}\,\Big(6320\,A+5521\,C+(2720\,A+3874\,C)\,\text{Cos}[c+d\,x]+$$
$$4\,(80\,A+331\,C)\,\text{Cos}[2\,(c+d\,x)]+348\,C\,\text{Cos}[3\,(c+d\,x)]+48\,C\,\text{Cos}[4\,(c+d\,x)]\Big)$$
$$\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)$$

Problem 190: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 218 leaves, 6 steps):

$$\frac{a^{5/2}\,(304 A+163 C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{64 d}+\frac{a^3\,(432 A+299 C)\,\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{192 d\,\sqrt{a+a\,\text{Cos}[c+d x]}}+$$
$$\frac{a^2\,(16 A+17 C)\,\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{32 d}+$$
$$\frac{5 a C\,\sqrt{\text{Cos}[c+d x]}\,(a+a\,\text{Cos}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{24 d}+$$
$$\frac{C\,\sqrt{\text{Cos}[c+d x]}\,(a+a\,\text{Cos}[c+d x])^{5/2}\,\text{Sin}[c+d x]}{4 d}$$

Result (type 3, 995 leaves):

$$\frac{1}{512}(304 A+163 C)\,(a\,(1+\text{Cos}[c+d x]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(\frac{1}{2}\,i\,\text{Sin}\left[\frac{c}{2}\right]\left(-\left(\left(2\,i\,e^{\frac{i d x}{2}}\,\text{Log}\left[2\left(e^{i d x}\,\text{Cos}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.\right.$$
$$\left.\left.i\,e^{i d x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right]$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\Bigg/$$
$$\left.\left(d\,\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right)-$$
$$\left(2\,i\,e^{\frac{i d x}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right]\right.$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\Bigg/$$
$$\left.\left.\left(d\,\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right)\right)+$$
$$\frac{1}{2}\text{Cos}\left[\frac{c}{2}\right]\left(-\left(\left(2\,i\,e^{\frac{i d x}{2}}\,\text{Log}\left[2\left(e^{i d x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i d x}\,\text{Sin}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.$$
$$\left.\left.\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right]$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\Bigg/$$
$$\left.\left(d\,\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right)+$$
$$\left(2\,i\,e^{\frac{i d x}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right]\right.$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\Bigg/$$
$$\left.\left.\left.\left(d\,\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right)\right)\right)+$$
$$\sqrt{\text{Cos}[c+d x]}\,(a\,(1+\text{Cos}[c+d x]))^{5/2}$$
$$\text{Sec}\Big[$$
$$\left.\frac{c}{2}+\frac{d x}{2}\right]^5$$

$$\left(\frac{5\,(6A+5C)\,\text{Cos}\left[\frac{dx}{2}\right]\,\text{Sin}\left[\frac{c}{2}\right]}{48\,d}+\frac{(16A+45C)\,\text{Cos}\left[\frac{3dx}{2}\right]\,\text{Sin}\left[\frac{3c}{2}\right]}{256\,d}+\frac{5\,C\,\text{Cos}\left[\frac{5dx}{2}\right]\,\text{Sin}\left[\frac{5c}{2}\right]}{96\,d}+\frac{C\,\text{Cos}\left[\frac{7dx}{2}\right]\,\text{Sin}\left[\frac{7c}{2}\right]}{128\,d}+\frac{5\,(6A+5C)\,\text{Cos}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{dx}{2}\right]}{48\,d}+\frac{(16A+45C)\,\text{Cos}\left[\frac{3c}{2}\right]\,\text{Sin}\left[\frac{3dx}{2}\right]}{256\,d}+\frac{5\,C\,\text{Cos}\left[\frac{5c}{2}\right]\,\text{Sin}\left[\frac{5dx}{2}\right]}{96\,d}+\frac{C\,\text{Cos}\left[\frac{7c}{2}\right]\,\text{Sin}\left[\frac{7dx}{2}\right]}{128\,d}\right)$$

Problem 191: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 222 leaves, 6 steps):

$$\frac{5\,a^{5/2}\,(8A+5C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{8\,d}-\frac{a^3\,(24A-49C)\,\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{24\,d\,\sqrt{a+a\,\text{Cos}[c+dx]}}-\frac{a^2\,(8A-3C)\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{4\,d}-\frac{a\,(6A-C)\,\sqrt{\text{Cos}[c+dx]}\,(a+a\,\text{Cos}[c+dx])^{3/2}\,\text{Sin}[c+dx]}{3\,d}+\frac{2\,A\,(a+a\,\text{Cos}[c+dx])^{5/2}\,\text{Sin}[c+dx]}{d\,\sqrt{\text{Cos}[c+dx]}}$$

Result (type 3, 968 leaves):

$$\frac{5}{64}\,(8A+5C)\,(a\,(1+\text{Cos}[c+dx]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(\frac{1}{2}\,i\,\text{Sin}\left[\frac{c}{2}\right]\left(-\left(\left(2\,i\,e^{\frac{idx}{2}}\,\text{Log}\left[2\left(e^{idx}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{idx}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right]\right.\right.\right.\right.$$

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

$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\Bigg) -$$

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

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

$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\Bigg) +$$

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

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

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

$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\Bigg) +$$

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

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

$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\Bigg)\Bigg) +$$

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

$$\left(\frac{(12 A+31 C)\text{Cos}\left[\frac{d x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{48 d}+\frac{5 C\,\text{Cos}\left[\frac{3 d x}{2}\right]\text{Sin}\left[\frac{3 c}{2}\right]}{32 d}+\frac{C\,\text{Cos}\left[\frac{5 d x}{2}\right]\text{Sin}\left[\frac{5 c}{2}\right]}{48 d}+\frac{(12 A+31 C)\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]}{48 d}+\frac{5 C\,\text{Cos}\left[\frac{3 c}{2}\right]\text{Sin}\left[\frac{3 d x}{2}\right]}{32 d}+\frac{C\,\text{Cos}\left[\frac{5 c}{2}\right]\text{Sin}\left[\frac{5 d x}{2}\right]}{48 d}+\frac{A\,\text{Sec}[c+d x]\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]}{2 d}\right)$$

Problem 192: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 218 leaves, 6 steps):

$$\frac{a^{5/2} (8 A + 19 C) \operatorname{ArcSin}\left[\frac{\sqrt{a} \sin[c+d x]}{\sqrt{a+a \cos[c+d x]}}\right]}{4 d} - \frac{a^3 (56 A - 27 C) \sqrt{\cos[c + d x]} \sin[c + d x]}{12 d \sqrt{a + a \cos[c + d x]}} - \frac{a^2 (8 A - C) \sqrt{\cos[c + d x]} \sqrt{a + a \cos[c + d x]} \sin[c + d x]}{2 d} + \frac{10 a A (a + a \cos[c + d x])^{3/2} \sin[c + d x]}{3 d \sqrt{\cos[c + d x]}} + \frac{2 A (a + a \cos[c + d x])^{5/2} \sin[c + d x]}{3 d \cos[c + d x]^{3/2}}$$

Result (type 3, 943 leaves):

$$\frac{1}{32}\left(8\,A+19\,C\right)\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}$$

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

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

$$\left(\text{Cos}\left[\frac{c}{2}\right]-\mathbb{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-\mathbb{i}\,d\,x}\,\left(\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Cos}[c]+\mathbb{i}\,\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Sin}[c]\right)}\,\Bigg)\Bigg/$$

$$\left(d\,\sqrt{2\,\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Cos}[c]+2\,\mathbb{i}\,\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Sin}[c]}\,\right)\Bigg)-$$

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

$$\left(\text{Cos}\left[\frac{c}{2}\right]+\mathbb{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-\mathbb{i}\,d\,x}\,\left(\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Cos}[c]+\mathbb{i}\,\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Sin}[c]\right)}\,\Bigg)\Bigg/$$

$$\left(d\,\sqrt{2\,\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Cos}[c]+2\,\mathbb{i}\,\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Sin}[c]}\,\right)\Bigg)+$$

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

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

$$\left(\text{Cos}\left[\frac{c}{2}\right]-\mathbb{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-\mathbb{i}\,d\,x}\,\left(\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Cos}[c]+\mathbb{i}\,\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Sin}[c]\right)}\,\Bigg)\Bigg/$$

$$\left(d\,\sqrt{2\,\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Cos}[c]+2\,\mathbb{i}\,\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Sin}[c]}\,\right)\Bigg)+$$

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

$$\left(\text{Cos}\left[\frac{c}{2}\right]+\mathbb{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-\mathbb{i}\,d\,x}\,\left(\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Cos}[c]+\mathbb{i}\,\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Sin}[c]\right)}\,\Bigg)\Bigg/$$

$$\left(d\,\sqrt{2\,\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Cos}[c]+2\,\mathbb{i}\,\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\,\text{Sin}[c]}\,\right)\Bigg)\Bigg)+$$

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

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5$$

$$\left(\frac{5\,C\,\text{Cos}\left[\frac{d\,x}{2}\right]\,\text{Sin}\left[\frac{c}{2}\right]}{8\,d}+\frac{C\,\text{Cos}\left[\frac{3\,d\,x}{2}\right]\,\text{Sin}\left[\frac{3\,c}{2}\right]}{16\,d}+\right.$$

$$\frac{5\,C\,\text{Cos}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]}{8\,d}+$$

$$\frac{C\,\text{Cos}\left[\frac{3\,c}{2}\right]\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]}{16\,d}+$$

$$\frac{4\,A\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]}{3\,d}+$$

$$\left.\frac{A\,\text{Sec}[c+d\,x]^2\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]}{6\,d}\right)$$

Problem 193: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a + a \operatorname{Cos}[c + d x])^{5/2} \left(A + C \operatorname{Cos}[c + d x]^2\right)}{\operatorname{Cos}[c + d x]^{7/2}} \, dx$$

Optimal (type 3, 210 leaves, 6 steps):

$$\frac{5 a^{5/2} C \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{d} - \frac{a^3 (64 A + 15 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{15 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{2 a^2 (8 A + 5 C) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{5 d \sqrt{\operatorname{Cos}[c + d x]}} + \frac{2 a A (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{3 d \operatorname{Cos}[c + d x]^{3/2}} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^{5/2} \operatorname{Sin}[c + d x]}{5 d \operatorname{Cos}[c + d x]^{5/2}}$$

Result (type 3, 853 leaves):

$$\frac{1}{240\sqrt{2}\,d\,\text{Cos}[c+d\,x]^{5/2}\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}}$$

$$\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\left(\frac{75}{4}C\,e^{-\frac{5}{2}i\,d\,x}\text{Cos}\left[\frac{c}{2}\right]^2\right.$$
$$\text{Log}\left[2\left(e^{i\,d\,x}\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\text{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2i\,d\,x})\,\text{Sin}[c]}\right)\right]$$
$$\left(i\,(1+e^{2i\,d\,x})\,\text{Cos}[c]-(-1+e^{2i\,d\,x})\,\text{Sin}[c]\right)^3+\frac{75}{4}C\,e^{-\frac{5}{2}i\,d\,x}$$
$$\text{Log}\left[2\left(e^{i\,d\,x}\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\text{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2i\,d\,x})\,\text{Sin}[c]}\right)\right]$$
$$\text{Sin}\left[\frac{c}{2}\right]^2\left(i\,(1+e^{2i\,d\,x})\,\text{Cos}[c]-(-1+e^{2i\,d\,x})\,\text{Sin}[c]\right)^3+$$
$$\frac{75}{4}i\,C\,e^{-\frac{5}{2}i\,d\,x}\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{(1+e^{2i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2i\,d\,x})\,\text{Sin}[c]}\right]$$
$$\text{Cos}\left[\frac{c}{2}\right]^2\left((1+e^{2i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2i\,d\,x})\,\text{Sin}[c]\right)^3+$$
$$\frac{75}{4}i\,C\,e^{-\frac{5}{2}i\,d\,x}\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{(1+e^{2i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2i\,d\,x})\,\text{Sin}[c]}\right]$$
$$\text{Sin}\left[\frac{c}{2}\right]^2\left((1+e^{2i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2i\,d\,x})\,\text{Sin}[c]\right)^3+$$
$$60\sqrt{2}\,C\,\text{Cos}\left[\frac{d\,x}{2}\right]\text{Cos}[c+d\,x]^3\,\text{Sin}\left[\frac{c}{2}\right]\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}+$$
$$60\sqrt{2}\,C\,\text{Cos}\left[\frac{c}{2}\right]\text{Cos}[c+d\,x]^3\,\text{Sin}\left[\frac{d\,x}{2}\right]\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}+$$
$$24\,A\sqrt{(1+e^{2i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2i\,d\,x})\,\text{Sin}[c]}\;\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$112\,A\,\text{Cos}[c+d\,x]\sqrt{(1+e^{2i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2i\,d\,x})\,\text{Sin}[c]}\;\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$344\sqrt{2}\,A\,\text{Cos}[c+d\,x]^2\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\;\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$\left.120\sqrt{2}\,C\,\text{Cos}[c+d\,x]^2\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\;\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

Problem 194: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^{5/2}\,(A+C\,\text{Cos}[c+d\,x]^2)}{\text{Cos}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 3, 210 leaves, 6 steps):

$$\frac{2 a^{5/2} C \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{d}+\frac{2 a^3 (32 A+49 C) \operatorname{Sin}[c+d x]}{21 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}+$$

$$\frac{2 a^2 (8 A+7 C) \sqrt{a+a \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{21 d \operatorname{Cos}[c+d x]^{3/2}}+$$

$$\frac{2 a A (a+a \operatorname{Cos}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{7 d \operatorname{Cos}[c+d x]^{5/2}}+\frac{2 A (a+a \operatorname{Cos}[c+d x])^{5/2} \operatorname{Sin}[c+d x]}{7 d \operatorname{Cos}[c+d x]^{7/2}}$$

Result (type 3, 949 leaves) :

$$\frac{1}{4} C \left(a \left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5$$
$$\left(\frac{1}{2} i \,\text{Sin}\left[\frac{c}{2}\right] \left(-\left(\left(2 i e^{\frac{i d x}{2}} \text{Log}\left[2 \left(e^{i d x} \text{Cos}\left[\frac{c}{2}\right]+i e^{i d x} \text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right]\right.\right.\right.\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-i \,\text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right) \Big/$$
$$\left.\left(d \sqrt{2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right)-$$
$$\left(2 i e^{\frac{i d x}{2}} \text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i \,\text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right]\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+i \,\text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right) \Big/$$
$$\left.\left(d \sqrt{2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right)+$$
$$\frac{1}{2} \text{Cos}\left[\frac{c}{2}\right] \left(-\left(\left(2 i e^{\frac{i d x}{2}} \text{Log}\left[2 \left(e^{i d x} \text{Cos}\left[\frac{c}{2}\right]+i e^{i d x} \text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right]\right.\right.\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-i \,\text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right) \Big/$$
$$\left.\left(d \sqrt{2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right)+$$
$$\left(2 i e^{\frac{i d x}{2}} \text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i \,\text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right]\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+i \,\text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right) \Big/$$
$$\left.\left.\left.\left(d \sqrt{2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right)\right)\right)+$$
$$\sqrt{\text{Cos}[c+d x]} \left(a \left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5$$
$$\left(\frac{2 A \,\text{Sec}[c+d x]^3 \text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]}{7 d}+\frac{A \,\text{Sec}[c+d x]^4 \text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]}{14 d}+\right.$$
$$\frac{\text{Sec}[c+d x]^2 \left(23 A \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+7 C \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}{42 d}+$$
$$\left.\frac{\text{Sec}[c+d x] \left(23 A \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+28 C \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}{21 d}\right)$$

Problem 198: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 226 leaves, 8 steps):

$$-\frac{(8A+9C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{8\sqrt{a}\,d}+\frac{\sqrt{2}\,(A+C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{\sqrt{a}\,d}+\frac{(8A+7C)\,\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{8d\sqrt{a+a\,\text{Cos}[c+dx]}}-\frac{C\,\text{Cos}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{12d\sqrt{a+a\,\text{Cos}[c+dx]}}+\frac{C\,\text{Cos}[c+dx]^{5/2}\,\text{Sin}[c+dx]}{3d\sqrt{a+a\,\text{Cos}[c+dx]}}$$

Result (type 3, 349 leaves):

$$\frac{1}{48d\sqrt{a\,(1+\text{Cos}[c+dx])}}\text{Cos}\left[\frac{1}{2}(c+dx)\right]\Bigg(-\frac{1}{\sqrt{1+e^{2i(c+dx)}}}3i\sqrt{2}\,e^{\frac{1}{2}i(c+dx)}\sqrt{e^{-i(c+dx)}\left(1+e^{2i(c+dx)}\right)}\Big(-8iAdx-9iCdx-(8A+9C)\,\text{ArcSinh}\left[e^{i(c+dx)}\right]+16\sqrt{2}\,(A+C)\,\text{Log}\left[1+e^{i(c+dx)}\right]+8A\,\text{Log}\left[1+\sqrt{1+e^{2i(c+dx)}}\right]+9C\,\text{Log}\left[1+\sqrt{1+e^{2i(c+dx)}}\right]-16\sqrt{2}\,A\,\text{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]-16\sqrt{2}\,C\,\text{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]\Big)+4\sqrt{\text{Cos}[c+dx]}\,(24A+25C-2C\,\text{Cos}[c+dx]+4C\,\text{Cos}[2(c+dx)])\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\Bigg)$$

Problem 199: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\sqrt{\text{Cos}[c+dx]}\,\left(A+C\,\text{Cos}[c+dx]^2\right)}{\sqrt{a+a\,\text{Cos}[c+dx]}}\,dx$$

Optimal (type 3, 183 leaves, 7 steps):

$$\frac{(8A+7C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{4\sqrt{a}\,d}-\frac{\sqrt{2}\,(A+C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{\sqrt{a}\,d}-\frac{C\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{4d\sqrt{a+a\,\text{Cos}[c+dx]}}+\frac{C\,\text{Cos}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{2d\sqrt{a+a\,\text{Cos}[c+dx]}}$$

Result (type 3, 344 leaves):

$$\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left(\left(\sqrt{2}\,e^{\frac{1}{2}i(c+d\,x)}\sqrt{e^{-i(c+d\,x)}\left(1+e^{2i(c+d\,x)}\right)}\left(8\,A\,d\,x+7\,C\,d\,x-i\,(8\,A+7\,C)\,\mathrm{ArcSinh}\left[e^{i(c+d\,x)}\right]+8\,i\,\sqrt{2}\,(A+C)\,\mathrm{Log}\left[1+e^{i(c+d\,x)}\right]+8\,i\,A\,\mathrm{Log}\left[1+\sqrt{1+e^{2i(c+d\,x)}}\right]+7\,i\,C\,\mathrm{Log}\left[1+\sqrt{1+e^{2i(c+d\,x)}}\right]-8\,i\,\sqrt{2}\,A\,\mathrm{Log}\left[1-e^{i(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2i(c+d\,x)}}\right]-8\,i\,\sqrt{2}\,C\,\mathrm{Log}\left[1-e^{i(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2i(c+d\,x)}}\right]\right)\right)\bigg/\left(d\,\sqrt{1+e^{2i(c+d\,x)}}\right)+\frac{4\,C\,\sqrt{\mathrm{Cos}[c+d\,x]}\left(-2\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{3}{2}(c+d\,x)\right]\right)}{d}\right)\right)\bigg/\left(8\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}\right)$$

Problem 200: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 133 leaves, 6 steps):

$$-\frac{C\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{\sqrt{2}\,(A+C)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{C\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 3, 289 leaves):

$$\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left(-\left(\left(i\,\sqrt{2}\,e^{\frac{1}{2}i(c+d\,x)}\sqrt{e^{-i(c+d\,x)}\left(1+e^{2i(c+d\,x)}\right)}\left(-i\,C\,d\,x-C\,\mathrm{ArcSinh}\left[e^{i(c+d\,x)}\right]+2\,\sqrt{2}\,(A+C)\,\mathrm{Log}\left[1+e^{i(c+d\,x)}\right]+C\,\mathrm{Log}\left[1+\sqrt{1+e^{2i(c+d\,x)}}\right]-2\,\sqrt{2}\,A\,\mathrm{Log}\left[1-e^{i(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2i(c+d\,x)}}\right]-2\,\sqrt{2}\,C\,\mathrm{Log}\left[1-e^{i(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2i(c+d\,x)}}\right]\right)\right)\bigg/\left(d\,\sqrt{1+e^{2i(c+d\,x)}}\right)\right)+\frac{4\,C\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{d}\right)\right)\bigg/\left(2\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}\right)$$

Problem 201: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + C \operatorname{Cos}[c + d x]^2}{\operatorname{Cos}[c + d x]^{3/2} \sqrt{a + a \operatorname{Cos}[c + d x]}} \, dx$$

Optimal (type 3, 135 leaves, 6 steps):

$$\frac{2 C \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{\sqrt{a}\, d} - \frac{\sqrt{2}\, (A + C) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{\sqrt{a}\, d} + \frac{2 A \operatorname{Sin}[c + d x]}{d \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + a \operatorname{Cos}[c + d x]}}$$

Result (type 3, 288 leaves):

$$\left(\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] \left(\frac{1}{\sqrt{1 + e^{2 i (c+d x)}}} \sqrt{2}\, e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)} \left(1 + e^{2 i (c+d x)}\right)} \left(C d x - i C \operatorname{ArcSinh}\left[e^{i (c+d x)}\right] + i \sqrt{2}\, (A + C) \operatorname{Log}\left[1 + e^{i (c+d x)}\right] + i C \operatorname{Log}\left[1 + \sqrt{1 + e^{2 i (c+d x)}}\right] - i \sqrt{2}\, A \operatorname{Log}\left[1 - e^{i (c+d x)} + \sqrt{2} \sqrt{1 + e^{2 i (c+d x)}}\right] - i \sqrt{2}\, C \operatorname{Log}\left[1 - e^{i (c+d x)} + \sqrt{2} \sqrt{1 + e^{2 i (c+d x)}}\right]\right) + \frac{4 A \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]}{\sqrt{\operatorname{Cos}[c + d x]}}\right)\right) \Big/ \left(d \sqrt{a \left(1 + \operatorname{Cos}[c + d x]\right)}\right)$$

Problem 202: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 136 leaves, 5 steps):

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

Result (type 3, 181 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(-\left(\left(2 i (A+C) e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\left(\text{Log}\left[1+e^{i (c+d x)}\right]-\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right)\Big/\left(d \sqrt{1+e^{2 i (c+d x)}}\right)\right)+\frac{8 A \text{Sin}\left[\frac{1}{2}(c+d x)\right]^3}{3 d \text{Cos}[c+d x]^{3/2}}\right)\right)\Big/\left(\sqrt{a (1+\text{Cos}[c+d x])}\right)$$

Problem 203: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 181 leaves, 6 steps):

$$-\frac{\sqrt{2} (A+C) \text{ArcTan}\left[\frac{\sqrt{a} \text{Sin}[c+d x]}{\sqrt{2} \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}\right]}{\sqrt{a} d}+\frac{2 A \text{Sin}[c+d x]}{5 d \text{Cos}[c+d x]^{5/2} \sqrt{a+a \text{Cos}[c+d x]}}-\frac{2 A \text{Sin}[c+d x]}{15 d \text{Cos}[c+d x]^{3/2} \sqrt{a+a \text{Cos}[c+d x]}}+\frac{2 (13 A+15 C) \text{Sin}[c+d x]}{15 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}$$

Result (type 3, 229 leaves):

$$\left(2 \text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(\frac{1}{\sqrt{1+e^{2 i (c+d x)}}} 15 i (A+C) e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\left(\text{Log}\left[1+e^{i (c+d x)}\right]-\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)+\frac{6 A \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\text{Cos}[c+d x]^{5/2}}-\frac{2 A \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\text{Cos}[c+d x]^{3/2}}+\frac{2 (13 A+15 C) \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right)\right)\Big/\left(15 d \sqrt{a (1+\text{Cos}[c+d x])}\right)$$

Problem 204: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 224 leaves, 7 steps):

$$\frac{\sqrt{2} (A+C) \text{ArcTan}\left[\frac{\sqrt{a} \text{Sin}[c+d x]}{\sqrt{2} \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}\right]}{\sqrt{a} d}+\frac{2 A \text{Sin}[c+d x]}{7 d \text{Cos}[c+d x]^{7/2} \sqrt{a+a \text{Cos}[c+d x]}}-\frac{2 A \text{Sin}[c+d x]}{35 d \text{Cos}[c+d x]^{5/2} \sqrt{a+a \text{Cos}[c+d x]}}+\frac{2 (31 A+35 C) \text{Sin}[c+d x]}{105 d \text{Cos}[c+d x]^{3/2} \sqrt{a+a \text{Cos}[c+d x]}}-\frac{2 (43 A+35 C) \text{Sin}[c+d x]}{105 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}$$

Result (type 3, 212 leaves):

$$\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\left(-\left(\left(2 i (A+C) e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\left(\mathrm{Log}\left[1+e^{i (c+d x)}\right]-\mathrm{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/ \left(d \sqrt{1+e^{2 i (c+d x)}}\right)\right)+\left(4 (73 A+35 C+24 A \mathrm{Cos}[c+d x]+(43 A+35 C) \mathrm{Cos}[2 (c+d x)]) \mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^3\right) \Big/ \left(105 d \mathrm{Cos}[c+d x]^{7/2}\right)\right)\right) \Big/ \left(\sqrt{a (1+\mathrm{Cos}[c+d x])}\right)$$

Problem 205: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 245 leaves, 8 steps):

$$\frac{(8 A+19 C) \mathrm{ArcSin}\left[\frac{\sqrt{a} \mathrm{Sin}[c+d x]}{\sqrt{a+a \mathrm{Cos}[c+d x]}}\right]}{4 a^{3/2} d}-\frac{(5 A+13 C) \mathrm{ArcTan}\left[\frac{\sqrt{a} \mathrm{Sin}[c+d x]}{\sqrt{2} \sqrt{\mathrm{Cos}[c+d x]} \sqrt{a+a \mathrm{Cos}[c+d x]}}\right]}{2 \sqrt{2} a^{3/2} d}-\frac{(A+C) \mathrm{Cos}[c+d x]^{5/2} \mathrm{Sin}[c+d x]}{2 d (a+a \mathrm{Cos}[c+d x])^{3/2}}-\frac{(2 A+7 C) \sqrt{\mathrm{Cos}[c+d x]} \mathrm{Sin}[c+d x]}{4 a d \sqrt{a+a \mathrm{Cos}[c+d x]}}+\frac{(A+2 C) \mathrm{Cos}[c+d x]^{3/2} \mathrm{Sin}[c+d x]}{2 a d \sqrt{a+a \mathrm{Cos}[c+d x]}}$$

Result (type 3, 370 leaves):

$$\frac{1}{4 d (a (1+\mathrm{Cos}[c+d x]))^{3/2}} \mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]^3\left(\frac{1}{\sqrt{1+e^{2 i (c+d x)}}} \sqrt{2} e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\left(8 A d x+19 C d x-i (8 A+19 C) \mathrm{ArcSinh}\left[e^{i (c+d x)}\right]+2 i \sqrt{2} (5 A+13 C) \mathrm{Log}\left[1+e^{i (c+d x)}\right]+8 i A \mathrm{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]+19 i C \mathrm{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-10 i \sqrt{2} A \mathrm{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]-26 i \sqrt{2} C \mathrm{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)-2 \sqrt{\mathrm{Cos}[c+d x]}(2 A+6 C+3 C \mathrm{Cos}[c+d x]-C \mathrm{Cos}[2 (c+d x)]) \mathrm{Sec}\left[\frac{1}{2}(c+d x)\right] \mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right)$$

Problem 206: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 188 leaves, 7 steps):

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

Result (type 3, 316 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^3\left(-\left(\left(i\,\sqrt{2}\,e^{\frac{1}{2}i\,(c+d\,x)}\,\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\left(-6\,i\,C\,d\,x-6\,C\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]+\sqrt{2}\,(A+9\,C)\,\text{Log}\left[1+e^{i\,(c+d\,x)}\right]+6\,C\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-\sqrt{2}\,A\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-9\,\sqrt{2}\,C\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/\left(d\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right)\right)+\frac{1}{d}2\,\sqrt{\text{Cos}[c+d\,x]}\,(A+3\,C+2\,C\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/\left(2\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\right)$$

Problem 207: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 145 leaves, 6 steps):

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

Result (type 3, 313 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^3\left(\left(\sqrt{2}\, e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\right.\right.\right.$$
$$\left(4 C d x-4 i C \,\text{ArcSinh}\left[e^{i (c+d x)}\right]-i \sqrt{2}\,(3 A-5 C) \,\text{Log}\left[1+e^{i (c+d x)}\right]+\right.$$
$$4 i C \,\text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]+3 i \sqrt{2} A \,\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]-$$
$$\left.\left.5 i \sqrt{2} C \,\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/ \left(d \sqrt{1+e^{2 i (c+d x)}}\right)-$$
$$\left.\left.\frac{2 (A+C) \sqrt{\text{Cos}[c+d x]}\, \text{Sec}\left[\frac{1}{2}(c+d x)\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{d}\right)\right) \Big/ \left(2 \left(a (1+\text{Cos}[c+d x])\right)^{3/2}\right)$$

Problem 208: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 152 leaves, 5 steps):

$$-\frac{(7 A-C) \,\text{ArcTan}\left[\frac{\sqrt{a}\, \text{Sin}[c+d x]}{\sqrt{2} \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \,\text{Cos}[c+d x]}}\right]}{2 \sqrt{2}\, a^{3/2} d}-$$
$$\frac{(A+C) \,\text{Sin}[c+d x]}{2 d \sqrt{\text{Cos}[c+d x]}\,(a+a \,\text{Cos}[c+d x])^{3/2}}+\frac{(5 A+C) \,\text{Sin}[c+d x]}{2 a d \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \,\text{Cos}[c+d x]}}$$

Result (type 3, 207 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^3\left(\left(i (7 A-C)\, e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\right.\right.\right.$$
$$\left.\left(\text{Log}\left[1+e^{i (c+d x)}\right]-\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/ \left(d \sqrt{1+e^{2 i (c+d x)}}\right)+$$
$$\left.\left.\frac{(4 A+(5 A+C) \,\text{Cos}[c+d x]) \,\text{Sec}\left[\frac{1}{2}(c+d x)\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{d \sqrt{\text{Cos}[c+d x]}}\right)\right) \Big/ \left(a (1+\text{Cos}[c+d x])\right)^{3/2}$$

Problem 209: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 201 leaves, 6 steps):

$$\frac{(11 A+3 C) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{2 \sqrt{2} a^{3/2} d}-\frac{(A+C) \operatorname{Sin}[c+d x]}{2 d \operatorname{Cos}[c+d x]^{3/2}(a+a \operatorname{Cos}[c+d x])^{3/2}}+\frac{(7 A+3 C) \operatorname{Sin}[c+d x]}{6 a d \operatorname{Cos}[c+d x]^{3/2} \sqrt{a+a \operatorname{Cos}[c+d x]}}-\frac{(19 A+3 C) \operatorname{Sin}[c+d x]}{6 a d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}$$

Result (type 3, 226 leaves):

$$\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^3\left(-\left(\left(\mathrm{i}(11 A+3 C) e^{\frac{1}{2} \mathrm{i}(c+d x)} \sqrt{e^{-\mathrm{i}(c+d x)}\left(1+e^{2 \mathrm{i}(c+d x)}\right)}\left(\operatorname{Log}\left[1+e^{\mathrm{i}(c+d x)}\right]-\operatorname{Log}\left[1-e^{\mathrm{i}(c+d x)}+\sqrt{2} \sqrt{1+e^{2 \mathrm{i}(c+d x)}}\right]\right)\right) \Big/\left(d \sqrt{1+e^{2 \mathrm{i}(c+d x)}}\right)\right)-\left((11 A+3 C+24 A \operatorname{Cos}[c+d x]+(19 A+3 C) \operatorname{Cos}[2(c+d x)]) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right] \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right) \Big/\left(6 d \operatorname{Cos}[c+d x]^{3/2}\right)\right)\right) \Big/(a(1+\operatorname{Cos}[c+d x]))^{3/2}$$

Problem 210: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+C \operatorname{Cos}[c+d x]^2}{\operatorname{Cos}[c+d x]^{7/2}(a+a \operatorname{Cos}[c+d x])^{3/2}} \, dx$$

Optimal (type 3, 248 leaves, 7 steps):

$$-\frac{(15 A+7 C) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{2 \sqrt{2} a^{3/2} d}-\frac{(A+C) \operatorname{Sin}[c+d x]}{2 d \operatorname{Cos}[c+d x]^{5/2}(a+a \operatorname{Cos}[c+d x])^{3/2}}+\frac{(9 A+5 C) \operatorname{Sin}[c+d x]}{10 a d \operatorname{Cos}[c+d x]^{5/2} \sqrt{a+a \operatorname{Cos}[c+d x]}}-\frac{(13 A+5 C) \operatorname{Sin}[c+d x]}{10 a d \operatorname{Cos}[c+d x]^{3/2} \sqrt{a+a \operatorname{Cos}[c+d x]}}+\frac{(49 A+25 C) \operatorname{Sin}[c+d x]}{10 a d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}$$

Result (type 3, 254 leaves):

$$\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^3\left(\left(\mathrm{i}(15 A+7 C) e^{\frac{1}{2} \mathrm{i}(c+d x)} \sqrt{e^{-\mathrm{i}(c+d x)}\left(1+e^{2 \mathrm{i}(c+d x)}\right)}\left(\operatorname{Log}\left[1+e^{\mathrm{i}(c+d x)}\right]-\operatorname{Log}\left[1-e^{\mathrm{i}(c+d x)}+\sqrt{2} \sqrt{1+e^{2 \mathrm{i}(c+d x)}}\right]\right)\right) \Big/\left(d \sqrt{1+e^{2 \mathrm{i}(c+d x)}}\right)+\left((88 A+40 C+(131 A+75 C) \operatorname{Cos}[c+d x]+8(9 A+5 C) \operatorname{Cos}[2(c+d x)]+49 A \operatorname{Cos}[3(c+d x)]+25 C \operatorname{Cos}[3(c+d x)]) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right] \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right) \Big/\left(20 d \operatorname{Cos}[c+d x]^{5/2}\right)\right)\right) \Big/(a(1+\operatorname{Cos}[c+d x]))^{3/2}$$

Problem 211: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 237 leaves, 8 steps):

$$-\frac{5 C \,\text{ArcSin}\left[\frac{\sqrt{a} \,\text{Sin}[c+d x]}{\sqrt{a+a \,\text{Cos}[c+d x]}}\right]}{a^{5/2} d}+\frac{(3 A+115 C) \,\text{ArcTan}\left[\frac{\sqrt{a} \,\text{Sin}[c+d x]}{\sqrt{2} \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \,\text{Cos}[c+d x]}}\right]}{16 \sqrt{2} \, a^{5/2} d}-\frac{(A+C) \,\text{Cos}[c+d x]^{5/2} \,\text{Sin}[c+d x]}{4 d \,(a+a \,\text{Cos}[c+d x])^{5/2}}+\frac{(A-15 C) \,\text{Cos}[c+d x]^{3/2} \,\text{Sin}[c+d x]}{16 a d \,(a+a \,\text{Cos}[c+d x])^{3/2}}+\frac{(3 A+35 C) \sqrt{\text{Cos}[c+d x]} \,\text{Sin}[c+d x]}{16 a^2 d \sqrt{a+a \,\text{Cos}[c+d x]}}$$

Result (type 3, 334 leaves):

$$\frac{1}{8 d \,(a \,(1+\text{Cos}[c+d x]))^{5/2}} \text{Cos}\left[\frac{1}{2} (c+d x)\right]^5 \left(-\frac{1}{\sqrt{1+e^{2 i (c+d x)}}} i \sqrt{2} \, e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)} \left(1+e^{2 i (c+d x)}\right)} \left(-80 i C d x-80 C \,\text{ArcSinh}\left[e^{i (c+d x)}\right]+\sqrt{2} (3 A+115 C) \,\text{Log}\left[1+e^{i (c+d x)}\right]+80 C \,\text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-3 \sqrt{2} A \,\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]-115 \sqrt{2} C \,\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)+\sqrt{\text{Cos}[c+d x]} \,(3 A+43 C+(7 A+55 C) \,\text{Cos}[c+d x]+8 C \,\text{Cos}[2 (c+d x)]) \,\text{Sec}\left[\frac{1}{2} (c+d x)\right]^3 \text{Tan}\left[\frac{1}{2} (c+d x)\right]\right)$$

Problem 212: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 192 leaves, 7 steps):

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

Result (type 3, 327 leaves):

$$\frac{1}{8 d \left(a \left(1+\text{Cos}[c+d x]\right)\right)^{5/2}}\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \left(\frac{1}{\sqrt{1+e^{2 i (c+d x)}}}\sqrt{2}\, e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)} \left(1+e^{2 i (c+d x)}\right)} \left(32 C d x-32 i C \text{ArcSinh}\left[e^{i (c+d x)}\right]-i \sqrt{2} (5 A-43 C) \text{Log}\left[1+e^{i (c+d x)}\right]+ 32 i C \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]+5 i \sqrt{2} A \text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]- 43 i \sqrt{2} C \text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)+ \sqrt{\text{Cos}[c+d x]} \left(5 A-11 C+(A-15 C) \text{Cos}[c+d x]\right) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)$$

Problem 213: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 154 leaves, 5 steps):

$$\frac{(19 A+3 C) \text{ArcTan}\left[\frac{\sqrt{a} \text{Sin}[c+d x]}{\sqrt{2} \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}\right]}{16 \sqrt{2}\, a^{5/2} d}-\frac{(A+C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{4 d \left(a+a \text{Cos}[c+d x]\right)^{5/2}}-\frac{(9 A-7 C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{16 a d \left(a+a \text{Cos}[c+d x]\right)^{3/2}}$$

Result (type 3, 217 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5 \left(-\frac{1}{\sqrt{1+e^{2 i (c+d x)}}} i (19 A+3 C) e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)} \left(1+e^{2 i (c+d x)}\right)} \left(\text{Log}\left[1+e^{i (c+d x)}\right]-\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)- \frac{1}{2} \sqrt{\text{Cos}[c+d x]} \left(13 A-3 C+(9 A-7 C) \text{Cos}[c+d x]\right) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/ \left(4 d \left(a \left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\right)$$

Problem 214: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+C \text{Cos}[c+d x]^2}{\text{Cos}[c+d x]^{3/2} \left(a+a \text{Cos}[c+d x]\right)^{5/2}} \, dx$$

Optimal (type 3, 199 leaves, 6 steps):

$$-\frac{5\,(15\,A-C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}}-\frac{(13\,A-3\,C)\,\text{Sin}[c+d\,x]}{16\,a\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}}+\frac{(49\,A+C)\,\text{Sin}[c+d\,x]}{16\,a^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 228 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\left(\frac{1}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}5\,i\,(15\,A-C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\left(\left(113\,A+C+10\,(17\,A+C)\,\text{Cos}[c+d\,x]+(49\,A+C)\,\text{Cos}[2\,(c+d\,x)]\right)\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Big/\left(4\,\sqrt{\text{Cos}[c+d\,x]}\right)\right)\right)\Big/\left(4\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\right)$$

Problem 215: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{5/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 3, 246 leaves, 7 steps):

$$\frac{(163\,A+19\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}}-\frac{(17\,A+C)\,\text{Sin}[c+d\,x]}{16\,a\,d\,\text{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}}+\frac{5\,(19\,A+3\,C)\,\text{Sin}[c+d\,x]}{48\,a^2\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{(299\,A+27\,C)\,\text{Sin}[c+d\,x]}{48\,a^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 256 leaves):

$$-\left(\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\left(\frac{1}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}3\,i\,(163\,A+19\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\left(\left(878\,A+78\,C+(1537\,A+81\,C)\,\text{Cos}[c+d\,x]+2\,(503\,A+39\,C)\,\text{Cos}[2\,(c+d\,x)]+299\,A\,\text{Cos}[3\,(c+d\,x)]+27\,C\,\text{Cos}[3\,(c+d\,x)]\right)\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Big/\left(8\,\text{Cos}[c+d\,x]^{3/2}\right)\right)\right)\Big/\left(12\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\right)\right)$$

Problem 221: Result more than twice size of optimal antiderivative.

$$\int \left(B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^2 \, dx$$

Optimal (type 3, 16 leaves, 3 steps):

$$C x+\frac{B \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{d}$$

Result (type 3, 73 leaves):

$$C x-\frac{B \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{B \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}$$

Problem 222: Result more than twice size of optimal antiderivative.

$$\int \left(B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^3 \, dx$$

Optimal (type 3, 24 leaves, 5 steps):

$$\frac{C \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{d}+\frac{B \operatorname{Tan}[c+d x]}{d}$$

Result (type 3, 81 leaves):

$$-\frac{C \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{C \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{B \operatorname{Tan}[c+d x]}{d}$$

Problem 225: Result more than twice size of optimal antiderivative.

$$\int \left(B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^6 \, dx$$

Optimal (type 3, 85 leaves, 7 steps):

$$\frac{3 B \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{8 d}+\frac{C \operatorname{Tan}[c+d x]}{d}+\frac{3 B \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{8 d}+\frac{B \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]}{4 d}+\frac{C \operatorname{Tan}[c+d x]^3}{3 d}$$

Result (type 3, 227 leaves):

$$-\frac{3\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{3\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{B}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{3\,B}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{B}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}-\frac{3\,B}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{2\,C\,\text{Tan}[c+d\,x]}{3\,d}+\frac{C\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Problem 230: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^2\,dx$$

Optimal (type 3, 32 leaves, 5 steps):

$$a\,(B+C)\,x+\frac{a\,B\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{a\,C\,\text{Sin}[c+d\,x]}{d}$$

Result (type 3, 104 leaves):

$$a\,B\,x+a\,C\,x-\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,C\,\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+\frac{a\,C\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}$$

Problem 231: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 3, 32 leaves, 5 steps):

$$a\,C\,x+\frac{a\,(B+C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{a\,B\,\text{Tan}[c+d\,x]}{d}$$

Result (type 3, 159 leaves):

$$a\,C\,x-\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}-\frac{a\,C\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,C\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,B\,\text{Tan}[c+d\,x]}{d}$$

Problem 232: Result more than twice size of optimal antiderivative.

$$\int (a + a \operatorname{Cos}[c + d x]) \left(B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^4 \, dx$$

Optimal (type 3, 56 leaves, 7 steps):

$$\frac{a (B + 2 C) \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{2 d} + \frac{a (B + C) \operatorname{Tan}[c + d x]}{d} + \frac{a B \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{2 d}$$

Result (type 3, 154 leaves):

$$\frac{1}{4 d} a \left(-2 (B + 2 C) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + 2 B \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + 4 C \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + \frac{B}{\left(\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} - \frac{B}{\left(\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} + 4 (B + C) \operatorname{Tan}[c + d x]\right)$$

Problem 234: Result more than twice size of optimal antiderivative.

$$\int (a + a \operatorname{Cos}[c + d x]) \left(B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^6 \, dx$$

Optimal (type 3, 106 leaves, 8 steps):

$$\frac{a (3 B + 4 C) \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{8 d} + \frac{a (B + C) \operatorname{Tan}[c + d x]}{d} + \frac{a (3 B + 4 C) \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{8 d} + \frac{a B \operatorname{Sec}[c + d x]^3 \operatorname{Tan}[c + d x]}{4 d} + \frac{a (B + C) \operatorname{Tan}[c + d x]^3}{3 d}$$

Result (type 3, 403 leaves):

$$-\frac{3\,a\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}-\frac{a\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+\frac{3\,a\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{a\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+\frac{a\,B}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{3\,a\,B}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{a\,C}{4\,d\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{a\,B}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}-\frac{3\,a\,B}{16\,d\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{a\,C}{4\,d\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{2\,a\,B\,\mathrm{Tan}[c+d\,x]}{3\,d}+\frac{2\,a\,C\,\mathrm{Tan}[c+d\,x]}{3\,d}+\frac{a\,B\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{3\,d}+\frac{a\,C\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{3\,d}$$

Problem 240: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\mathrm{Cos}[c+d\,x])^2\,\left(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^4\,dx$$

Optimal (type 3, 88 leaves, 6 steps):

$$a^2\,C\,x+\frac{a^2\,(3\,B+4\,C)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,d}+\frac{a^2\,(3\,B+2\,C)\,\mathrm{Tan}[c+d\,x]}{2\,d}+\frac{B\,\left(a^2+a^2\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 277 leaves):

$$\frac{1}{16}\,a^2\,(1+\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\left(4\,C\,x-\frac{2\,(3\,B+4\,C)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{2\,(3\,B+4\,C)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{B}{d\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{4\,(2\,B+C)\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{d\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}-\frac{B}{d\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{4\,(2\,B+C)\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{d\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}\right)$$

Problem 241: Result more than twice size of optimal antiderivative.

$$\int (a+a \operatorname{Cos}[c+d x])^2 \left(B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^5 \, dx$$

Optimal (type 3, 113 leaves, 8 steps):

$$\frac{a^2 (2 B+3 C) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{2 d}+\frac{a^2 (5 B+6 C) \operatorname{Tan}[c+d x]}{3 d}+\frac{a^2 (4 B+3 C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{6 d}+\frac{B \left(a^2+a^2 \operatorname{Cos}[c+d x]\right) \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 d}$$

Result (type 3, 753 leaves):

$$\frac{1}{8 d}(-2 B-3 C) (a+a \operatorname{Cos}[c+d x])^2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4+$$
$$\frac{1}{8 d}(2 B+3 C) (a+a \operatorname{Cos}[c+d x])^2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4+$$
$$\frac{B (a+a \operatorname{Cos}[c+d x])^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Sin}\left[\frac{d x}{2}\right]}{24 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$
$$\left((a+a \operatorname{Cos}[c+d x])^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \left(7 B \operatorname{Cos}\left[\frac{c}{2}\right]+3 C \operatorname{Cos}\left[\frac{c}{2}\right]-5 B \operatorname{Sin}\left[\frac{c}{2}\right]-3 C \operatorname{Sin}\left[\frac{c}{2}\right]\right)\right) \Big/$$
$$\left(48 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2\right)+$$
$$\frac{(a+a \operatorname{Cos}[c+d x])^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \left(5 B \operatorname{Sin}\left[\frac{d x}{2}\right]+6 C \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{12 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}+$$
$$\frac{B (a+a \operatorname{Cos}[c+d x])^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \operatorname{Sin}\left[\frac{d x}{2}\right]}{24 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$
$$\left((a+a \operatorname{Cos}[c+d x])^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \left(-7 B \operatorname{Cos}\left[\frac{c}{2}\right]-3 C \operatorname{Cos}\left[\frac{c}{2}\right]-5 B \operatorname{Sin}\left[\frac{c}{2}\right]-3 C \operatorname{Sin}\left[\frac{c}{2}\right]\right)\right) \Big/$$
$$\left(48 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2\right)+$$
$$\frac{(a+a \operatorname{Cos}[c+d x])^2 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \left(5 B \operatorname{Sin}\left[\frac{d x}{2}\right]+6 C \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{12 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}$$

Problem 248: Result more than twice size of optimal antiderivative.

$$\int (a+a \operatorname{Cos}[c+d x])^3 \left(B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^3 \, dx$$

Optimal (type 3, 110 leaves, 7 steps):

$$\frac{1}{2} a^3 (6 B+7 C) x+\frac{a^3 (3 B+C) \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{5 a^3 C \text{Sin}[c+d x]}{2 d}-\frac{(2 B-C) \left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{2 d}+\frac{a B (a+a \text{Cos}[c+d x])^2 \text{Tan}[c+d x]}{d}$$

Result (type 3, 272 leaves):

$$\frac{1}{32} a^3 (1+\text{Cos}[c+d x])^3 \text{Sec}\left[\frac{1}{2} (c+d x)\right]^6 \left(2 (6 B+7 C) x-\frac{4 (3 B+C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{d}+\frac{4 (3 B+C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{d}+\frac{4 (B+3 C) \text{Cos}[d x] \text{Sin}[c]}{d}+\frac{C \text{Cos}[2 d x] \text{Sin}[2 c]}{d}+\frac{4 (B+3 C) \text{Cos}[c] \text{Sin}[d x]}{d}+\frac{C \text{Cos}[2 c] \text{Sin}[2 d x]}{d}+\frac{4 B \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+\frac{4 B \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}\right)$$

Problem 250: Result more than twice size of optimal antiderivative.

$$\int (a+a \text{Cos}[c+d x])^3 \left(B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]^5 \, dx$$

Optimal (type 3, 125 leaves, 7 steps):

$$a^3 C x+\frac{a^3 (5 B+7 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{5 a^3 (B+C) \text{Tan}[c+d x]}{2 d}+\frac{(5 B+3 C) \left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{6 d}+\frac{a B (a+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 d}$$

Result (type 3, 786 leaves):

$$\frac{1}{8} C x \left(a+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6+\frac{1}{16 d}$$
$$\left(-5 B-7 C\right) \left(a+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6+$$
$$\frac{1}{16 d}\left(5 B+7 C\right) \left(a+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6+$$
$$\frac{B \left(a+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Sin}\left[\frac{d x}{2}\right]}{48 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$
$$\left(\left(a+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(10 B \operatorname{Cos}\left[\frac{c}{2}\right]+3 C \operatorname{Cos}\left[\frac{c}{2}\right]-8 B \operatorname{Sin}\left[\frac{c}{2}\right]-3 C \operatorname{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(96 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2\right)+$$
$$\frac{\left(a+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(11 B \operatorname{Sin}\left[\frac{d x}{2}\right]+9 C \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{24 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}+$$
$$\frac{B \left(a+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Sin}\left[\frac{d x}{2}\right]}{48 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3}+$$
$$\left(\left(a+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(-10 B \operatorname{Cos}\left[\frac{c}{2}\right]-3 C \operatorname{Cos}\left[\frac{c}{2}\right]-8 B \operatorname{Sin}\left[\frac{c}{2}\right]-3 C \operatorname{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(96 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2\right)+$$
$$\frac{\left(a+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(11 B \operatorname{Sin}\left[\frac{d x}{2}\right]+9 C \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{24 d \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}$$

Problem 253: Result more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Cos}[c+d x]^2 \left(B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right)}{a+a \operatorname{Cos}[c+d x]} \, dx$$

Optimal (type 3, 122 leaves, 7 steps):

$$\frac{3 \left(B-C\right) x}{2 a}-\frac{\left(3 B-4 C\right) \operatorname{Sin}[c+d x]}{a d}+\frac{3 \left(B-C\right) \operatorname{Cos}[c+d x] \operatorname{Sin}[c+d x]}{2 a d}+$$
$$\frac{\left(B-C\right) \operatorname{Cos}[c+d x]^3 \operatorname{Sin}[c+d x]}{d \left(a+a \operatorname{Cos}[c+d x]\right)}+\frac{\left(3 B-4 C\right) \operatorname{Sin}[c+d x]^3}{3 a d}$$

Result (type 3, 249 leaves):

$$\frac{1}{24\,a\,d\,\left(1+\text{Cos}[c+d\,x]\right)}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(36\,(B-C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+36\,(B-C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-60\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+69\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]-12\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+21\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-9\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+18\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-9\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+18\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-2\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-2\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+C\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 255: Result more than twice size of optimal antiderivative.

$$\int\frac{B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 54 leaves, 4 steps):

$$\frac{(B-C)\,x}{a}+\frac{C\,\text{Sin}[c+d\,x]}{a\,d}-\frac{(B-C)\,\text{Sin}[c+d\,x]}{a\,d\,\left(1+\text{Cos}[c+d\,x]\right)}$$

Result (type 3, 126 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(2\,(B-C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+2\,(B-C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-4\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+5\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]\right)\right)\Big/\left(2\,a\,d\,\left(1+\text{Cos}[c+d\,x]\right)\right)$$

Problem 256: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 34 leaves, 3 steps):

$$\frac{C\,x}{a}+\frac{(B-C)\,\text{Sin}[c+d\,x]}{d\,\left(a+a\,\text{Cos}[c+d\,x]\right)}$$

Result (type 3, 72 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(C\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+C\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+2\,(B-C)\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Big/\left(a\,d\,\left(1+\text{Cos}[c+d\,x]\right)\right)$$

Problem 257: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^2}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 44 leaves, 4 steps):

$$\frac{B\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a\,d}-\frac{(B-C)\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 3, 109 leaves):

$$\left(2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left(B\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left(-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+(-B+C)\,\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Big/\left(a\,d\,(1+\text{Cos}[c+d\,x])\right)$$

Problem 258: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^3}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 69 leaves, 6 steps):

$$-\frac{(B-C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a\,d}+\frac{(2\,B-C)\,\text{Tan}[c+d\,x]}{a\,d}-\frac{(B-C)\,\text{Tan}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 3, 201 leaves):

$$\left(2\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left((B-C)\,\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left((B-C)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+(B\,\text{Sin}[d\,x])\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\right)\right)\right)\Big/\left(a\,d\,(1+\text{Cos}[c+d\,x])\right)$$

Problem 259: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^4}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 107 leaves, 7 steps):

$$\frac{(3\,B-2\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a\,d}-\frac{2\,(B-C)\,\text{Tan}[c+d\,x]}{a\,d}+\frac{(3\,B-2\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a\,d}-\frac{(B-C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 3, 289 leaves):

$$\frac{1}{2\,a\,d\,\left(1+\mathrm{Cos}\left[c+d\,x\right]\right)}\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\left(4\left(-B+C\right)\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]+\right.$$
$$\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\left(\left(-6\,B+4\,C\right)\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]+\right.$$
$$6\,B\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]-4\,C\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]+$$
$$\frac{B}{\left(\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^2}-\frac{B}{\left(\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^2}-$$
$$\left(4\left(B-C\right)\mathrm{Sin}\left[d\,x\right]\right)\Big/\left(\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right.$$
$$\left.\left.\left.\left(\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\right)\right)\right)$$

Problem 260: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(B\,\mathrm{Cos}\left[c+d\,x\right]+C\,\mathrm{Cos}\left[c+d\,x\right]^2\right)\mathrm{Sec}\left[c+d\,x\right]^5}{a+a\,\mathrm{Cos}\left[c+d\,x\right]}\,dx$$

Optimal (type 3, 131 leaves, 7 steps):

$$-\frac{3\left(B-C\right)\mathrm{ArcTanh}\left[\mathrm{Sin}\left[c+d\,x\right]\right]}{2\,a\,d}+\frac{\left(4\,B-3\,C\right)\mathrm{Tan}\left[c+d\,x\right]}{a\,d}-$$
$$\frac{3\left(B-C\right)\mathrm{Sec}\left[c+d\,x\right]\mathrm{Tan}\left[c+d\,x\right]}{2\,a\,d}-\frac{\left(B-C\right)\mathrm{Sec}\left[c+d\,x\right]^2\mathrm{Tan}\left[c+d\,x\right]}{d\left(a+a\,\mathrm{Cos}\left[c+d\,x\right]\right)}+\frac{\left(4\,B-3\,C\right)\mathrm{Tan}\left[c+d\,x\right]^3}{3\,a\,d}$$

Result (type 3, 567 leaves):

$$\frac{1}{a}\left(\frac{3\,(B-C)\,\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\,(1+\text{Cos}[c+d\,x])}-\frac{3\,(B-C)\,\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\,(1+\text{Cos}[c+d\,x])}+\frac{1}{48\,d\,(1+\text{Cos}[c+d\,x])}\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\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+6\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+39\,B\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-27\,C\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-24\,B\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+12\,C\,\text{Sin}\left[c-\frac{d\,x}{2}\right]-6\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+6\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-24\,B\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]+24\,C\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]+21\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-9\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+9\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-9\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-9\,B\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+9\,C\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+7\,B\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]-3\,C\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]+B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-3\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-9\,B\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+9\,C\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+16\,B\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-12\,C\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+10\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-6\,C\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+6\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-6\,C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)\right)$$

Problem 261: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^3\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{(a+a\,\text{Cos}[c+d\,x])^2}\,dx$$

Optimal (type 3, 170 leaves, 8 steps):

$$\frac{(7\,B-10\,C)\,x}{2\,a^2}-\frac{4\,(2\,B-3\,C)\,\text{Sin}[c+d\,x]}{a^2\,d}+\frac{(7\,B-10\,C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^2\,d}+\frac{(7\,B-10\,C)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Cos}[c+d\,x])}+\frac{(B-C)\,\text{Cos}[c+d\,x]^4\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}+\frac{4\,(2\,B-3\,C)\,\text{Sin}[c+d\,x]^3}{3\,a^2\,d}$$

Result (type 3, 369 leaves):

$$\frac{1}{48\,a^2\,d\,\left(1+\mathrm{Cos}[c+d\,x]\right)^2}\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\left(36\,(7\,B-10\,C)\,d\,x\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]+36\,(7\,B-10\,C)\,d\,x\,\mathrm{Cos}\left[c+\frac{d\,x}{2}\right]+\right.$$
$$84\,B\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]-120\,C\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]+84\,B\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-$$
$$120\,C\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-381\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+516\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+147\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-$$
$$156\,C\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-239\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+342\,C\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-63\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+$$
$$118\,C\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-15\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+30\,C\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-$$
$$15\,B\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+30\,C\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+3\,B\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-3\,C\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+$$
$$\left.3\,B\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-3\,C\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+C\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+C\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

Problem 262: Result more than twice size of optimal antiderivative.

$$\int \frac{\mathrm{Cos}[c+d\,x]^2\,\left(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2}\,dx$$

Optimal (type 3, 147 leaves, 4 steps):

$$-\frac{(4\,B-7\,C)\,x}{2\,a^2}+\frac{2\,(5\,B-8\,C)\,\mathrm{Sin}[c+d\,x]}{3\,a^2\,d}-\frac{(4\,B-7\,C)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Sin}[c+d\,x]}{2\,a^2\,d}+$$
$$\frac{(5\,B-8\,C)\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sin}[c+d\,x]}{3\,a^2\,d\,\left(1+\mathrm{Cos}[c+d\,x]\right)}+\frac{(B-C)\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sin}[c+d\,x]}{3\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2}$$

Result (type 3, 315 leaves):

$$\frac{1}{48\,a^2\,d\,\left(1+\mathrm{Cos}[c+d\,x]\right)^2}\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\left(-36\,(4\,B-7\,C)\,d\,x\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]-36\,(4\,B-7\,C)\,d\,x\,\mathrm{Cos}\left[c+\frac{d\,x}{2}\right]-\right.$$
$$48\,B\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]+84\,C\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]-48\,B\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+$$
$$84\,C\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+264\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-381\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-120\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+$$
$$147\,C\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+164\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-239\,C\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+36\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-$$
$$63\,C\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+12\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-15\,C\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+$$
$$\left.12\,B\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-15\,C\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+3\,C\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+3\,C\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 264: Result more than twice size of optimal antiderivative.

$$\int \frac{B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2}{(a+a \operatorname{Cos}[c+d x])^2}\,dx$$

Optimal (type 3, 70 leaves, 3 steps):

$$\frac{C x}{a^2}+\frac{(2 B-5 C) \operatorname{Sin}[c+d x]}{3 a^2 d (1+\operatorname{Cos}[c+d x])}-\frac{(B-C) \operatorname{Sin}[c+d x]}{3 d (a+a \operatorname{Cos}[c+d x])^2}$$

Result (type 3, 153 leaves):

$$\frac{1}{24 a^2 d}\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{1}{2} (c+d x)\right]^3 \left(9 C d x \operatorname{Cos}\left[\frac{d x}{2}\right]+9 C d x \operatorname{Cos}\left[c+\frac{d x}{2}\right]+3 C d x \operatorname{Cos}\left[c+\frac{3 d x}{2}\right]+3 C d x \operatorname{Cos}\left[2 c+\frac{3 d x}{2}\right]+6 B \operatorname{Sin}\left[\frac{d x}{2}\right]-18 C \operatorname{Sin}\left[\frac{d x}{2}\right]-6 B \operatorname{Sin}\left[c+\frac{d x}{2}\right]+12 C \operatorname{Sin}\left[c+\frac{d x}{2}\right]+4 B \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]-10 C \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]\right)$$

Problem 266: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^2}{(a+a \operatorname{Cos}[c+d x])^2}\,dx$$

Optimal (type 3, 79 leaves, 5 steps):

$$\frac{B \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{a^2 d}-\frac{(4 B-C) \operatorname{Sin}[c+d x]}{3 a^2 d (1+\operatorname{Cos}[c+d x])}-\frac{(B-C) \operatorname{Sin}[c+d x]}{3 d (a+a \operatorname{Cos}[c+d x])^2}$$

Result (type 3, 170 leaves):

$$-\left(\left(2 \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right] \left(6 B \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^3 \left(\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+(B-C) \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sin}\left[\frac{d x}{2}\right]+2 (4 B-C) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^2 \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sin}\left[\frac{d x}{2}\right]+(B-C) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right] \operatorname{Tan}\left[\frac{c}{2}\right]\right)\right)\Big/\left(3 a^2 d (1+\operatorname{Cos}[c+d x])^2\right)\right)$$

Problem 267: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^3}{(a+a \operatorname{Cos}[c+d x])^2}\,dx$$

Optimal (type 3, 107 leaves, 7 steps):

$$-\frac{(2B-C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{a^2 d}+\frac{2\,(5B-2C)\,\text{Tan}[c+dx]}{3a^2 d}-\frac{(2B-C)\,\text{Tan}[c+dx]}{a^2 d\,(1+\text{Cos}[c+dx])}-\frac{(B-C)\,\text{Tan}[c+dx]}{3d\,(a+a\,\text{Cos}[c+dx])^2}$$

Result (type 3, 264 leaves):

$$\frac{1}{3a^2 d\,(1+\text{Cos}[c+dx])^2}2\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left((B-C)\,\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]+2\,(7B-4C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]+6\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left((2B-C)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right)+(B\,\text{Sin}[dx])\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\right)+(B-C)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\text{Tan}\left[\frac{c}{2}\right]\right)$$

Problem 268: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(B\,\text{Cos}[c+dx]+C\,\text{Cos}[c+dx]^2\right)\text{Sec}[c+dx]^4}{(a+a\,\text{Cos}[c+dx])^2}\,dx$$

Optimal (type 3, 152 leaves, 8 steps):

$$\frac{(7B-4C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{2a^2 d}-\frac{2\,(8B-5C)\,\text{Tan}[c+dx]}{3a^2 d}+\frac{(7B-4C)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{2a^2 d}-\frac{(8B-5C)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{3a^2 d\,(1+\text{Cos}[c+dx])}-\frac{(B-C)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{3d\,(a+a\,\text{Cos}[c+dx])^2}$$

Result (type 3, 572 leaves):

$$\frac{1}{a^2}\left(-\frac{2\,(7\,B-4\,C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,(1+\text{Cos}[c+d\,x])^2}+\right.$$

$$\frac{2\,(7\,B-4\,C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,(1+\text{Cos}[c+d\,x])^2}+$$

$$\frac{1}{48\,d\,(1+\text{Cos}[c+d\,x])^2}\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2$$

$$\left(14\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-14\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]-97\,B\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]+64\,C\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]+126\,B\,\text{Sin}\left[c-\frac{d\,x}{2}\right]-\right.$$

$$84\,C\,\text{Sin}\left[c-\frac{d\,x}{2}\right]-42\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+42\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+98\,B\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-$$

$$56\,C\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]+3\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-6\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-37\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+$$

$$34\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+63\,B\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-36\,C\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-$$

$$75\,B\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]+48\,C\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]-15\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+6\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-$$

$$39\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+30\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+21\,B\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-$$

$$12\,C\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-32\,B\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+20\,C\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-$$

$$\left.\left.12\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+6\,C\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-20\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+14\,C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)\right)$$

Problem 269: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d\,x]^3\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{(a+a\,\text{Cos}[c+d\,x])^3}\,dx$$

Optimal (type 3, 193 leaves, 5 steps):

$$-\frac{(6\,B-13\,C)\,x}{2\,a^3}+\frac{8\,(9\,B-19\,C)\,\text{Sin}[c+d\,x]}{15\,a^3\,d}-$$

$$\frac{(6\,B-13\,C)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^3\,d}+\frac{(B-C)\,\text{Cos}[c+d\,x]^4\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}+$$

$$\frac{(6\,B-11\,C)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}+\frac{4\,(9\,B-19\,C)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{15\,d\,(a^3+a^3\,\text{Cos}[c+d\,x])}$$

Result (type 3, 435 leaves):

$$\frac{1}{480\, a^3\, d\, (1+\mathrm{Cos}[c+d\, x])^3}\mathrm{Cos}\left[\frac{1}{2}(c+d\, x)\right]\mathrm{Sec}\left[\frac{c}{2}\right]\left(-600\,(6\, B-13\, C)\, d\, x\, \mathrm{Cos}\left[\frac{d\, x}{2}\right]-600\,(6\, B-13\, C)\, d\, x\, \mathrm{Cos}\left[c+\frac{d\, x}{2}\right]-\right.$$
$$1800\, B\, d\, x\, \mathrm{Cos}\left[c+\frac{3\, d\, x}{2}\right]+3900\, C\, d\, x\, \mathrm{Cos}\left[c+\frac{3\, d\, x}{2}\right]-1800\, B\, d\, x\, \mathrm{Cos}\left[2\, c+\frac{3\, d\, x}{2}\right]+$$
$$3900\, C\, d\, x\, \mathrm{Cos}\left[2\, c+\frac{3\, d\, x}{2}\right]-360\, B\, d\, x\, \mathrm{Cos}\left[2\, c+\frac{5\, d\, x}{2}\right]+780\, C\, d\, x\, \mathrm{Cos}\left[2\, c+\frac{5\, d\, x}{2}\right]-$$
$$360\, B\, d\, x\, \mathrm{Cos}\left[3\, c+\frac{5\, d\, x}{2}\right]+780\, C\, d\, x\, \mathrm{Cos}\left[3\, c+\frac{5\, d\, x}{2}\right]+7020\, B\, \mathrm{Sin}\left[\frac{d\, x}{2}\right]-12\,760\, C\, \mathrm{Sin}\left[\frac{d\, x}{2}\right]-$$
$$4500\, B\, \mathrm{Sin}\left[c+\frac{d\, x}{2}\right]+7560\, C\, \mathrm{Sin}\left[c+\frac{d\, x}{2}\right]+4860\, B\, \mathrm{Sin}\left[c+\frac{3\, d\, x}{2}\right]-9230\, C\, \mathrm{Sin}\left[c+\frac{3\, d\, x}{2}\right]-$$
$$900\, B\, \mathrm{Sin}\left[2\, c+\frac{3\, d\, x}{2}\right]+930\, C\, \mathrm{Sin}\left[2\, c+\frac{3\, d\, x}{2}\right]+1452\, B\, \mathrm{Sin}\left[2\, c+\frac{5\, d\, x}{2}\right]-2782\, C\, \mathrm{Sin}\left[2\, c+\frac{5\, d\, x}{2}\right]+$$
$$300\, B\, \mathrm{Sin}\left[3\, c+\frac{5\, d\, x}{2}\right]-750\, C\, \mathrm{Sin}\left[3\, c+\frac{5\, d\, x}{2}\right]+60\, B\, \mathrm{Sin}\left[3\, c+\frac{7\, d\, x}{2}\right]-105\, C\, \mathrm{Sin}\left[3\, c+\frac{7\, d\, x}{2}\right]+$$
$$\left.60\, B\, \mathrm{Sin}\left[4\, c+\frac{7\, d\, x}{2}\right]-105\, C\, \mathrm{Sin}\left[4\, c+\frac{7\, d\, x}{2}\right]+15\, C\, \mathrm{Sin}\left[4\, c+\frac{9\, d\, x}{2}\right]+15\, C\, \mathrm{Sin}\left[5\, c+\frac{9\, d\, x}{2}\right]\right)$$

Problem 270: Result more than twice size of optimal antiderivative.

$$\int \frac{\mathrm{Cos}[c+d\, x]^2\,(B\, \mathrm{Cos}[c+d\, x]+C\, \mathrm{Cos}[c+d\, x]^2)}{(a+a\, \mathrm{Cos}[c+d\, x])^3}\, dx$$

Optimal (type 3, 147 leaves, 8 steps):

$$\frac{(B-3\, C)\, x}{a^3}-\frac{(7\, B-27\, C)\, \mathrm{Sin}[c+d\, x]}{15\, a^3\, d}+\frac{(B-C)\, \mathrm{Cos}[c+d\, x]^3\, \mathrm{Sin}[c+d\, x]}{5\, d\, (a+a\, \mathrm{Cos}[c+d\, x])^3}+$$
$$\frac{(4\, B-9\, C)\, \mathrm{Cos}[c+d\, x]^2\, \mathrm{Sin}[c+d\, x]}{15\, a\, d\, (a+a\, \mathrm{Cos}[c+d\, x])^2}-\frac{(B-3\, C)\, \mathrm{Sin}[c+d\, x]}{d\, (a^3+a^3\, \mathrm{Cos}[c+d\, x])}$$

Result (type 3, 361 leaves):

$$\frac{1}{120\,a^3\,d\,\left(1+\mathrm{Cos}[c+d\,x]\right)^3}\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\left(300\,(B-3\,C)\,d\,x\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]+300\,(B-3\,C)\,d\,x\,\mathrm{Cos}\left[c+\frac{d\,x}{2}\right]+\right.$$
$$150\,B\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]-450\,C\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]+150\,B\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-$$
$$450\,C\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+30\,B\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]-90\,C\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+$$
$$30\,B\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-90\,C\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-740\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+1755\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+$$
$$540\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-1125\,C\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-460\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+1215\,C\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+$$
$$180\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-225\,C\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-128\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+$$
$$\left.363\,C\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+75\,C\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+15\,C\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+15\,C\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 271: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+d\,x]\,\left(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3}\,dx$$

Optimal (type 3, 116 leaves, 6 steps):

$$\frac{C\,x}{a^3}+\frac{(B-C)\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sin}[c+d\,x]}{5\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3}-\frac{(2\,B-7\,C)\,\mathrm{Sin}[c+d\,x]}{15\,a\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2}+\frac{(4\,B-29\,C)\,\mathrm{Sin}[c+d\,x]}{15\,d\,\left(a^3+a^3\,\mathrm{Cos}[c+d\,x]\right)}$$

Result (type 3, 241 leaves):

$$\frac{1}{480\,a^3\,d}\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5$$
$$\left(150\,C\,d\,x\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]+150\,C\,d\,x\,\mathrm{Cos}\left[c+\frac{d\,x}{2}\right]+75\,C\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]+75\,C\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+\right.$$
$$15\,C\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+15\,C\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+80\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-370\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-$$
$$60\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+270\,C\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+40\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-230\,C\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-$$
$$\left.30\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+90\,C\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+14\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-64\,C\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]\right)$$

Problem 275: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^3}{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3}\,dx$$

Optimal (type 3, 145 leaves, 8 steps):

$$-\frac{(3\,B-C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a^3\,d}+\frac{2\,(36\,B-11\,C)\,\text{Tan}[c+d\,x]}{15\,a^3\,d}-\frac{(B-C)\,\text{Tan}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}-\frac{(9\,B-4\,C)\,\text{Tan}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{(3\,B-C)\,\text{Tan}[c+d\,x]}{d\,(a^3+a^3\,\text{Cos}[c+d\,x])}$$

Result (type 3, 556 leaves):

$$\frac{1}{a^3}\left(\frac{8\,(3\,B-C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\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\,(1+\text{Cos}[c+d\,x])^3}-\frac{8\,(3\,B-C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\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\,(1+\text{Cos}[c+d\,x])^3}+\frac{1}{120\,d\,(1+\text{Cos}[c+d\,x])^3}\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]\left(-255\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+160\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+567\,B\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-167\,C\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-600\,B\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+170\,C\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+375\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-170\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-480\,B\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]+160\,C\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-60\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+75\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+402\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-167\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-225\,B\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+75\,C\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+315\,B\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]-95\,C\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]+30\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+15\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+240\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-95\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-45\,B\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+15\,C\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+72\,B\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-22\,C\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+15\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+57\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-22\,C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)\right)$$

Problem 276: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^4}{(a+a\,\text{Cos}[c+d\,x])^3}\,dx$$

Optimal (type 3, 196 leaves, 9 steps):

$$\frac{(13\,B-6\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^3\,d}-\frac{8\,(19\,B-9\,C)\,\text{Tan}[c+d\,x]}{15\,a^3\,d}+\frac{(13\,B-6\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a^3\,d}-\frac{(B-C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}-\frac{(11\,B-6\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{4\,(19\,B-9\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{15\,d\,(a^3+a^3\,\text{Cos}[c+d\,x])}$$

Result (type 3, 684 leaves):

$$\frac{1}{a^3}\left(-\frac{4\,(13\,B-6\,C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,(1+\mathrm{Cos}[c+d\,x])^3}+\right.$$

$$\frac{4\,(13\,B-6\,C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,(1+\mathrm{Cos}[c+d\,x])^3}+$$

$$\frac{1}{480\,d\,(1+\mathrm{Cos}[c+d\,x])^3}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2$$

$$\left(1235\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-870\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-3805\,B\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]+1830\,C\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]+\right.$$

$$4329\,B\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]-2094\,C\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]-1989\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+1314\,C\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+$$

$$3575\,B\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]-1650\,C\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]+475\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-450\,C\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-$$

$$2005\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+1230\,C\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+2275\,B\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-$$

$$1050\,C\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-2673\,B\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]+1278\,C\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]-$$

$$105\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-90\,C\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-1593\,B\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+$$

$$918\,C\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+975\,B\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-450\,C\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-$$

$$1325\,B\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+630\,C\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-255\,B\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+$$

$$60\,C\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-875\,B\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+480\,C\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+195\,B\,\mathrm{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]-$$

$$90\,C\,\mathrm{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]-304\,B\,\mathrm{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]+144\,C\,\mathrm{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]-90\,B\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+$$

$$\left.\left.30\,C\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-214\,B\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+114\,C\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)\right)$$

Problem 295: Result more than twice size of optimal antiderivative.

$$\int \left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]\,dx$$

Optimal (type 3, 27 leaves, 3 steps):

$$B\,x+\frac{A\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{d}+\frac{C\,\mathrm{Sin}[c+d\,x]}{d}$$

Result (type 3, 95 leaves):

$$B\,x-\frac{A\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+$$

$$\frac{A\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{C\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{d}+\frac{C\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{d}$$

Problem 296: Result more than twice size of optimal antiderivative.

$$\int \left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^2 \, dx$$

Optimal (type 3, 27 leaves, 3 steps):

$$C x + \frac{B \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{d} + \frac{A \operatorname{Tan}[c + d x]}{d}$$

Result (type 3, 84 leaves):

$$C x - \frac{B \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{B \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{A \operatorname{Tan}[c + d x]}{d}$$

Problem 297: Result more than twice size of optimal antiderivative.

$$\int \left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^3 \, dx$$

Optimal (type 3, 51 leaves, 5 steps):

$$\frac{(A + 2 C) \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{2 d} + \frac{B \operatorname{Tan}[c + d x]}{d} + \frac{A \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{2 d}$$

Result (type 3, 151 leaves):

$$\frac{1}{4 d} \left(-2 (A + 2 C) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + 2 A \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + 4 C \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + \frac{A}{\left(\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} - \frac{A}{\left(\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} + 4 B \operatorname{Tan}[c + d x]\right)$$

Problem 299: Result more than twice size of optimal antiderivative.

$$\int \left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^5 \, dx$$

Optimal (type 3, 97 leaves, 6 steps):

$$\frac{(3 A + 4 C) \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{8 d} + \frac{B \operatorname{Tan}[c + d x]}{d} + \frac{(3 A + 4 C) \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{8 d} + \frac{A \operatorname{Sec}[c + d x]^3 \operatorname{Tan}[c + d x]}{4 d} + \frac{B \operatorname{Tan}[c + d x]^3}{3 d}$$

Result (type 3, 353 leaves):

$$-\frac{3\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}-\frac{C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+\frac{3\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+\frac{A}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{3\,A}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{C}{4\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{A}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}-\frac{3\,A}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{C}{4\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{2\,B\,\text{Tan}[c+d\,x]}{3\,d}+\frac{B\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Problem 300: Result more than twice size of optimal antiderivative.

$$\int\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^6\,dx$$

Optimal (type 3, 122 leaves, 7 steps):

$$\frac{3\,B\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{(4\,A+5\,C)\,\text{Tan}[c+d\,x]}{5\,d}+\frac{3\,B\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{B\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}+\frac{A\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d}+\frac{(4\,A+5\,C)\,\text{Tan}[c+d\,x]^3}{15\,d}$$

Result (type 3, 285 leaves):

$$-\frac{3\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{3\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{B}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{3\,B}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{B}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}-\frac{3\,B}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{8\,A\,\text{Tan}[c+d\,x]}{15\,d}+\frac{2\,C\,\text{Tan}[c+d\,x]}{3\,d}+\frac{4\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{15\,d}+\frac{C\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{A\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d}$$

Problem 305: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^2\,dx$$

Optimal (type 3, 46 leaves, 4 steps):

$$a\,(B+C)\,x+\frac{a\,(A+B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{a\,C\,\text{Sin}[c+d\,x]}{d}+\frac{a\,A\,\text{Tan}[c+d\,x]}{d}$$

Result (type 3, 187 leaves):

$$a\,B\,x+a\,C\,x-\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}-\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+$$
$$\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+$$
$$\frac{a\,C\,\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+\frac{a\,C\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}+\frac{a\,A\,\text{Tan}[c+d\,x]}{d}$$

Problem 306: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 3, 62 leaves, 4 steps):

$$a\,C\,x+\frac{a\,(A+2\,(B+C))\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{a\,(A+B)\,\text{Tan}[c+d\,x]}{d}+\frac{a\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 203 leaves):

$$\frac{1}{4}\,a\left(4\,C\,x-\frac{2\,(A+2\,(B+C))\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\right.$$
$$\frac{2\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{4\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+$$
$$\frac{4\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{A}{d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-$$
$$\left.\frac{A}{d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{4\,(A+B)\,\text{Tan}[c+d\,x]}{d}\right)$$

Problem 308: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 3, 125 leaves, 7 steps):

$$\frac{a\,(3A+4(B+C))\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}-\frac{a\,(A+B-3(A+B+C))\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,(3A+4(B+C))\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{a\,(A+B)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,A\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 545 leaves):

$$-\frac{3\,a\,A\,\text{Log}\left[\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right]}{8\,d}-\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right]}{2\,d}-\frac{a\,C\,\text{Log}\left[\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right]}{2\,d}+\frac{3\,a\,A\,\text{Log}\left[\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right]}{8\,d}+\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right]}{2\,d}+\frac{a\,C\,\text{Log}\left[\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right]}{2\,d}+\frac{a\,A}{16\,d\left(\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right)^4}+\frac{3\,a\,A}{16\,d\left(\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right)^2}+\frac{a\,B}{4\,d\left(\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right)^2}+\frac{a\,C}{4\,d\left(\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right)^2}-\frac{a\,A}{16\,d\left(\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right)^4}-\frac{3\,a\,A}{16\,d\left(\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right)^2}-\frac{a\,B}{4\,d\left(\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right)^2}-\frac{a\,C}{4\,d\left(\text{Cos}\left[\tfrac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\tfrac{1}{2}(c+d\,x)\right]\right)^2}+\frac{2\,a\,A\,\text{Tan}[c+d\,x]}{3\,d}+\frac{2\,a\,B\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,C\,\text{Tan}[c+d\,x]}{d}+\frac{a\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,B\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Problem 314: Result more than twice size of optimal antiderivative.

$$\int(a+a\,\text{Cos}[c+d\,x])^2\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 3, 123 leaves, 6 steps):

$$a^2\,(B+2C)\,x+\frac{a^2\,(3A+4B+2C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}-\frac{a^2\,(3A+2B-2C)\,\text{Sin}[c+d\,x]}{2\,d}+\frac{(A+B)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Tan}[c+d\,x]}{d}+\frac{A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 259 leaves):

$$\frac{1}{16 d} a^2 (1+\text{Cos}[c+d x])^2 \text{Sec}\left[\frac{1}{2} (c+d x)\right]^4$$
$$\left(4 (B+2 C) (c+d x)-2 (3 A+4 B+2 C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\right.$$
$$2 (3 A+4 B+2 C) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+$$
$$\frac{A}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{4 (2 A+B) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]}-$$
$$\left.\frac{A}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{4 (2 A+B) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]}+4 C \text{Sin}[c+d x]\right)$$

Problem 315: Result more than twice size of optimal antiderivative.

$$\int (a+a \text{Cos}[c+d x])^2 \left(A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]^4 \, dx$$

Optimal (type 3, 134 leaves, 6 steps):

$$a^2 C x+\frac{a^2 (2 A+3 B+4 C) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{a^2 (2 A+3 B+2 C) \text{Tan}[c+d x]}{2 d}+$$
$$\frac{(2 A+3 B) \left(a^2+a^2 \text{Cos}[c+d x]\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{6 d}+$$
$$\frac{A (a+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 d}$$

Result (type 3, 639 leaves):

$$\frac{C\,(c+d\,x)\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4}{4\,d}+\frac{1}{8\,d}$$
$$(-2\,A-3\,B-4\,C)\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4+$$
$$\frac{1}{8\,d}(2\,A+3\,B+4\,C)\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4+$$
$$\frac{(7\,A+3\,B)\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4}{48\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{24\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+$$
$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{24\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+$$
$$\frac{(-7\,A-3\,B)\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4}{48\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\Bigg((a+a\,\text{Cos}[c+d\,x])^2$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\left(5\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+6\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Bigg)\Big/$$
$$\left(12\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+\Bigg((a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(5\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+6\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Bigg)\Big/$$
$$\left(12\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)$$

Problem 316: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^2\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 3, 160 leaves, 8 steps):

$$\frac{a^2\,(7\,A+8\,B+12\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+$$
$$\frac{a^2\,(4\,A+5\,B+6\,C)\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a^2\,(11\,A+16\,B+12\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{24\,d}+$$
$$\frac{(A+2\,B)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{6\,d}+$$
$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 404 leaves):

$$\frac{1}{192\,d}a^2\,(1+\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4$$
$$\left(-6\,(7\,A+8\,B+12\,C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\right.$$
$$6\,(7\,A+8\,B+12\,C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$
$$\frac{3\,A}{\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+\frac{29\,A+28\,B+12\,C}{\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+$$
$$\frac{8\,(2\,A+B)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+\frac{16\,(4\,A+5\,B+6\,C)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}-$$
$$\frac{3\,A}{\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+\frac{8\,(2\,A+B)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+$$
$$\left.\frac{-29\,A-4\,(7\,B+3\,C)}{\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{16\,(4\,A+5\,B+6\,C)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}\right)$$

Problem 317: Result more than twice size of optimal antiderivative.

$$\int(a+a\,\text{Cos}[c+d\,x])^2\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^6\,dx$$

Optimal (type 3, 196 leaves, 9 steps):

$$\frac{a^2\,(6\,A+7\,B+8\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{a^2\,(18\,A+20\,B+25\,C)\,\text{Tan}[c+d\,x]}{15\,d}+$$
$$\frac{a^2\,(6\,A+7\,B+8\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{a^2\,(18\,A+25\,B+20\,C)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{60\,d}+$$
$$\frac{(2\,A+5\,B)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{20\,d}+$$
$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d}$$

Result (type 3, 931 leaves):

$$\frac{1}{32\,d}(-6\,A-7\,B-8\,C)\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4+$$
$$\frac{1}{32\,d}(6\,A+7\,B+8\,C)\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4+$$
$$\frac{(12\,A+5\,B)\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4}{320\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+$$
$$\frac{(129\,A+145\,B+140\,C)\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4}{960\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{80\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^5}+$$
$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{80\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^5}+$$
$$\frac{(-12\,A-5\,B)\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4}{320\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+$$
$$\frac{(-129\,A-145\,B-140\,C)\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4}{960\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\Bigg((a+a\,\text{Cos}[c+d\,x])^2$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\left(39\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+40\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+20\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Bigg)\Bigg/$$
$$\left(480\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3\right)+\Bigg((a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(39\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+40\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+20\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Bigg)\Bigg/$$
$$\left(480\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3\right)+\Bigg((a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(18\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+20\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+25\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Bigg)\Bigg/$$
$$\left(60\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+\Bigg((a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(18\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+20\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+25\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Bigg)\Bigg/$$
$$\left(60\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)$$

Problem 324: Result more than twice size of optimal antiderivative.

$$\int(a+a\,\text{Cos}[c+d\,x])^3\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 3, 169 leaves, 7 steps):

$$a^3 (B+3C) x+\frac{a^3 (5A+7B+6C) \text{ArcTanh}[\text{Sin}[c+dx]]}{2d}-\frac{5a^3 (A+B) \text{Sin}[c+dx]}{2d}+\frac{(5A+6B+3C) \left(a^3+a^3 \text{Cos}[c+dx]\right) \text{Tan}[c+dx]}{3d}+\frac{(A+B) \left(a^2+a^2 \text{Cos}[c+dx]\right)^2 \text{Sec}[c+dx] \text{Tan}[c+dx]}{2ad}+\frac{A (a+a \text{Cos}[c+dx])^3 \text{Sec}[c+dx]^2 \text{Tan}[c+dx]}{3d}$$

Result (type 3, 684 leaves):

$$\frac{(B+3C) (c+dx) (a+a \text{Cos}[c+dx])^3 \text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6}{8d}+\frac{1}{16d}(-5A-7B-6C) (a+a \text{Cos}[c+dx])^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6+\frac{1}{16d}(5A+7B+6C) (a+a \text{Cos}[c+dx])^3 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right] \text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6+\frac{(10A+3B) (a+a \text{Cos}[c+dx])^3 \text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6}{96d \left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+\frac{A (a+a \text{Cos}[c+dx])^3 \text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 \text{Sin}\left[\frac{1}{2}(c+dx)\right]}{48d \left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}+\frac{A (a+a \text{Cos}[c+dx])^3 \text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 \text{Sin}\left[\frac{1}{2}(c+dx)\right]}{48d \left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}+\frac{(-10A-3B) (a+a \text{Cos}[c+dx])^3 \text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6}{96d \left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+\left((a+a \text{Cos}[c+dx])^3 \text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 \left(11A \text{Sin}\left[\frac{1}{2}(c+dx)\right]+9B \text{Sin}\left[\frac{1}{2}(c+dx)\right]+3C \text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\Big/\left(24d \left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)+\left((a+a \text{Cos}[c+dx])^3 \text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 \left(11A \text{Sin}\left[\frac{1}{2}(c+dx)\right]+9B \text{Sin}\left[\frac{1}{2}(c+dx)\right]+3C \text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\Big/\left(24d \left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)+\frac{C (a+a \text{Cos}[c+dx])^3 \text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 \text{Sin}[c+dx]}{8d}$$

Problem 325: Result more than twice size of optimal antiderivative.

$$\int (a+a \text{Cos}[c+dx])^3 \left(A+B \text{Cos}[c+dx]+C \text{Cos}[c+dx]^2\right) \text{Sec}[c+dx]^5 \, dx$$

Optimal (type 3, 183 leaves, 7 steps):

$$a^3 C x + \frac{a^3 (15 A + 20 B + 28 C) \text{ArcTanh}[\text{Sin}[c + d x]]}{8 d} + \frac{5 a^3 (3 A + 4 (B + C)) \text{Tan}[c + d x]}{8 d} + \frac{(15 A + 20 B + 12 C) (a^3 + a^3 \text{Cos}[c + d x]) \text{Sec}[c + d x] \text{Tan}[c + d x]}{24 d} + \frac{(3 A + 4 B) (a^2 + a^2 \text{Cos}[c + d x])^2 \text{Sec}[c + d x]^2 \text{Tan}[c + d x]}{12 a d} + \frac{A (a + a \text{Cos}[c + d x])^3 \text{Sec}[c + d x]^3 \text{Tan}[c + d x]}{4 d}$$

Result (type 3, 793 leaves):

$$\frac{C\,(c+d\,x)\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6}{8\,d}+\frac{1}{64\,d}$$
$$(-15\,A-20\,B-28\,C)\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6+$$
$$\frac{1}{64\,d}(15\,A+20\,B+28\,C)\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6+\frac{A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6}{128\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+$$
$$\frac{(57\,A+40\,B+12\,C)\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6}{384\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-$$
$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6}{128\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+$$
$$\frac{(-57\,A-40\,B-12\,C)\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6}{384\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\left((a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(3\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(48\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3\right)+$$
$$\left((a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(3\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(48\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3\right)+\left((a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\right.$$
$$\left.\left(9\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+11\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+9\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(24\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+\left((a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\right.$$
$$\left.\left(9\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+11\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+9\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(24\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)$$

Problem 326: Result more than twice size of optimal antiderivative.

$$\int(a+a\,\text{Cos}[c+d\,x])^3\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^6\,dx$$

Optimal (type 3, 212 leaves, 9 steps):

$$\frac{a^3 (13 A + 15 B + 20 C) \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{8 d} +$$
$$\frac{a^3 (38 A + 45 B + 55 C) \operatorname{Tan}[c + d x]}{15 d} + \frac{a^3 (109 A + 135 B + 140 C) \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{120 d} +$$
$$\frac{(11 A + 15 B + 10 C) (a^3 + a^3 \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^2 \operatorname{Tan}[c + d x]}{30 d} +$$
$$\frac{(3 A + 5 B) (a^2 + a^2 \operatorname{Cos}[c + d x])^2 \operatorname{Sec}[c + d x]^3 \operatorname{Tan}[c + d x]}{20 a d} +$$
$$\frac{A (a + a \operatorname{Cos}[c + d x])^3 \operatorname{Sec}[c + d x]^4 \operatorname{Tan}[c + d x]}{5 d}$$

Result (type 3, 931 leaves) :

$$\frac{1}{64\,d}\left(-13\,A-15\,B-20\,C\right)\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3$$
$$\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6+\frac{1}{64\,d}$$
$$\left(13\,A+15\,B+20\,C\right)\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6+$$
$$\frac{\left(17\,A+5\,B\right)\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6}{640\,d\,\left(\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^4}+$$
$$\frac{\left(274\,A+285\,B+200\,C\right)\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6}{1920\,d\,\left(\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^2}+$$
$$\frac{A\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}{160\,d\,\left(\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^5}+$$
$$\frac{A\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}{160\,d\,\left(\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^5}+$$
$$\frac{\left(-17\,A-5\,B\right)\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6}{640\,d\,\left(\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^4}+$$
$$\frac{\left(-274\,A-285\,B-200\,C\right)\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6}{1920\,d\,\left(\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^2}+\left(\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\right.$$
$$\left.\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\left(79\,A\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+60\,B\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+20\,C\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)\right)\Big/$$
$$\left(960\,d\,\left(\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^3\right)+\left(\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\right.$$
$$\left.\left(79\,A\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+60\,B\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+20\,C\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)\right)\Big/$$
$$\left(960\,d\,\left(\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^3\right)+\left(\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\right.$$
$$\left.\left(38\,A\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+45\,B\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+55\,C\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)\right)\Big/$$
$$\left(120\,d\,\left(\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)\right)+\left(\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\right.$$
$$\left.\left(38\,A\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+45\,B\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+55\,C\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)\right)\Big/$$
$$\left(120\,d\,\left(\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)\right)$$

Problem 333: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^4\,(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2)\,\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 3, 206 leaves, 8 steps):

$$\frac{1}{2}a^4\,(8A+13B+12C)\,x+\frac{a^4\,(13A+8B+2C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2d}-\frac{5a^4\,(A-B-2C)\,\text{Sin}[c+d\,x]}{2d}-\frac{(15A+6B-2C)\,(a^2+a^2\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{6d}-\frac{(18A+3B-8C)\,(a^4+a^4\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{6d}+\frac{a\,(2A+B)\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Tan}[c+d\,x]}{d}+\frac{A\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2d}$$

Result (type 3, 610 leaves):

$$\frac{(8A+13B+12C)\,(c+d\,x)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8}{32d}+\frac{1}{32d}(-13A-8B-2C)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8+\frac{1}{32d}(13A+8B+2C)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8+\frac{A\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8}{64d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{A\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8}{64d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\left((a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\left(4A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/\left(16d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)+\left((a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\left(4A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/\left(16d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)+\frac{(4A+16B+27C)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sin}[c+d\,x]}{64d}+\frac{(B+4C)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sin}[2\,(c+d\,x)]}{64d}+\frac{C\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sin}[3\,(c+d\,x)]}{192d}$$

Problem 334: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^4\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 3, 219 leaves, 8 steps):

$$\frac{1}{2}a^4\,(2A+8B+13C)\,x+\frac{a^4\,(12A+13B+8C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2d}-\frac{5a^4\,(2A+B-C)\,\text{Sin}[c+d\,x]}{2d}-\frac{(22A+18B+3C)\,\left(a^4+a^4\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{6d}+\frac{(16A+15B+6C)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Tan}[c+d\,x]}{6d}+\frac{a\,(4A+3B)\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{6d}+\frac{A\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3d}$$

Result (type 3, 440 leaves):

$$a^4\left(\frac{(2A+8B+13C)\,(c+d\,x)}{2d}+\frac{(-12A-13B-8C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2d}+\frac{(12A+13B+8C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{2d}+\frac{13A+3B}{12d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{6d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+\frac{A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{6d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+\frac{-13A-3B}{12d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{20A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+12B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+3C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{3d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}+\frac{20A\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+12B\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+3C\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{3d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}+\frac{(B+4C)\,\text{Sin}[c+d\,x]}{d}+\frac{C\,\text{Sin}[2\,(c+d\,x)]}{4d}\right)$$

Problem 335: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^4\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 3, 217 leaves, 8 steps):

$$a^4 (B+4C) x+\frac{a^4 (35A+48B+52C) \text{ArcTanh}[\text{Sin}[c+dx]]}{8d}-\frac{5a^4 (7A+8B+4C) \text{Sin}[c+dx]}{8d}+\frac{(35A+44B+36C) (a^4+a^4 \text{Cos}[c+dx]) \text{Tan}[c+dx]}{12d}+\frac{(7A+8B+4C) (a^2+a^2 \text{Cos}[c+dx])^2 \text{Sec}[c+dx] \text{Tan}[c+dx]}{8d}+\frac{a (A+B) (a+a \text{Cos}[c+dx])^3 \text{Sec}[c+dx]^2 \text{Tan}[c+dx]}{3d}+\frac{A (a+a \text{Cos}[c+dx])^4 \text{Sec}[c+dx]^3 \text{Tan}[c+dx]}{4d}$$

Result (type 3, 838 leaves):

$$\frac{(B+4C)\,(c+d x)\,(a+a\,\mathrm{Cos}[c+d x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8}{16 d}+\frac{1}{128 d}$$

$$(-35A-48B-52C)\,(a+a\,\mathrm{Cos}[c+d x])^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8+$$

$$\frac{1}{128 d}(35A+48B+52C)\,(a+a\,\mathrm{Cos}[c+d x])^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8+\frac{A\,(a+a\,\mathrm{Cos}[c+d x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8}{256 d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+$$

$$\frac{(97A+52B+12C)\,(a+a\,\mathrm{Cos}[c+d x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8}{768 d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-$$

$$\frac{A\,(a+a\,\mathrm{Cos}[c+d x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8}{256 d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+$$

$$\frac{(-97A-52B-12C)\,(a+a\,\mathrm{Cos}[c+d x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8}{768 d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$

$$\left((a+a\,\mathrm{Cos}[c+d x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8\left(4A\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+B\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$

$$\left(96 d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3\right)+$$

$$\left((a+a\,\mathrm{Cos}[c+d x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8\left(4A\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+B\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$

$$\left(96 d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3\right)+\left((a+a\,\mathrm{Cos}[c+d x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8\right.$$

$$\left.\left(5A\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+5B\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+3C\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$

$$\left(12 d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+\left((a+a\,\mathrm{Cos}[c+d x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8\right.$$

$$\left.\left(5A\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+5B\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+3C\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$

$$\left(12 d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+\frac{C\,(a+a\,\mathrm{Cos}[c+d x])^4\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^8\,\mathrm{Sin}[c+d x]}{16 d}$$

Problem 336: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\mathrm{Cos}[c+d x])^4\,\left(A+B\,\mathrm{Cos}[c+d x]+C\,\mathrm{Cos}[c+d x]^2\right)\,\mathrm{Sec}[c+d x]^6\,dx$$

Optimal (type 3, 225 leaves, 8 steps):

$$a^4\,C\,x+\frac{a^4\,\left(28\,A+35\,B+48\,C\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{a^4\,\left(28\,A+35\,B+40\,C\right)\,\text{Tan}[c+d\,x]}{8\,d}+$$
$$\frac{\left(28\,A+35\,B+32\,C\right)\,\left(a^4+a^4\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{24\,d}+$$
$$\frac{\left(28\,A+35\,B+20\,C\right)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{60\,d}+$$
$$\frac{a\,(4\,A+5\,B)\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{20\,d}+$$
$$\frac{A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^4\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d}$$

Result (type 3, 971 leaves) :

$$\frac{C\,(c+d\,x)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8}{16\,d}+\frac{1}{128\,d}$$

$$(-28\,A-35\,B-48\,C)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8+$$

$$\frac{1}{128\,d}(28\,A+35\,B+48\,C)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8+\frac{(22\,A+5\,B)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8}{1280\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+$$

$$\frac{(559\,A+485\,B+260\,C)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8}{3840\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$

$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{320\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^5}+$$

$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{320\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^5}+$$

$$\frac{(-22\,A-5\,B)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8}{1280\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+$$

$$\frac{(-559\,A-485\,B-260\,C)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8}{3840\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\left((a+a\,\text{Cos}[c+d\,x])^4\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\left(139\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+80\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+20\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$

$$\left(1920\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3\right)+\left((a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\right.$$

$$\left.\left(139\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+80\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+20\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$

$$\left(1920\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3\right)+\left((a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\right.$$

$$\left.\left(83\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+100\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+100\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$

$$\left(240\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+\left((a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\right.$$

$$\left.\left(83\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+100\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+100\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$

$$\left(240\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)$$

Problem 339: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^3 \left(A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right)}{a+a \text{Cos}[c+d x]} \, dx$$

Optimal (type 3, 174 leaves, 7 steps):

$$\frac{3 (4 A-4 B+5 C) x}{8 a}-\frac{(3 A-4 B+4 C) \text{Sin}[c+d x]}{a d}+\frac{3 (4 A-4 B+5 C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{8 a d}+\frac{(4 A-4 B+5 C) \text{Cos}[c+d x]^3 \text{Sin}[c+d x]}{4 a d}-\frac{(A-B+C) \text{Cos}[c+d x]^4 \text{Sin}[c+d x]}{d (a+a \text{Cos}[c+d x])}+\frac{(3 A-4 B+4 C) \text{Sin}[c+d x]^3}{3 a d}$$

Result (type 3, 393 leaves):

$$\frac{1}{192 a d (1+\text{Cos}[c+d x])} \text{Cos}\left[\frac{1}{2} (c+d x)\right] \text{Sec}\left[\frac{c}{2}\right] \left(72 (4 A-4 B+5 C) d x \text{Cos}\left[\frac{d x}{2}\right]+72 (4 A-4 B+5 C) d x \text{Cos}\left[c+\frac{d x}{2}\right]-480 A \text{Sin}\left[\frac{d x}{2}\right]+552 B \text{Sin}\left[\frac{d x}{2}\right]-552 C \text{Sin}\left[\frac{d x}{2}\right]-96 A \text{Sin}\left[c+\frac{d x}{2}\right]+168 B \text{Sin}\left[c+\frac{d x}{2}\right]-168 C \text{Sin}\left[c+\frac{d x}{2}\right]-72 A \text{Sin}\left[c+\frac{3 d x}{2}\right]+144 B \text{Sin}\left[c+\frac{3 d x}{2}\right]-120 C \text{Sin}\left[c+\frac{3 d x}{2}\right]-72 A \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+144 B \text{Sin}\left[2 c+\frac{3 d x}{2}\right]-120 C \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+24 A \text{Sin}\left[2 c+\frac{5 d x}{2}\right]-16 B \text{Sin}\left[2 c+\frac{5 d x}{2}\right]+40 C \text{Sin}\left[2 c+\frac{5 d x}{2}\right]+24 A \text{Sin}\left[3 c+\frac{5 d x}{2}\right]-16 B \text{Sin}\left[3 c+\frac{5 d x}{2}\right]+40 C \text{Sin}\left[3 c+\frac{5 d x}{2}\right]+8 B \text{Sin}\left[3 c+\frac{7 d x}{2}\right]-5 C \text{Sin}\left[3 c+\frac{7 d x}{2}\right]+8 B \text{Sin}\left[4 c+\frac{7 d x}{2}\right]-5 C \text{Sin}\left[4 c+\frac{7 d x}{2}\right]+3 C \text{Sin}\left[4 c+\frac{9 d x}{2}\right]+3 C \text{Sin}\left[5 c+\frac{9 d x}{2}\right]\right)$$

Problem 340: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^2 \left(A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right)}{a+a \text{Cos}[c+d x]} \, dx$$

Optimal (type 3, 139 leaves, 6 steps):

$$-\frac{(2 A-3 B+3 C) x}{2 a}+\frac{(3 A-3 B+4 C) \text{Sin}[c+d x]}{a d}-\frac{(2 A-3 B+3 C) \text{Cos}[c+d x] \text{Sin}[c+d x]}{2 a d}-\frac{(A-B+C) \text{Cos}[c+d x]^3 \text{Sin}[c+d x]}{d (a+a \text{Cos}[c+d x])}-\frac{(3 A-3 B+4 C) \text{Sin}[c+d x]^3}{3 a d}$$

Result (type 3, 307 leaves):

$$\frac{1}{24\,a\,d\,\left(1+\text{Cos}[c+d\,x]\right)}\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\,\text{Sec}\left[\frac{c}{2}\right]\left(-12\,\left(2\,A-3\,B+3\,C\right)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-12\,\left(2\,A-3\,B+3\,C\right)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+60\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-60\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+69\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+12\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-12\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+21\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+12\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-9\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+18\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+12\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-9\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+18\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-2\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-2\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+C\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 342: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 54 leaves, 3 steps):

$$\frac{\left(B-C\right)\,x}{a}+\frac{C\,\text{Sin}[c+d\,x]}{a\,d}+\frac{\left(A-B+C\right)\,\text{Sin}[c+d\,x]}{a\,d\,\left(1+\text{Cos}[c+d\,x]\right)}$$

Result (type 3, 136 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\,\text{Sec}\left[\frac{c}{2}\right]\left(2\,\left(B-C\right)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+2\,\left(B-C\right)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+4\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-4\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+5\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]\right)\right)\Big/\left(2\,a\,d\,\left(1+\text{Cos}[c+d\,x]\right)\right)$$

Problem 343: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 51 leaves, 3 steps):

$$\frac{C\,x}{a}+\frac{A\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a\,d}-\frac{\left(A-B+C\right)\,\text{Sin}[c+d\,x]}{d\,\left(a+a\,\text{Cos}[c+d\,x]\right)}$$

Result (type 3, 163 leaves):

$$\left(4\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(C\,d\,x-A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)-(A-B+C)\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\right)\Big/\left(a\,d\,(1+\text{Cos}[c+d\,x])\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,(c+d\,x)]\right)\right)$$

Problem 344: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^2}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 71 leaves, 5 steps):

$$-\frac{(A-B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a\,d}+\frac{(2\,A-B+C)\,\text{Tan}[c+d\,x]}{a\,d}-\frac{(A-B+C)\,\text{Tan}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 3, 256 leaves):

$$\frac{1}{a\,d\,(1+\text{Cos}[c+d\,x])\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,(c+d\,x)]\right)}\,4\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Cos}[c+d\,x]^2\,\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\left((A-B+C)\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left((A-B)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+(A\,\text{Sin}[d\,x])\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\right)\right)$$

Problem 345: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 117 leaves, 6 steps):

$$\frac{(3\,A-2\,B+2\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a\,d}-\frac{(2\,A-2\,B+C)\,\text{Tan}[c+d\,x]}{a\,d}+\frac{(3\,A-2\,B+2\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a\,d}-\frac{(A-B+C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 3, 256 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\left(-2(3A-2B+2C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\right.\right.$$
$$2(3A-2B+2C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$\frac{A}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{4(-A+B)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]}-$$
$$\frac{A}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{4(-A+B)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]}-$$
$$\left.\left.4(A-B+C)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/\left(2 a d\,(1+\text{Cos}[c+d x])\right)$$

Problem 346: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]^4}{a+a\,\text{Cos}[c+d x]}\,dx$$

Optimal (type 3, 148 leaves, 6 steps):

$$-\frac{(3A-3B+2C)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{2 a d}+$$
$$\frac{(4A-3B+3C)\,\text{Tan}[c+d x]}{a d}-\frac{(3A-3B+2C)\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{2 a d}-$$
$$\frac{(A-B+C)\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{d\,(a+a\,\text{Cos}[c+d x])}+\frac{(4A-3B+3C)\,\text{Tan}[c+d x]^3}{3 a d}$$

Result (type 3, 673 leaves):

$$\frac{(3 A-3 B+2 C) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d(a+a \operatorname{Cos}[c+d x])}+$$
$$\left((-3 A+3 B-2 C) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right) \Big/$$
$$(d(a+a \operatorname{Cos}[c+d x]))+\frac{(-2 A+3 B) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2}{6 d(a+a \operatorname{Cos}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\frac{A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{3 d(a+a \operatorname{Cos}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$
$$\frac{A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{3 d(a+a \operatorname{Cos}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$
$$\frac{(2 A-3 B) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2}{6 d(a+a \operatorname{Cos}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\left(2 \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]\left(A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]-B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/$$
$$(d(a+a \operatorname{Cos}[c+d x]))+$$
$$\left(2 \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\left(5 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]-3 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+3 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/$$
$$\left(3 d(a+a \operatorname{Cos}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+$$
$$\left(2 \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\left(5 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]-3 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+3 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/$$
$$\left(3 d(a+a \operatorname{Cos}[c+d x])\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)$$

Problem 347: Result more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Cos}[c+d x]^3\left(A+B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right)}{(a+a \operatorname{Cos}[c+d x])^2} \, dx$$

Optimal (type 3, 185 leaves, 7 steps):

$$-\frac{(4 A-7 B+10 C) x}{2 a^2}+\frac{(5 A-8 B+12 C) \operatorname{Sin}[c+d x]}{a^2 d}-$$
$$\frac{(4 A-7 B+10 C) \operatorname{Cos}[c+d x] \operatorname{Sin}[c+d x]}{2 a^2 d}-\frac{(4 A-7 B+10 C) \operatorname{Cos}[c+d x]^3 \operatorname{Sin}[c+d x]}{3 a^2 d(1+\operatorname{Cos}[c+d x])}-$$
$$\frac{(A-B+C) \operatorname{Cos}[c+d x]^4 \operatorname{Sin}[c+d x]}{3 d(a+a \operatorname{Cos}[c+d x])^2}-\frac{(5 A-8 B+12 C) \operatorname{Sin}[c+d x]^3}{3 a^2 d}$$

Result (type 3, 481 leaves):

$$\frac{1}{48\,a^2\,d\,\left(1+\cos[c+d\,x]\right)^2}\cos\left[\frac{1}{2}\,(c+d\,x)\right]\,\sec\left[\frac{c}{2}\right]\,\left(-36\,(4\,A-7\,B+10\,C)\,d\,x\,\cos\left[\frac{d\,x}{2}\right]-36\,(4\,A-7\,B+10\,C)\,d\,x\,\cos\left[c+\frac{d\,x}{2}\right]-\right.$$
$$48\,A\,d\,x\,\cos\left[c+\frac{3\,d\,x}{2}\right]+84\,B\,d\,x\,\cos\left[c+\frac{3\,d\,x}{2}\right]-120\,C\,d\,x\,\cos\left[c+\frac{3\,d\,x}{2}\right]-$$
$$48\,A\,d\,x\,\cos\left[2\,c+\frac{3\,d\,x}{2}\right]+84\,B\,d\,x\,\cos\left[2\,c+\frac{3\,d\,x}{2}\right]-120\,C\,d\,x\,\cos\left[2\,c+\frac{3\,d\,x}{2}\right]+$$
$$264\,A\,\sin\left[\frac{d\,x}{2}\right]-381\,B\,\sin\left[\frac{d\,x}{2}\right]+516\,C\,\sin\left[\frac{d\,x}{2}\right]-120\,A\,\sin\left[c+\frac{d\,x}{2}\right]+$$
$$147\,B\,\sin\left[c+\frac{d\,x}{2}\right]-156\,C\,\sin\left[c+\frac{d\,x}{2}\right]+164\,A\,\sin\left[c+\frac{3\,d\,x}{2}\right]-239\,B\,\sin\left[c+\frac{3\,d\,x}{2}\right]+$$
$$342\,C\,\sin\left[c+\frac{3\,d\,x}{2}\right]+36\,A\,\sin\left[2\,c+\frac{3\,d\,x}{2}\right]-63\,B\,\sin\left[2\,c+\frac{3\,d\,x}{2}\right]+118\,C\,\sin\left[2\,c+\frac{3\,d\,x}{2}\right]+$$
$$12\,A\,\sin\left[2\,c+\frac{5\,d\,x}{2}\right]-15\,B\,\sin\left[2\,c+\frac{5\,d\,x}{2}\right]+30\,C\,\sin\left[2\,c+\frac{5\,d\,x}{2}\right]+12\,A\,\sin\left[3\,c+\frac{5\,d\,x}{2}\right]-$$
$$15\,B\,\sin\left[3\,c+\frac{5\,d\,x}{2}\right]+30\,C\,\sin\left[3\,c+\frac{5\,d\,x}{2}\right]+3\,B\,\sin\left[3\,c+\frac{7\,d\,x}{2}\right]-3\,C\,\sin\left[3\,c+\frac{7\,d\,x}{2}\right]+$$
$$\left.3\,B\,\sin\left[4\,c+\frac{7\,d\,x}{2}\right]-3\,C\,\sin\left[4\,c+\frac{7\,d\,x}{2}\right]+C\,\sin\left[4\,c+\frac{9\,d\,x}{2}\right]+C\,\sin\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

Problem 348: Result more than twice size of optimal antiderivative.

$$\int\frac{\cos[c+d\,x]^2\,\left(A+B\cos[c+d\,x]+C\cos[c+d\,x]^2\right)}{\left(a+a\cos[c+d\,x]\right)^2}\,dx$$

Optimal (type 3, 160 leaves, 3 steps):

$$\frac{(2\,A-4\,B+7\,C)\,x}{2\,a^2}-\frac{2\,(2\,A-5\,B+8\,C)\,\sin[c+d\,x]}{3\,a^2\,d}+\frac{(2\,A-4\,B+7\,C)\,\cos[c+d\,x]\,\sin[c+d\,x]}{2\,a^2\,d}-$$
$$\frac{(2\,A-5\,B+8\,C)\,\cos[c+d\,x]^2\,\sin[c+d\,x]}{3\,a^2\,d\,(1+\cos[c+d\,x])}-\frac{(A-B+C)\,\cos[c+d\,x]^3\,\sin[c+d\,x]}{3\,d\,\left(a+a\cos[c+d\,x]\right)^2}$$

Result (type 3, 385 leaves):

$$\frac{1}{48\,a^2\,d\,\left(1+\text{Cos}[c+d\,x]\right)^2}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(36\,(2\,A-4\,B+7\,C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+36\,(2\,A-4\,B+7\,C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+24\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-48\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+84\,C\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+24\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-48\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+84\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-144\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+264\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-381\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+96\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-120\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+147\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-80\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+164\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-239\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+36\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-63\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+12\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-15\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+12\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-15\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 349: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^2}\,dx$$

Optimal (type 3, 103 leaves, 6 steps):

$$\frac{(B-2\,C)\,x}{a^2}+\frac{(A-B+4\,C)\,\text{Sin}[c+d\,x]}{3\,a^2\,d}-\frac{(B-2\,C)\,\text{Sin}[c+d\,x]}{a^2\,d\,\left(1+\text{Cos}[c+d\,x]\right)}-\frac{(A-B+C)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{3\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}$$

Result (type 3, 275 leaves):

$$\frac{1}{12\,a^2\,d\,\left(1+\text{Cos}[c+d\,x]\right)^2}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(18\,(B-2\,C)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+18\,(B-2\,C)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+6\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-12\,C\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+6\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-12\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+12\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-36\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+66\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]-12\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+24\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-30\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+8\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-20\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+41\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+9\,C\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]\right)$$

Problem 350: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\left(a+a\,\text{Cos}[c+d\,x]\right)^2}\,dx$$

Optimal (type 3, 72 leaves, 3 steps):

$$\frac{C\,x}{a^2}+\frac{(A+2B-5C)\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Cos}[c+d\,x])}+\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 3, 175 leaves):

$$\frac{1}{24\,a^2\,d}\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\left(9\,C\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+9\,C\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+3\,C\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+3\,C\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+6\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+6\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-18\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]-6\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+12\,C\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+2\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+4\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-10\,C\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]\right)$$

Problem 351: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]}{(a+a\,\text{Cos}[c+d\,x])^2}\,dx$$

Optimal (type 3, 83 leaves, 4 steps):

$$\frac{A\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a^2\,d}-\frac{(4A-B-2C)\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Cos}[c+d\,x])}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 3, 221 leaves):

$$-\left(\left(4\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\left(6\,A\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+(A-B+C)\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]+2\,(4A-B-2C)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]+(A-B+C)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Tan}\left[\frac{c}{2}\right]\right)\right)\Big/\left(3\,a^2\,d\,(1+\text{Cos}[c+d\,x])^2\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,(c+d\,x)]\right)\right)\right)$$

Problem 352: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^2}{(a+a\,\text{Cos}[c+d\,x])^2}\,dx$$

Optimal (type 3, 109 leaves, 6 steps):

$$-\frac{(2A-B)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}+\frac{(10A-4B+C)\,\text{Tan}[c+d x]}{3a^2 d}-\frac{(2A-B)\,\text{Tan}[c+d x]}{a^2 d\,(1+\text{Cos}[c+d x])}-\frac{(A-B+C)\,\text{Tan}[c+d x]}{3 d\,(a+a\,\text{Cos}[c+d x])^2}$$

Result (type 3, 321 leaves):

$$\Big(1\Big/\Big(3a^2 d\,(1+\text{Cos}[c+d x])^2\,(2A+C+2B\,\text{Cos}[c+d x]+C\,\text{Cos}[2(c+d x)])\Big)\Big)\,4\,\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]\,\text{Cos}[c+d x]^2\,\big(C+B\,\text{Sec}[c+d x]+A\,\text{Sec}[c+d x]^2\big)\Big(\Big((A-B+C)\,\text{Sec}\Big[\frac{c}{2}\Big]\,\text{Sin}\Big[\frac{d x}{2}\Big]+2(7A-4B+C)\,\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Sec}\Big[\frac{c}{2}\Big]\,\text{Sin}\Big[\frac{d x}{2}\Big]+6\,\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^3\Big((2A-B)\Big(\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]-\text{Sin}\Big[\frac{1}{2}(c+d x)\Big]\Big]-\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]+\text{Sin}\Big[\frac{1}{2}(c+d x)\Big]\Big]\Big)+(A\,\text{Sin}[d x])\Big/\Big(\Big(\text{Cos}\Big[\frac{c}{2}\Big]-\text{Sin}\Big[\frac{c}{2}\Big]\Big)\Big(\text{Cos}\Big[\frac{c}{2}\Big]+\text{Sin}\Big[\frac{c}{2}\Big]\Big)\Big(\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]-\text{Sin}\Big[\frac{1}{2}(c+d x)\Big]\Big)\Big(\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]+\text{Sin}\Big[\frac{1}{2}(c+d x)\Big]\Big)\Big)\Big)+(A-B+C)\,\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]\,\text{Tan}\Big[\frac{c}{2}\Big]\Big)$$

Problem 353: Result more than twice size of optimal antiderivative.

$$\int\frac{\big(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\big)\,\text{Sec}[c+d x]^3}{(a+a\,\text{Cos}[c+d x])^2}\,dx$$

Optimal (type 3, 165 leaves, 7 steps):

$$\frac{(7A-4B+2C)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{2a^2 d}-\frac{2(8A-5B+2C)\,\text{Tan}[c+d x]}{3a^2 d}+\frac{(7A-4B+2C)\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{2a^2 d}-\frac{(8A-5B+2C)\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{3a^2 d\,(1+\text{Cos}[c+d x])}-\frac{(A-B+C)\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{3 d\,(a+a\,\text{Cos}[c+d x])^2}$$

Result (type 3, 578 leaves):

$$-\left(\left(2\,(7A-4B+2C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right)\Big/\left(d\,(a+a\,\text{Cos}[c+dx])^2\right)\right)+\left(2\,(7A-4B+2C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right)\Big/\left(d\,(a+a\,\text{Cos}[c+dx])^2\right)+\frac{A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4}{d\,(a+a\,\text{Cos}[c+dx])^2\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}-\frac{A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4}{d\,(a+a\,\text{Cos}[c+dx])^2\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}-\frac{4\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\left(2A\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]-B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}{d\,(a+a\,\text{Cos}[c+dx])^2\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}-\frac{4\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\left(2A\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]-B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}{d\,(a+a\,\text{Cos}[c+dx])^2\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}-\left(2\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^3\left(A\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]-B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+C\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\Big/\left(3d\,(a+a\,\text{Cos}[c+dx])^2\right)-\left(4\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]\left(10A\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]-7B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+4C\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\Big/\left(3d\,(a+a\,\text{Cos}[c+dx])^2\right)$$

Problem 354: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+dx]+C\,\text{Cos}[c+dx]^2\right)\text{Sec}[c+dx]^4}{(a+a\,\text{Cos}[c+dx])^2}\,dx$$

Optimal (type 3, 194 leaves, 7 steps):

$$-\frac{(10A-7B+4C)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{2a^2d}+\frac{(12A-8B+5C)\,\text{Tan}[c+dx]}{a^2d}-\frac{(10A-7B+4C)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{2a^2d}-\frac{(10A-7B+4C)\,\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]}{3a^2d\,(1+\text{Cos}[c+dx])}-\frac{(A-B+C)\,\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]}{3d\,(a+a\,\text{Cos}[c+dx])^2}+\frac{(12A-8B+5C)\,\text{Tan}[c+dx]^3}{3a^2d}$$

Result (type 3, 763 leaves):

$$\left(2\,(10\,A-7\,B+4\,C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)\Big/\left(d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\right)-$$
$$\left(2\,(10\,A-7\,B+4\,C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)\Big/$$
$$\left(d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\right)+\frac{(-5\,A+3\,B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4}{3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{2\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+$$
$$\frac{2\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+$$
$$\frac{(5\,A-3\,B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4}{3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\left(2\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\left(A\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-B\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+C\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\right)+$$
$$\left(4\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\left(11\,A\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-6\,B\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,C\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+$$
$$\left(4\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\left(11\,A\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-6\,B\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,C\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+$$
$$\left(4\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(13\,A\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\right.\right.$$
$$\left.\left.10\,B\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+7\,C\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/\left(3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\right)$$

Problem 355: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+d\,x]^4\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{(a+a\,\mathrm{Cos}[c+d\,x])^3}\,dx$$

Optimal (type 3, 237 leaves, 8 steps):

$$-\frac{(6A-13B+23C)\,x}{2a^3}+\frac{4(9A-19B+34C)\,\text{Sin}[c+dx]}{5a^3 d}-\frac{(6A-13B+23C)\,\text{Cos}[c+dx]\,\text{Sin}[c+dx]}{2a^3 d}-\frac{(A-B+C)\,\text{Cos}[c+dx]^5\,\text{Sin}[c+dx]}{5d\,(a+a\,\text{Cos}[c+dx])^3}-\frac{(3A-8B+13C)\,\text{Cos}[c+dx]^4\,\text{Sin}[c+dx]}{15ad\,(a+a\,\text{Cos}[c+dx])^2}-\frac{(6A-13B+23C)\,\text{Cos}[c+dx]^3\,\text{Sin}[c+dx]}{3d\,(a^3+a^3\,\text{Cos}[c+dx])}-\frac{4(9A-19B+34C)\,\text{Sin}[c+dx]^3}{15a^3 d}$$

Result (type 3, 663 leaves):

$$\frac{1}{480\,a^3 d\,(1+\text{Cos}[c+dx])^3}\text{Cos}\left[\frac{1}{2}(c+dx)\right]\text{Sec}\left[\frac{c}{2}\right]\Bigg(-600\,(6A-13B+23C)\,dx\,\text{Cos}\left[\frac{dx}{2}\right]-600\,(6A-13B+23C)\,dx\,\text{Cos}\left[c+\frac{dx}{2}\right]-$$
$$1800\,A\,dx\,\text{Cos}\left[c+\frac{3dx}{2}\right]+3900\,B\,dx\,\text{Cos}\left[c+\frac{3dx}{2}\right]-6900\,C\,dx\,\text{Cos}\left[c+\frac{3dx}{2}\right]-$$
$$1800\,A\,dx\,\text{Cos}\left[2c+\frac{3dx}{2}\right]+3900\,B\,dx\,\text{Cos}\left[2c+\frac{3dx}{2}\right]-6900\,C\,dx\,\text{Cos}\left[2c+\frac{3dx}{2}\right]-$$
$$360\,A\,dx\,\text{Cos}\left[2c+\frac{5dx}{2}\right]+780\,B\,dx\,\text{Cos}\left[2c+\frac{5dx}{2}\right]-1380\,C\,dx\,\text{Cos}\left[2c+\frac{5dx}{2}\right]-$$
$$360\,A\,dx\,\text{Cos}\left[3c+\frac{5dx}{2}\right]+780\,B\,dx\,\text{Cos}\left[3c+\frac{5dx}{2}\right]-1380\,C\,dx\,\text{Cos}\left[3c+\frac{5dx}{2}\right]+$$
$$7020\,A\,\text{Sin}\left[\frac{dx}{2}\right]-12760\,B\,\text{Sin}\left[\frac{dx}{2}\right]+20410\,C\,\text{Sin}\left[\frac{dx}{2}\right]-4500\,A\,\text{Sin}\left[c+\frac{dx}{2}\right]+$$
$$7560\,B\,\text{Sin}\left[c+\frac{dx}{2}\right]-11110\,C\,\text{Sin}\left[c+\frac{dx}{2}\right]+4860\,A\,\text{Sin}\left[c+\frac{3dx}{2}\right]-9230\,B\,\text{Sin}\left[c+\frac{3dx}{2}\right]+$$
$$15380\,C\,\text{Sin}\left[c+\frac{3dx}{2}\right]-900\,A\,\text{Sin}\left[2c+\frac{3dx}{2}\right]+930\,B\,\text{Sin}\left[2c+\frac{3dx}{2}\right]-380\,C\,\text{Sin}\left[2c+\frac{3dx}{2}\right]+$$
$$1452\,A\,\text{Sin}\left[2c+\frac{5dx}{2}\right]-2782\,B\,\text{Sin}\left[2c+\frac{5dx}{2}\right]+4777\,C\,\text{Sin}\left[2c+\frac{5dx}{2}\right]+$$
$$300\,A\,\text{Sin}\left[3c+\frac{5dx}{2}\right]-750\,B\,\text{Sin}\left[3c+\frac{5dx}{2}\right]+1625\,C\,\text{Sin}\left[3c+\frac{5dx}{2}\right]+$$
$$60\,A\,\text{Sin}\left[3c+\frac{7dx}{2}\right]-105\,B\,\text{Sin}\left[3c+\frac{7dx}{2}\right]+230\,C\,\text{Sin}\left[3c+\frac{7dx}{2}\right]+60\,A\,\text{Sin}\left[4c+\frac{7dx}{2}\right]-$$
$$105\,B\,\text{Sin}\left[4c+\frac{7dx}{2}\right]+230\,C\,\text{Sin}\left[4c+\frac{7dx}{2}\right]+15\,B\,\text{Sin}\left[4c+\frac{9dx}{2}\right]-20\,C\,\text{Sin}\left[4c+\frac{9dx}{2}\right]+$$
$$15\,B\,\text{Sin}\left[5c+\frac{9dx}{2}\right]-20\,C\,\text{Sin}\left[5c+\frac{9dx}{2}\right]+5\,C\,\text{Sin}\left[5c+\frac{11dx}{2}\right]+5\,C\,\text{Sin}\left[6c+\frac{11dx}{2}\right]\Bigg)$$

Problem 356: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+dx]^3\,\left(A+B\,\text{Cos}[c+dx]+C\,\text{Cos}[c+dx]^2\right)}{(a+a\,\text{Cos}[c+dx])^3}\,dx$$

Optimal (type 3, 207 leaves, 4 steps):

$$\frac{(2A-6B+13C)\,x}{2a^3}-\frac{2\,(11A-36B+76C)\,\text{Sin}[c+dx]}{15a^3d}+\frac{(2A-6B+13C)\,\text{Cos}[c+dx]\,\text{Sin}[c+dx]}{2a^3d}-\frac{(A-B+C)\,\text{Cos}[c+dx]^4\,\text{Sin}[c+dx]}{5d\,(a+a\,\text{Cos}[c+dx])^3}-\frac{(A-6B+11C)\,\text{Cos}[c+dx]^3\,\text{Sin}[c+dx]}{15ad\,(a+a\,\text{Cos}[c+dx])^2}-\frac{(11A-36B+76C)\,\text{Cos}[c+dx]^2\,\text{Sin}[c+dx]}{15d\,(a^3+a^3\,\text{Cos}[c+dx])}$$

Result (type 3, 565 leaves):

$$\frac{1}{480a^3d\,(1+\text{Cos}[c+dx])^3}\text{Cos}\left[\frac{1}{2}(c+dx)\right]\text{Sec}\left[\frac{c}{2}\right]\Big(600\,(2A-6B+13C)\,dx\,\text{Cos}\left[\frac{dx}{2}\right]+600\,(2A-6B+13C)\,dx\,\text{Cos}\left[c+\frac{dx}{2}\right]+$$
$$600\,A\,d\,x\,\text{Cos}\left[c+\frac{3dx}{2}\right]-1800\,B\,d\,x\,\text{Cos}\left[c+\frac{3dx}{2}\right]+3900\,C\,d\,x\,\text{Cos}\left[c+\frac{3dx}{2}\right]+$$
$$600\,A\,d\,x\,\text{Cos}\left[2c+\frac{3dx}{2}\right]-1800\,B\,d\,x\,\text{Cos}\left[2c+\frac{3dx}{2}\right]+3900\,C\,d\,x\,\text{Cos}\left[2c+\frac{3dx}{2}\right]+$$
$$120\,A\,d\,x\,\text{Cos}\left[2c+\frac{5dx}{2}\right]-360\,B\,d\,x\,\text{Cos}\left[2c+\frac{5dx}{2}\right]+780\,C\,d\,x\,\text{Cos}\left[2c+\frac{5dx}{2}\right]+$$
$$120\,A\,d\,x\,\text{Cos}\left[3c+\frac{5dx}{2}\right]-360\,B\,d\,x\,\text{Cos}\left[3c+\frac{5dx}{2}\right]+780\,C\,d\,x\,\text{Cos}\left[3c+\frac{5dx}{2}\right]-$$
$$2960\,A\,\text{Sin}\left[\frac{dx}{2}\right]+7020\,B\,\text{Sin}\left[\frac{dx}{2}\right]-12\,760\,C\,\text{Sin}\left[\frac{dx}{2}\right]+2160\,A\,\text{Sin}\left[c+\frac{dx}{2}\right]-$$
$$4500\,B\,\text{Sin}\left[c+\frac{dx}{2}\right]+7560\,C\,\text{Sin}\left[c+\frac{dx}{2}\right]-1840\,A\,\text{Sin}\left[c+\frac{3dx}{2}\right]+4860\,B\,\text{Sin}\left[c+\frac{3dx}{2}\right]-$$
$$9230\,C\,\text{Sin}\left[c+\frac{3dx}{2}\right]+720\,A\,\text{Sin}\left[2c+\frac{3dx}{2}\right]-900\,B\,\text{Sin}\left[2c+\frac{3dx}{2}\right]+930\,C\,\text{Sin}\left[2c+\frac{3dx}{2}\right]-$$
$$512\,A\,\text{Sin}\left[2c+\frac{5dx}{2}\right]+1452\,B\,\text{Sin}\left[2c+\frac{5dx}{2}\right]-2782\,C\,\text{Sin}\left[2c+\frac{5dx}{2}\right]+$$
$$300\,B\,\text{Sin}\left[3c+\frac{5dx}{2}\right]-750\,C\,\text{Sin}\left[3c+\frac{5dx}{2}\right]+60\,B\,\text{Sin}\left[3c+\frac{7dx}{2}\right]-105\,C\,\text{Sin}\left[3c+\frac{7dx}{2}\right]+$$
$$60\,B\,\text{Sin}\left[4c+\frac{7dx}{2}\right]-105\,C\,\text{Sin}\left[4c+\frac{7dx}{2}\right]+15\,C\,\text{Sin}\left[4c+\frac{9dx}{2}\right]+15\,C\,\text{Sin}\left[5c+\frac{9dx}{2}\right]\Big)$$

Problem 357: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+dx]^2\,(A+B\,\text{Cos}[c+dx]+C\,\text{Cos}[c+dx]^2)}{(a+a\,\text{Cos}[c+dx])^3}\,dx$$

Optimal (type 3, 152 leaves, 7 steps):

$$\frac{(B-3C)\,x}{a^3}+\frac{(2A-7B+27C)\,\text{Sin}[c+dx]}{15a^3d}-\frac{(A-B+C)\,\text{Cos}[c+dx]^3\,\text{Sin}[c+dx]}{5d\,(a+a\,\text{Cos}[c+dx])^3}+\frac{(A+4B-9C)\,\text{Cos}[c+dx]^2\,\text{Sin}[c+dx]}{15ad\,(a+a\,\text{Cos}[c+dx])^2}-\frac{(B-3C)\,\text{Sin}[c+dx]}{d\,(a^3+a^3\,\text{Cos}[c+dx])}$$

Result (type 3, 423 leaves):

$$\frac{1}{120\,a^3\,d\,\left(1+\mathrm{Cos}[c+d\,x]\right)^3}\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\mathrm{Sec}\left[\frac{c}{2}\right]\left(300\,\left(B-3\,C\right)\,d\,x\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]+300\,\left(B-3\,C\right)\,d\,x\,\mathrm{Cos}\left[c+\frac{d\,x}{2}\right]+150\,B\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]-450\,C\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]+150\,B\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-450\,C\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+30\,B\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]-90\,C\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+30\,B\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-90\,C\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+160\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-740\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+1755\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-120\,A\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+540\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-1125\,C\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+80\,A\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-460\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+1215\,C\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-60\,A\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+180\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-225\,C\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+28\,A\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-128\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+363\,C\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+75\,C\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+15\,C\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+15\,C\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 358: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+d\,x]\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3}\,dx$$

Optimal (type 3, 123 leaves, 5 steps):

$$\frac{C\,x}{a^3}-\frac{\left(A-B+C\right)\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sin}[c+d\,x]}{5\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3}-\frac{\left(3\,A+2\,B-7\,C\right)\,\mathrm{Sin}[c+d\,x]}{15\,a\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2}+\frac{\left(6\,A+4\,B-29\,C\right)\,\mathrm{Sin}[c+d\,x]}{15\,d\,\left(a^3+a^3\,\mathrm{Cos}[c+d\,x]\right)}$$

Result (type 3, 289 leaves):

$$\frac{1}{480\,a^3\,d}\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5\left(150\,C\,d\,x\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]+150\,C\,d\,x\,\mathrm{Cos}\left[c+\frac{d\,x}{2}\right]+75\,C\,d\,x\,\mathrm{Cos}\left[c+\frac{3\,d\,x}{2}\right]+75\,C\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+15\,C\,d\,x\,\mathrm{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+15\,C\,d\,x\,\mathrm{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+30\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+80\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-370\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-30\,A\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-60\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+270\,C\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+30\,A\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+40\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-230\,C\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-30\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+90\,C\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+6\,A\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+14\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-64\,C\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]\right)$$

Problem 360: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]}{(a+a \operatorname{Cos}[c+d x])^3} \, dx$$

Optimal (type 3, 124 leaves, 5 steps):

$$\frac{A \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{a^3 d}-\frac{(A-B+C) \operatorname{Sin}[c+d x]}{5 d (a+a \operatorname{Cos}[c+d x])^3}-\frac{(7 A-2 B-3 C) \operatorname{Sin}[c+d x]}{15 a d (a+a \operatorname{Cos}[c+d x])^2}-\frac{(22 A-2 B-3 C) \operatorname{Sin}[c+d x]}{15 d \left(a^3+a^3 \operatorname{Cos}[c+d x]\right)}$$

Result (type 3, 276 leaves):

$$-\Bigg(\Bigg(\left(A+B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \Bigg(240 A \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]^6 \left(\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+$$
$$\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right] \operatorname{Sec}\left[\frac{c}{2}\right] \Bigg(5 (29 A-4 B-3 C) \operatorname{Sin}\left[\frac{d x}{2}\right]+15 (-5 A+C) \operatorname{Sin}\left[c+\frac{d x}{2}\right]+$$
$$95 A \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]-10 B \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]-15 C \operatorname{Sin}\left[c+\frac{3 d x}{2}\right]-15 A \operatorname{Sin}\left[2 c+\frac{3 d x}{2}\right]+$$
$$22 A \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]-2 B \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]-3 C \operatorname{Sin}\left[2 c+\frac{5 d x}{2}\right]\Bigg)\Bigg)\Bigg)\Bigg/$$
$$\left(15 a^3 d (1+\operatorname{Cos}[c+d x])^3 (2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 (c+d x)])\right)\Bigg)$$

Problem 361: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^2}{(a+a \operatorname{Cos}[c+d x])^3} \, dx$$

Optimal (type 3, 150 leaves, 7 steps):

$$-\frac{(3 A-B) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{a^3 d}+\frac{2 (36 A-11 B+C) \operatorname{Tan}[c+d x]}{15 a^3 d}-\frac{(A-B+C) \operatorname{Tan}[c+d x]}{5 d (a+a \operatorname{Cos}[c+d x])^3}-\frac{(9 A-4 B-C) \operatorname{Tan}[c+d x]}{15 a d (a+a \operatorname{Cos}[c+d x])^2}-\frac{(3 A-B) \operatorname{Tan}[c+d x]}{d \left(a^3+a^3 \operatorname{Cos}[c+d x]\right)}$$

Result (type 3, 839 leaves):

$$\frac{1}{a^3}\left(\left(16\,(3\,A-B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Cos}[c+d\,x]^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]\,\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,(1+\text{Cos}[c+d\,x])^3\,(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x])\right)-\left(16\,(3\,A-B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Cos}[c+d\,x]^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]\,\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,(1+\text{Cos}[c+d\,x])^3\,(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x])\right)+\left(1\Big/\left(60\,d\,(1+\text{Cos}[c+d\,x])^3\,(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x])\right)\right)\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\left(-255\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+160\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-20\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]+567\,A\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-167\,B\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]+22\,C\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-600\,A\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+170\,B\,\text{Sin}\left[c-\frac{d\,x}{2}\right]-10\,C\,\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]+10\,C\,\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]-20\,C\,\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]+22\,C\,\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]+10\,C\,\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]+10\,C\,\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]-22\,B\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+2\,C\,\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]+2\,C\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)\right)$$

Problem 365: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^3\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{(a+a\,\text{Cos}[c+d\,x])^4}\,dx$$

Optimal (type 3, 195 leaves, 8 steps):

$$\frac{(B-4C)\,x}{a^4}+\frac{(6A-55B+244C)\,\mathrm{Sin}[c+dx]}{105\,a^4\,d}+\frac{(3A+25B-88C)\,\mathrm{Cos}[c+dx]^2\,\mathrm{Sin}[c+dx]}{105\,a^4\,d\,(1+\mathrm{Cos}[c+dx])^2}-\frac{(B-4C)\,\mathrm{Sin}[c+dx]}{a^4\,d\,(1+\mathrm{Cos}[c+dx])}-\frac{(A-B+C)\,\mathrm{Cos}[c+dx]^4\,\mathrm{Sin}[c+dx]}{7\,d\,(a+a\,\mathrm{Cos}[c+dx])^4}+\frac{(2A+5B-12C)\,\mathrm{Cos}[c+dx]^3\,\mathrm{Sin}[c+dx]}{35\,a\,d\,(a+a\,\mathrm{Cos}[c+dx])^3}$$

Result (type 3, 571 leaves):

$$\frac{1}{1680\,a^4\,d\,(1+\mathrm{Cos}[c+dx])^4}\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]\mathrm{Sec}\left[\frac{c}{2}\right]\Big(7350\,(B-4C)\,d\,x\,\mathrm{Cos}\left[\frac{dx}{2}\right]+7350\,(B-4C)\,d\,x\,\mathrm{Cos}\left[c+\frac{dx}{2}\right]+4410\,B\,d\,x\,\mathrm{Cos}\left[c+\frac{3dx}{2}\right]-17640\,C\,d\,x\,\mathrm{Cos}\left[c+\frac{3dx}{2}\right]+4410\,B\,d\,x\,\mathrm{Cos}\left[2c+\frac{3dx}{2}\right]-17640\,C\,d\,x\,\mathrm{Cos}\left[2c+\frac{3dx}{2}\right]+1470\,B\,d\,x\,\mathrm{Cos}\left[2c+\frac{5dx}{2}\right]-5880\,C\,d\,x\,\mathrm{Cos}\left[2c+\frac{5dx}{2}\right]+1470\,B\,d\,x\,\mathrm{Cos}\left[3c+\frac{5dx}{2}\right]-5880\,C\,d\,x\,\mathrm{Cos}\left[3c+\frac{5dx}{2}\right]+210\,B\,d\,x\,\mathrm{Cos}\left[3c+\frac{7dx}{2}\right]-840\,C\,d\,x\,\mathrm{Cos}\left[3c+\frac{7dx}{2}\right]+210\,B\,d\,x\,\mathrm{Cos}\left[4c+\frac{7dx}{2}\right]-840\,C\,d\,x\,\mathrm{Cos}\left[4c+\frac{7dx}{2}\right]+2520\,A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-19880\,B\,\mathrm{Sin}\left[\frac{dx}{2}\right]+60830\,C\,\mathrm{Sin}\left[\frac{dx}{2}\right]-2520\,A\,\mathrm{Sin}\left[c+\frac{dx}{2}\right]+16520\,B\,\mathrm{Sin}\left[c+\frac{dx}{2}\right]-46130\,C\,\mathrm{Sin}\left[c+\frac{dx}{2}\right]+1764\,A\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right]-14280\,B\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right]+46116\,C\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right]-1260\,A\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right]+7560\,B\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right]-18060\,C\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right]+588\,A\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right]-5600\,B\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right]+19292\,C\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right]-420\,A\,\mathrm{Sin}\left[3c+\frac{5dx}{2}\right]+1680\,B\,\mathrm{Sin}\left[3c+\frac{5dx}{2}\right]-2100\,C\,\mathrm{Sin}\left[3c+\frac{5dx}{2}\right]+144\,A\,\mathrm{Sin}\left[3c+\frac{7dx}{2}\right]-1040\,B\,\mathrm{Sin}\left[3c+\frac{7dx}{2}\right]+3791\,C\,\mathrm{Sin}\left[3c+\frac{7dx}{2}\right]+735\,C\,\mathrm{Sin}\left[4c+\frac{7dx}{2}\right]+105\,C\,\mathrm{Sin}\left[4c+\frac{9dx}{2}\right]+105\,C\,\mathrm{Sin}\left[5c+\frac{9dx}{2}\right]\Big)$$

Problem 366: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+dx]^2\,(A+B\,\mathrm{Cos}[c+dx]+C\,\mathrm{Cos}[c+dx]^2)}{(a+a\,\mathrm{Cos}[c+dx])^4}\,dx$$

Optimal (type 3, 164 leaves, 6 steps):

$$\frac{C\,x}{a^4}-\frac{(8A+6B-55C)\,\mathrm{Sin}[c+dx]}{105\,a^4\,d\,(1+\mathrm{Cos}[c+dx])^2}+\frac{(16A+12B-215C)\,\mathrm{Sin}[c+dx]}{105\,a^4\,d\,(1+\mathrm{Cos}[c+dx])}-\frac{(A-B+C)\,\mathrm{Cos}[c+dx]^3\,\mathrm{Sin}[c+dx]}{7\,d\,(a+a\,\mathrm{Cos}[c+dx])^4}+\frac{(4A+3B-10C)\,\mathrm{Cos}[c+dx]^2\,\mathrm{Sin}[c+dx]}{35\,a\,d\,(a+a\,\mathrm{Cos}[c+dx])^3}$$

Result (type 3, 405 leaves) :

$$\frac{1}{13440\, a^4\, d}\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]^7\left(3675\, C\, d\, x\, \text{Cos}\left[\frac{d x}{2}\right]+3675\, C\, d\, x\, \text{Cos}\left[c+\frac{d x}{2}\right]+2205\, C\, d\, x\, \text{Cos}\left[c+\frac{3 d x}{2}\right]+2205\, C\, d\, x\, \text{Cos}\left[2 c+\frac{3 d x}{2}\right]+735\, C\, d\, x\, \text{Cos}\left[2 c+\frac{5 d x}{2}\right]+735\, C\, d\, x\, \text{Cos}\left[3 c+\frac{5 d x}{2}\right]+105\, C\, d\, x\, \text{Cos}\left[3 c+\frac{7 d x}{2}\right]+105\, C\, d\, x\, \text{Cos}\left[4 c+\frac{7 d x}{2}\right]+560\, A\, \text{Sin}\left[\frac{d x}{2}\right]+1260\, B\, \text{Sin}\left[\frac{d x}{2}\right]-9940\, C\, \text{Sin}\left[\frac{d x}{2}\right]-350\, A\, \text{Sin}\left[c+\frac{d x}{2}\right]-1260\, B\, \text{Sin}\left[c+\frac{d x}{2}\right]+8260\, C\, \text{Sin}\left[c+\frac{d x}{2}\right]+336\, A\, \text{Sin}\left[c+\frac{3 d x}{2}\right]+882\, B\, \text{Sin}\left[c+\frac{3 d x}{2}\right]-7140\, C\, \text{Sin}\left[c+\frac{3 d x}{2}\right]-210\, A\, \text{Sin}\left[2 c+\frac{3 d x}{2}\right]-630\, B\, \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+3780\, C\, \text{Sin}\left[2 c+\frac{3 d x}{2}\right]+182\, A\, \text{Sin}\left[2 c+\frac{5 d x}{2}\right]+294\, B\, \text{Sin}\left[2 c+\frac{5 d x}{2}\right]-2800\, C\, \text{Sin}\left[2 c+\frac{5 d x}{2}\right]-210\, B\, \text{Sin}\left[3 c+\frac{5 d x}{2}\right]+840\, C\, \text{Sin}\left[3 c+\frac{5 d x}{2}\right]+26\, A\, \text{Sin}\left[3 c+\frac{7 d x}{2}\right]+72\, B\, \text{Sin}\left[3 c+\frac{7 d x}{2}\right]-520\, C\, \text{Sin}\left[3 c+\frac{7 d x}{2}\right]\right)$$

Problem 369: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]}{(a+a\,\text{Cos}[c+d x])^4}\,dx$$

Optimal (type 3, 157 leaves, 6 steps) :

$$\frac{A\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a^4\, d}-\frac{(55 A-6 B-8 C)\,\text{Sin}[c+d x]}{105\, a^4\, d\,(1+\text{Cos}[c+d x])^2}-\frac{2\,(80 A-3 B-4 C)\,\text{Sin}[c+d x]}{105\, a^4\, d\,(1+\text{Cos}[c+d x])}-\frac{(A-B+C)\,\text{Sin}[c+d x]}{7\, d\,(a+a\,\text{Cos}[c+d x])^4}-\frac{(10 A-3 B-4 C)\,\text{Sin}[c+d x]}{35\, a\, d\,(a+a\,\text{Cos}[c+d x])^3}$$

Result (type 3, 334 leaves) :

$$-\left(\left(\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\left(6720\,A\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^8\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\mathrm{Sec}\left[\frac{c}{2}\right]\left(70\,(49\,A-3\,B-2\,C)\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-70\,(31\,A-2\,C)\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+2625\,A\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-126\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-168\,C\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-735\,A\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+1015\,A\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-42\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-56\,C\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-105\,A\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+160\,A\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-6\,B\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-8\,C\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]\right)\right)\right)\Big/\left(210\,a^4\,d\,(1+\mathrm{Cos}[c+d\,x])^4\,(2\,A+C+2\,B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[2\,(c+d\,x)])\right)\right)$$

Problem 370: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\mathrm{Sec}[c+d\,x]^2}{(a+a\,\mathrm{Cos}[c+d\,x])^4}\,dx$$

Optimal (type 3, 185 leaves, 8 steps):

$$-\frac{(4\,A-B)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{a^4\,d}+\frac{2\,(332\,A-80\,B+3\,C)\,\mathrm{Tan}[c+d\,x]}{105\,a^4\,d}-\frac{(88\,A-25\,B-3\,C)\,\mathrm{Tan}[c+d\,x]}{105\,a^4\,d\,(1+\mathrm{Cos}[c+d\,x])^2}-\frac{(4\,A-B)\,\mathrm{Tan}[c+d\,x]}{a^4\,d\,(1+\mathrm{Cos}[c+d\,x])}-\frac{(A-B+C)\,\mathrm{Tan}[c+d\,x]}{7\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^4}-\frac{(12\,A-5\,B-2\,C)\,\mathrm{Tan}[c+d\,x]}{35\,a\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^3}$$

Result (type 3, 1190 leaves):

$$\frac{1}{a^4}\left(\left(32\,(4\,A-B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\mathrm{Cos}[c+d\,x]^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\left(C+B\,\mathrm{Sec}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,(1+\mathrm{Cos}[c+d\,x])^4\,(2\,A+C+2\,B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)-\left(32\,(4\,A-B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\mathrm{Cos}[c+d\,x]^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\left(C+B\,\mathrm{Sec}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x]^2\right)\right)\Big/\left(d\,(1+\mathrm{Cos}[c+d\,x])^4\,(2\,A+C+2\,B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)+\left(4\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sec}\left[\frac{c}{2}\right]\left(C+B\,\mathrm{Sec}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x]^2\right)\left(A\,\mathrm{Sin}\left[\frac{c}{2}\right]-B\,\mathrm{Sin}\left[\frac{c}{2}\right]+C\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/\right.$$

$$\left(7\,d\,(1+\mathrm{Cos}[c+d\,x])^4\,(2\,A+C+2\,B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)+$$
$$\Big(8\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\left(C+B\,\mathrm{Sec}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(17\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]-10\,B\,\mathrm{Sin}\left[\frac{c}{2}\right]+3\,C\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\Big)\Big/$$
$$\left(35\,d\,(1+\mathrm{Cos}[c+d\,x])^4\,(2\,A+C+2\,B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)+$$
$$\Big(16\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\left(C+B\,\mathrm{Sec}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(139\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]-55\,B\,\mathrm{Sin}\left[\frac{c}{2}\right]+6\,C\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\Big)\Big/$$
$$\left(105\,d\,(1+\mathrm{Cos}[c+d\,x])^4\,(2\,A+C+2\,B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)+$$
$$\Big(4\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\left(C+B\,\mathrm{Sec}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)\Big)\Big/$$
$$\left(7\,d\,(1+\mathrm{Cos}[c+d\,x])^4\,(2\,A+C+2\,B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)+$$
$$\Big(8\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\left(C+B\,\mathrm{Sec}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(17\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-10\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+3\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)\Big)\Big/$$
$$\left(35\,d\,(1+\mathrm{Cos}[c+d\,x])^4\,(2\,A+C+2\,B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)+$$
$$\Big(32\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\left(C+B\,\mathrm{Sec}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(559\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-160\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+6\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)\Big)\Big/$$
$$\left(105\,d\,(1+\mathrm{Cos}[c+d\,x])^4\,(2\,A+C+2\,B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)+$$
$$\Big(16\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\left(C+B\,\mathrm{Sec}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x]^2\right)$$
$$\left(139\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-55\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+6\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)\Big)\Big/$$
$$\left(105\,d\,(1+\mathrm{Cos}[c+d\,x])^4\,(2\,A+C+2\,B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)+$$
$$\Big(32\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}[c]\,\left(C+B\,\mathrm{Sec}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x]^2\right)\,\mathrm{Sin}[d\,x]\Big)\Big/$$
$$\left(d\,(1+\mathrm{Cos}[c+d\,x])^4\,(2\,A+C+2\,B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)\Big)$$

Problem 377: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]\,dx$$

Optimal (type 3, 100 leaves, 4 steps):

$$\frac{2\sqrt{a}\,A\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{d}+\frac{2a\,(3B+C)\,\text{Sin}[c+d x]}{3d\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{2C\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{3d}$$

Result (type 3, 1495 leaves):

$$-\left(\left(\left(\left(\frac{1}{4}-\frac{i}{4}\right)A\left(1+e^{i c}\right)\left(\sqrt{2}-(1-i)\,e^{\frac{i c}{2}}+(16-16 i)\,e^{\frac{3 i c}{2}+i d x}+(20+20 i)\sqrt{2}\,e^{2 i c+\frac{3 i d x}{2}}-(34-34 i)\,e^{\frac{5 i c}{2}+2 i d x}-(20+20 i)\sqrt{2}\,e^{3 i c+\frac{5 i d x}{2}}+(16-16 i)\,e^{\frac{7 i c}{2}+3 i d x}+(4+4 i)\sqrt{2}\,e^{4 i c+\frac{7 i d x}{2}}-(1-i)\,e^{\frac{9 i c}{2}+4 i d x}+8 i\,e^{\frac{1}{2} i (c+d x)}-16\sqrt{2}\,e^{i (c+d x)}-40 i\,e^{\frac{3}{2} i (c+d x)}+34\sqrt{2}\,e^{2 i (c+d x)}+40 i\,e^{\frac{5}{2} i (c+d x)}-16\sqrt{2}\,e^{3 i (c+d x)}-8 i\,e^{\frac{7}{2} i (c+d x)}+\sqrt{2}\,e^{4 i (c+d x)}-(4+4 i)\sqrt{2}\,e^{\frac{1}{2} i (2 c+d x)}\right)x\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\Big/\left(\left(\left(-1-i\right)+\sqrt{2}\,e^{\frac{i c}{2}}\right)\left(-1+e^{i c}\right)\left(i-2\sqrt{2}\,e^{\frac{1}{2} i (c+d x)}-4 i\,e^{i (c+d x)}+2\sqrt{2}\,e^{\frac{3}{2} i (c+d x)}+i\,e^{2 i (c+d x)}\right)^2\right)\right)-$$

$$\frac{1}{\sqrt{2}\,d}i\,A\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]-\frac{1}{\sqrt{2}\,d}$$

$$i\,A\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]-$$

$$\frac{1}{2\sqrt{2}\,d}A\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]-\frac{1}{2\sqrt{2}\,d}$$

$$A\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]+$$

$$\frac{(2B+C)\,\text{Cos}\left[\frac{d x}{2}\right]\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{d}-$$

$$\left(2\,i\,A\,\text{ArcTan}\left[\frac{2\,i\,\text{Cos}\left[\frac{c}{2}\right]-i\left(-\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}\right]\right)\text{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right]\right.$$

$$\left.\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\text{Cot}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\Big/\left(d\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}\right)+$$

$$\left(\sqrt{2}\,A\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right.$$

$$\left(-d\,x\,\text{Cos}\left[\frac{c}{2}\right]+2\,\text{Log}\left[\sqrt{2}+2\,\text{Cos}\left[\frac{d\,x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]+2\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]\right]\text{Sin}\left[\frac{c}{2}\right]+\right.$$

$$\left.\left.\frac{4\,i\sqrt{2}\,\text{ArcTan}\left[\frac{2\,i\,\text{Cos}\left[\frac{c}{2}\right]-i\left(-\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}\right]\right)\text{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right]\text{Cos}\left[\frac{c}{2}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right)\right)\Big/$$

$$\left(d\left(4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2\right)\right)+\frac{C\,\text{Cos}\left[\frac{3\,d\,x}{2}\right]\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Sin}\left[\frac{3\,c}{2}\right]}{3\,d}+$$

$$\frac{(2\,B+C)\,\text{Cos}\left[\frac{c}{2}\right]\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]}{d}+$$

$$\frac{C\,\text{Cos}\left[\frac{3\,c}{2}\right]\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Sin}\left[\frac{3\,d\,x}{2}\right]}{3\,d}$$

Problem 378: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^2\,dx$$

Optimal (type 3, 98 leaves, 4 steps):

$$\frac{\sqrt{a}\,(A+2B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{d}-\frac{a\,(A-2C)\,\text{Sin}[c+d x]}{d\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{A\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Tan}[c+d x]}{d}$$

Result (type 3, 527 leaves):

$$\frac{1}{d}\left(\frac{1}{32}+\frac{i}{32}\right)\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]\left(\frac{1}{i+\sqrt{2}}2\,i\sqrt{2}\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(A+2B)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]-\frac{1}{i+\sqrt{2}}2\sqrt{2}\left((-1+i)+\sqrt{2}\right)$$
$$\left((3+i)+\sqrt{2}\right)(A+2B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]+$$
$$\frac{(4+4i)\left(-2i+\sqrt{2}\right)(A+2B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{i+\sqrt{2}}+\frac{1}{i+\sqrt{2}}i\sqrt{2}\left((-1+i)+\sqrt{2}\right)$$
$$\left((3+i)+\sqrt{2}\right)(A+2B)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$\frac{1}{i+\sqrt{2}}\sqrt{2}\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(A+2B)$$
$$\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\frac{(8-8i)\,A}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]}+$$
$$\left.(32-32i)\,C\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]-\frac{(8-8i)\,A}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]}\right)$$

Problem 379: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Cos}[c+d x]}\,\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]^3\,dx$$

Optimal (type 3, 117 leaves, 4 steps):

$$\frac{\sqrt{a}\,(3A+4B+8C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{4d}+$$
$$\frac{a\,(A+4B)\,\text{Tan}[c+d x]}{4d\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{A\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{2d}$$

Result (type 3, 627 leaves):

$$\frac{1}{d}\left(\frac{1}{128}+\frac{i}{128}\right)\sqrt{a\,(1+\text{Cos}[c+d\,x])}\ \text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]$$
$$\left(\frac{1}{i+\sqrt{2}}2\,i\,\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)\,\left((1+i)+\sqrt{2}\right)\,(3\,A+4\,B+8\,C)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]-\frac{1}{i+\sqrt{2}}2\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)$$
$$\left((3+i)+\sqrt{2}\right)\,(3\,A+4\,B+8\,C)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]+$$
$$\frac{1}{i+\sqrt{2}}(4+4\,i)\,\left(-2\,i+\sqrt{2}\right)\,(3\,A+4\,B+8\,C)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+$$
$$\frac{1}{i+\sqrt{2}}i\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)\,\left((3+i)+\sqrt{2}\right)\,(3\,A+4\,B+8\,C)$$
$$\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\frac{1}{i+\sqrt{2}}\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)$$
$$\left((1+i)+\sqrt{2}\right)\,(3\,A+4\,B+8\,C)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+$$
$$\frac{(8-8\,i)\,(3\,A+4\,B)}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}+\frac{(16-16\,i)\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\left.\frac{(16-16\,i)\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{(8-8\,i)\,(3\,A+4\,B)}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}\right)$$

Problem 380: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Cos}[c+d\,x]}\ \left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 3, 163 leaves, 5 steps):

$$\frac{\sqrt{a}\,(5\,A+6\,B+8\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{8\,d}+\frac{a\,(5\,A+6\,B+8\,C)\,\text{Tan}[c+d\,x]}{8\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a\,(A+6\,B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{12\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{A\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\ \text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 1178 leaves):

$$-\frac{1}{\sqrt{2}\,\left(i+\sqrt{2}\right)\,d}$$

$$\left(\frac{1}{64}+\frac{i}{64}\right)\left((-1+i)+\sqrt{2}\right)\left((15+5i)A+5\sqrt{2}A+(18+6i)B+6\sqrt{2}B+(24+8i)C+8\sqrt{2}C\right)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{-\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]$$
$$\sqrt{a(1+\text{Cos}[c+dx])}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]-\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}$$
$$\left(\frac{1}{64}-\frac{i}{64}\right)\left((1+i)+\sqrt{2}\right)\left((-15+5i)A+5\sqrt{2}A-(18-6i)B+6\sqrt{2}B-(24-8i)C+8\sqrt{2}C\right)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]$$
$$\sqrt{a(1+\text{Cos}[c+dx])}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]+\frac{1}{32\left(i+\sqrt{2}\right)d}$$
$$\left(10A+5i\sqrt{2}A+12B+6i\sqrt{2}B+16C+8i\sqrt{2}C\right)\sqrt{a(1+\text{Cos}[c+dx])}$$
$$\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]-\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}\left(\frac{1}{128}-\frac{i}{128}\right)\left((-1+i)+\sqrt{2}\right)$$
$$\left((15+5i)A+5\sqrt{2}A+(18+6i)B+6\sqrt{2}B+(24+8i)C+8\sqrt{2}C\right)\sqrt{a(1+\text{Cos}[c+dx])}$$
$$\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]+\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}$$
$$\left(\frac{1}{128}+\frac{i}{128}\right)\left((1+i)+\sqrt{2}\right)\left((-15+5i)A+5\sqrt{2}A-(18-6i)B+6\sqrt{2}B-(24-8i)C+8\sqrt{2}C\right)$$
$$\sqrt{a(1+\text{Cos}[c+dx])}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]+$$
$$\frac{A\sqrt{a(1+\text{Cos}[c+dx])}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]}{12d\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}+\frac{(5A+6B+8C)\sqrt{a(1+\text{Cos}[c+dx])}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]}{16d\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}-$$
$$\frac{A\sqrt{a(1+\text{Cos}[c+dx])}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]}{12d\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}+$$
$$\frac{(-5A-6B-8C)\sqrt{a(1+\text{Cos}[c+dx])}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]}{16d\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}+$$
$$\left(\sqrt{a(1+\text{Cos}[c+dx])}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+2B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\Big/$$
$$\left(8d\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2\right)+$$
$$\left(\sqrt{a(1+\text{Cos}[c+dx])}\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]+2B\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\Big/$$

$$\left(8\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2\right)$$

Problem 381: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 3, 209 leaves, 6 steps):

$$\frac{\sqrt{a}\,(35A+40B+48C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{64\,d}+\frac{a\,(35A+40B+48C)\,\text{Tan}[c+d\,x]}{64\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a\,(35A+40B+48C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{96\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a\,(A+8B)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{24\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{A\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 1356 leaves):

$$-\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}\left(\frac{1}{512}+\frac{i}{512}\right)\left((-1+i)+\sqrt{2}\right)\left(\left(105+35\,i\right)A+35\sqrt{2}\,A+\left(120+40\,i\right)B+40\sqrt{2}\,B+\left(144+48\,i\right)C+48\sqrt{2}\,C\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}\left(\frac{1}{512}-\frac{i}{512}\right)\left((1+i)+\sqrt{2}\right)\left(\left(-105+35\,i\right)A+35\sqrt{2}\,A-\left(120-40\,i\right)B+40\sqrt{2}\,B-\left(144-48\,i\right)C+48\sqrt{2}\,C\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\frac{1}{256\left(i+\sqrt{2}\right)d}\left(70A+35\,i\sqrt{2}\,A+80B+40\,i\sqrt{2}\,B+96C+48\,i\sqrt{2}\,C\right)\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}\left(\frac{1}{1024}-\frac{i}{1024}\right)\left((-1+i)+\sqrt{2}\right)\left(\left(105+35\,i\right)A+35\sqrt{2}\,A+\left(120+40\,i\right)B+40\sqrt{2}\,B+\left(144+48\,i\right)C+48\sqrt{2}\,C\right)\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\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]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}\left(\frac{1}{1024}+\frac{i}{1024}\right)\left((1+i)+\sqrt{2}\right)$$

$$\Big(\big((-105+35\,i)\,A+35\sqrt{2}\,A-(120-40\,i)\,B+40\sqrt{2}\,B-(144-48\,i)\,C+48\sqrt{2}\,C\big)$$
$$\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}\ \mathrm{Log}\Big[2+\sqrt{2}\,\mathrm{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]-\sqrt{2}\,\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]+$$
$$\frac{(7\,A+8\,B)\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}\ \mathrm{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]}{96\,d\,\big(\mathrm{Cos}\big[\frac{1}{2}(c+d\,x)\big]-\mathrm{Sin}\big[\frac{1}{2}(c+d\,x)\big]\big)^3}+$$
$$\frac{(35\,A+40\,B+48\,C)\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}\ \mathrm{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]}{128\,d\,\big(\mathrm{Cos}\big[\frac{1}{2}(c+d\,x)\big]-\mathrm{Sin}\big[\frac{1}{2}(c+d\,x)\big]\big)}+$$
$$\frac{A\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}\ \mathrm{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]\,\mathrm{Sin}\big[\frac{1}{2}(c+d\,x)\big]}{16\,d\,\big(\mathrm{Cos}\big[\frac{1}{2}(c+d\,x)\big]-\mathrm{Sin}\big[\frac{1}{2}(c+d\,x)\big]\big)^4}+$$
$$\frac{A\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}\ \mathrm{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]\,\mathrm{Sin}\big[\frac{1}{2}(c+d\,x)\big]}{16\,d\,\big(\mathrm{Cos}\big[\frac{1}{2}(c+d\,x)\big]+\mathrm{Sin}\big[\frac{1}{2}(c+d\,x)\big]\big)^4}+$$
$$\frac{(-7\,A-8\,B)\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}\ \mathrm{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]}{96\,d\,\big(\mathrm{Cos}\big[\frac{1}{2}(c+d\,x)\big]+\mathrm{Sin}\big[\frac{1}{2}(c+d\,x)\big]\big)^3}+$$
$$\frac{(-35\,A-40\,B-48\,C)\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}\ \mathrm{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]}{128\,d\,\big(\mathrm{Cos}\big[\frac{1}{2}(c+d\,x)\big]+\mathrm{Sin}\big[\frac{1}{2}(c+d\,x)\big]\big)}+\Big(\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}$$
$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big(11\,A\,\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]+8\,B\,\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]+16\,C\,\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\Big)\Big/$$
$$\Big(64\,d\,\Big(\mathrm{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]-\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)^2\Big)+\Big(\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}\ \mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]$$
$$\Big(11\,A\,\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]+8\,B\,\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]+16\,C\,\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)\Big)\Big/$$
$$\Big(64\,d\,\Big(\mathrm{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]+\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]\Big)^2\Big)$$

Problem 385: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,\big(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\big)\,\mathrm{Sec}[c+d\,x]\,dx$$

Optimal (type 3, 142 leaves, 5 steps):

$$\frac{2\,a^{3/2}\,A\,\mathrm{ArcTanh}\Big[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\Big]}{d}+\frac{2\,a^2\,(15\,A+20\,B+12\,C)\,\mathrm{Sin}[c+d\,x]}{15\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+$$
$$\frac{2\,a\,(5\,B+3\,C)\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\ \mathrm{Sin}[c+d\,x]}{15\,d}+\frac{2\,C\,(a+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{5\,d}$$

Result (type 3, 1649 leaves) :

$$-\Bigg(\bigg(\Big(\left(\frac{1}{8}-\frac{i}{8}\right) A \left(1+e^{i c}\right) \Big(\sqrt{2}-(1-i)\, e^{\frac{i c}{2}}+(16-16 i)\, e^{\frac{3 i c}{2}+i d x}+(20+20 i) \sqrt{2}\, e^{2 i c+\frac{3 i d x}{2}}-(34-34 i)\, e^{\frac{5 i c}{2}+2 i d x}-(20+20 i) \sqrt{2}\, e^{3 i c+\frac{5 i d x}{2}}+(16-16 i)\, e^{\frac{7 i c}{2}+3 i d x}+(4+4 i) \sqrt{2}\, e^{4 i c+\frac{7 i d x}{2}}-(1-i)\, e^{\frac{9 i c}{2}+4 i d x}+8 i\, e^{\frac{1}{2} i (c+d x)}-16 \sqrt{2}\, e^{i (c+d x)}-40 i\, e^{\frac{3}{2} i (c+d x)}+34 \sqrt{2}\, e^{2 i (c+d x)}+40 i\, e^{\frac{5}{2} i (c+d x)}-16 \sqrt{2}\, e^{3 i (c+d x)}-8 i\, e^{\frac{7}{2} i (c+d x)}+\sqrt{2}\, e^{4 i (c+d x)}-(4+4 i) \sqrt{2}\, e^{\frac{1}{2} i (2 c+d x)}\Big)\, x \left(a \left(1+\mathrm{Cos}[c+d x]\right)\right)^{3/2} \mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\Big)\Big/\Big(\Big(\left((-1-i)+\sqrt{2}\, e^{\frac{i c}{2}}\right) \left(-1+e^{i c}\right) \left(i-2 \sqrt{2}\, e^{\frac{1}{2} i (c+d x)}-4 i\, e^{i (c+d x)}+2 \sqrt{2}\, e^{\frac{3}{2} i (c+d x)}+i\, e^{2 i (c+d x)}\right)^2\Big)\Big)\bigg)-$$

$$\frac{1}{2 \sqrt{2}\, d} i\, A\, \mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\, \mathrm{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\mathrm{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\, \mathrm{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right] \left(a \left(1+\mathrm{Cos}[c+d x]\right)\right)^{3/2} \mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3-$$

$$\frac{1}{2 \sqrt{2}\, d} i\, A\, \mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\mathrm{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\, \mathrm{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{\mathrm{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\, \mathrm{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right] \left(a \left(1+\mathrm{Cos}[c+d x]\right)\right)^{3/2} \mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3-$$

$$\frac{1}{4 \sqrt{2}\, d} A \left(a \left(1+\mathrm{Cos}[c+d x]\right)\right)^{3/2} \mathrm{Log}\left[2-\sqrt{2}\, \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\, \mathrm{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3-$$

$$\frac{1}{4 \sqrt{2}\, d} A \left(a \left(1+\mathrm{Cos}[c+d x]\right)\right)^{3/2} \mathrm{Log}\left[2+\sqrt{2}\, \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\, \mathrm{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3+\frac{1}{2 d}$$

$$(2 A+3 B+2 C)\, \mathrm{Cos}\left[\frac{d x}{2}\right] \left(a \left(1+\mathrm{Cos}[c+d x]\right)\right)^{3/2} \mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \mathrm{Sin}\left[\frac{c}{2}\right]-$$

$$\left(\mathrm{i}\, A\, \mathrm{ArcTan}\left[\frac{2\,\mathrm{i}\,\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{i}\left(-\sqrt{2}+2\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\mathrm{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}}\right]\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\right.$$

$$\left.\mathrm{Cot}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\right)\Big/\left(d\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}\right)+$$

$$\left(A\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\right.$$

$$\left(-d\,x\,\mathrm{Cos}\left[\frac{c}{2}\right]+2\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\mathrm{Sin}\left[\frac{c}{2}\right]+2\,\mathrm{Cos}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right]\mathrm{Sin}\left[\frac{c}{2}\right]+\right.$$

$$\left.\left.\frac{4\,\mathrm{i}\sqrt{2}\,\mathrm{ArcTan}\left[\frac{2\,\mathrm{i}\,\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{i}\left(-\sqrt{2}+2\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\mathrm{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}}\right]\mathrm{Cos}\left[\frac{c}{2}\right]}{\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}}\right)\right)\Big/$$

$$\left(\sqrt{2}\,d\left(4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2\right)\right)+$$

$$\frac{(2\,B+3\,C)\,\mathrm{Cos}\left[\frac{3\,d\,x}{2}\right]\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Sin}\left[\frac{3\,c}{2}\right]}{12\,d}+$$

$$\frac{C\,\mathrm{Cos}\left[\frac{5\,d\,x}{2}\right]\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Sin}\left[\frac{5\,c}{2}\right]}{20\,d}+$$

$$\frac{1}{2\,d}$$

$$(2\,A+3\,B+2\,C)\,\mathrm{Cos}\left[\frac{c}{2}\right]$$

$$\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Sin}\left[\frac{d\,x}{2}\right]+$$

$$\frac{(2\,B+3\,C)\,\mathrm{Cos}\left[\frac{3\,c}{2}\right]\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]}{12\,d}+$$

$$\frac{C\,\text{Cos}\left[\frac{5c}{2}\right]\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Sin}\left[\frac{5\,d\,x}{2}\right]}{20\,d}$$

Problem 386: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^2\,dx$$

Optimal (type 3, 144 leaves, 5 steps):

$$\frac{a^{3/2}\,(3\,A+2\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{d}-\frac{a^2\,(3\,A-6\,B-8\,C)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{a\,(3\,A-2\,C)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Tan}[c+d\,x]}{d}$$

Result (type 3, 561 leaves):

$$\frac{1}{d}\left(\frac{1}{192}+\frac{i}{192}\right)\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3$$
$$\left(\frac{1}{i+\sqrt{2}}6\,i\,\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)\,\left((1+i)+\sqrt{2}\right)\,(3\,A+2\,B)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]-\frac{1}{i+\sqrt{2}}6\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)$$
$$\left((3+i)+\sqrt{2}\right)\,(3\,A+2\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]+$$
$$\frac{(12+12\,i)\,\left(-2\,i+\sqrt{2}\right)\,(3\,A+2\,B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{i+\sqrt{2}}+$$
$$\frac{1}{i+\sqrt{2}}3\,i\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)\,\left((3+i)+\sqrt{2}\right)\,(3\,A+2\,B)$$
$$\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\frac{1}{i+\sqrt{2}}3\,\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)$$
$$\left((1+i)+\sqrt{2}\right)\,(3\,A+2\,B)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+$$
$$\frac{(24-24\,i)\,A}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}+(48-48\,i)\,(2\,B+3\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-$$
$$\left.\frac{(24-24\,i)\,A}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}+(16-16\,i)\,C\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\right)$$

Problem 387: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a + a \operatorname{Cos}[c + d x])^{3/2} (A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2) \operatorname{Sec}[c + d x]^3 \, dx$$

Optimal (type 3, 159 leaves, 5 steps):

$$\frac{a^{3/2} (7 A + 12 B + 8 C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{4 d} - \frac{a^2 (5 A + 4 B - 8 C) \operatorname{Sin}[c + d x]}{4 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{a (3 A + 4 B) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Tan}[c + d x]}{4 d} + \frac{A (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{2 d}$$

Result (type 3, 644 leaves):

$$\frac{1}{d}\left(\frac{1}{256} + \frac{i}{256}\right) (a (1 + \operatorname{Cos}[c + d x]))^{3/2} \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^3$$
$$\left(\frac{1}{i + \sqrt{2}} 2 i \sqrt{2} \left((-3 + i) + \sqrt{2}\right) \left((1 + i) + \sqrt{2}\right) (7 A + 12 B + 8 C)\right.$$
$$\operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{1}{4} (c + d x)\right] - \left(-1 + \sqrt{2}\right) \operatorname{Sin}\left[\frac{1}{4} (c + d x)\right]}{\left(1 + \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{4} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{4} (c + d x)\right]}\right] - \frac{1}{i + \sqrt{2}} 2 \sqrt{2} \left((-1 + i) + \sqrt{2}\right)$$
$$\left((3 + i) + \sqrt{2}\right) (7 A + 12 B + 8 C) \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{1}{4} (c + d x)\right] - \left(1 + \sqrt{2}\right) \operatorname{Sin}\left[\frac{1}{4} (c + d x)\right]}{\left(-1 + \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{4} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{4} (c + d x)\right]}\right] +$$
$$\frac{1}{i + \sqrt{2}} (4 + 4 i) \left(-2 i + \sqrt{2}\right) (7 A + 12 B + 8 C) \operatorname{Log}\left[\sqrt{2} + 2 \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] +$$
$$\frac{1}{i + \sqrt{2}} i \sqrt{2} \left((-1 + i) + \sqrt{2}\right) \left((3 + i) + \sqrt{2}\right) (7 A + 12 B + 8 C)$$
$$\operatorname{Log}\left[2 - \sqrt{2} \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \sqrt{2} \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] +$$
$$\frac{1}{i + \sqrt{2}} \sqrt{2} \left((-3 + i) + \sqrt{2}\right) \left((1 + i) + \sqrt{2}\right) (7 A + 12 B + 8 C)$$
$$\operatorname{Log}\left[2 + \sqrt{2} \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \sqrt{2} \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + \frac{(8 - 8 i) (7 A + 4 B)}{\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]} +$$
$$(128 - 128 i) C \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right] + \frac{(16 - 16 i) A \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]}{\left(\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} +$$
$$\left.\frac{(16 - 16 i) A \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]}{\left(\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} - \frac{(8 - 8 i) (7 A + 4 B)}{\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]}\right)$$

Problem 388: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^{3/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 3, 165 leaves, 5 steps):

$$\frac{a^{3/2}\,(11\,A+14\,B+24\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{8\,d}+\frac{a^2\,(19\,A+30\,B+24\,C)\,\text{Tan}[c+d\,x]}{24\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a\,(A+2\,B)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{4\,d}+$$
$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 1202 leaves):

$$-\frac{1}{\sqrt{2}\,\left(i+\sqrt{2}\right)d}\left(\frac{1}{128}+\frac{i}{128}\right)\left((-1+i)+\sqrt{2}\right)$$
$$\left((33+11\,i)\,A+11\,\sqrt{2}\,A+(42+14\,i)\,B+14\,\sqrt{2}\,B+(72+24\,i)\,C+24\,\sqrt{2}\,C\right)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]$$
$$(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3-\frac{1}{\sqrt{2}\,\left(i+\sqrt{2}\right)d}\left(\frac{1}{128}-\frac{i}{128}\right)\left((1+i)+\sqrt{2}\right)$$
$$\left((-33+11\,i)\,A+11\,\sqrt{2}\,A-(42-14\,i)\,B+14\,\sqrt{2}\,B-(72-24\,i)\,C+24\,\sqrt{2}\,C\right)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]$$
$$(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+\frac{1}{64\,\left(i+\sqrt{2}\right)d}$$
$$\left(22\,A+11\,i\,\sqrt{2}\,A+28\,B+14\,i\,\sqrt{2}\,B+48\,C+24\,i\,\sqrt{2}\,C\right)\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}$$
$$\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3-\frac{1}{\sqrt{2}\,\left(i+\sqrt{2}\right)d}\left(\frac{1}{256}-\frac{i}{256}\right)$$
$$\left((-1+i)+\sqrt{2}\right)\left((33+11\,i)\,A+11\,\sqrt{2}\,A+(42+14\,i)\,B+14\,\sqrt{2}\,B+(72+24\,i)\,C+24\,\sqrt{2}\,C\right)$$
$$(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+$$
$$\frac{1}{\sqrt{2}\,\left(i+\sqrt{2}\right)d}\left(\frac{1}{256}+\frac{i}{256}\right)\left((1+i)+\sqrt{2}\right)$$
$$\left((-33+11\,i)\,A+11\,\sqrt{2}\,A-(42-14\,i)\,B+14\,\sqrt{2}\,B-(72-24\,i)\,C+24\,\sqrt{2}\,C\right)$$

$$\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3+$$

$$\frac{A\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3}{24 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$

$$\frac{(11 A+14 B+8 C)\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3}{32 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}-$$

$$\frac{A\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3}{24 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$

$$\frac{(-11 A-14 B-8 C)\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3}{32 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\left(\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(3 A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+2 B\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$
$$\left(16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)+$$

$$\left(\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(3 A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+2 B\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/$$
$$\left(16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)$$

Problem 389: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int(a+a\,\text{Cos}[c+d x])^{3/2}\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]^5\,dx$$

Optimal (type 3, 215 leaves, 6 steps):

$$\frac{a^{3/2}(75 A+88 B+112 C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{64 d}+$$

$$\frac{a^2(75 A+88 B+112 C)\,\text{Tan}[c+d x]}{64 d\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{a^2(39 A+56 B+48 C)\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{96 d\sqrt{a+a\,\text{Cos}[c+d x]}}+$$

$$\frac{a(3 A+8 B)\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{24 d}+$$

$$\frac{A(a+a\,\text{Cos}[c+d x])^{3/2}\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{4 d}$$

Result (type 3, 1382 leaves):

$$-\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}\left(\frac{1}{1024}+\frac{i}{1024}\right)\left((-1+i)+\sqrt{2}\right)$$

$$\left(\left(225+75\,i\right)A+75\sqrt{2}\,A+\left(264+88\,i\right)B+88\sqrt{2}\,B+\left(336+112\,i\right)C+112\sqrt{2}\,C\right)$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{-\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}\right]$$

$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3-\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}\left(\frac{1}{1024}-\frac{i}{1024}\right)\left(\left(1+i\right)+\sqrt{2}\right)$$

$$\left(\left(-225+75\,i\right)A+75\sqrt{2}\,A-\left(264-88\,i\right)B+88\sqrt{2}\,B-\left(336-112\,i\right)C+112\sqrt{2}\,C\right)$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}\right]$$

$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+\frac{1}{512\left(i+\sqrt{2}\right)d}$$

$$\left(150\,A+75\,i\sqrt{2}\,A+176\,B+88\,i\sqrt{2}\,B+224\,C+112\,i\sqrt{2}\,C\right)$$

$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3-$$

$$\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}\left(\frac{1}{2048}-\frac{i}{2048}\right)\left(\left(-1+i\right)+\sqrt{2}\right)$$

$$\left(\left(225+75\,i\right)A+75\sqrt{2}\,A+\left(264+88\,i\right)B+88\sqrt{2}\,B+\left(336+112\,i\right)C+112\sqrt{2}\,C\right)$$

$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+$$

$$\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}\left(\frac{1}{2048}+\frac{i}{2048}\right)\left(\left(1+i\right)+\sqrt{2}\right)$$

$$\left(\left(-225+75\,i\right)A+75\sqrt{2}\,A-\left(264-88\,i\right)B+88\sqrt{2}\,B-\left(336-112\,i\right)C+112\sqrt{2}\,C\right)$$

$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+$$

$$\frac{\left(15\,A+8\,B\right)\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{192\,d\left(\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^3}+$$

$$\frac{\left(75\,A+88\,B+112\,C\right)\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{256\,d\left(\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)}+$$

$$\frac{A\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{32\,d\left(\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^4}+$$

$$\frac{A\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{32\,d\left(\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^4}+$$

$$\frac{\left(-15\,A-8\,B\right)\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{192\,d\left(\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^3}+$$

$$\frac{(-75\,A-88\,B-112\,C)\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{256\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$
$$\left(\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\right.$$
$$\left.\left(19\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+24\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+16\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(128\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\right)+\left(\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\right.$$
$$\left.\left(19\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+24\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+16\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(128\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\right)$$

Problem 390: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^6\,dx$$

Optimal (type 3, 263 leaves, 7 steps):

$$\frac{a^{3/2}\,(133\,A+150\,B+176\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{128\,d}+$$
$$\frac{a^2\,(133\,A+150\,B+176\,C)\,\text{Tan}[c+d\,x]}{128\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a^2\,(133\,A+150\,B+176\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{192\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a^2\,(67\,A+90\,B+80\,C)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{240\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a\,(3\,A+10\,B)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{40\,d}+$$
$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d}$$

Result (type 3, 1542 leaves):

$$-\frac{1}{\sqrt{2}\,\left(i+\sqrt{2}\right)\,d}\left(\frac{1}{2048}+\frac{i}{2048}\right)\,\left((-1+i)+\sqrt{2}\right)$$
$$\left((399+133\,i)\,A+133\,\sqrt{2}\,A+(450+150\,i)\,B+150\,\sqrt{2}\,B+(528+176\,i)\,C+176\,\sqrt{2}\,C\right)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]$$
$$\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3-\frac{1}{\sqrt{2}\,\left(i+\sqrt{2}\right)\,d}\left(\frac{1}{2048}-\frac{i}{2048}\right)\,\left((1+i)+\sqrt{2}\right)$$

$$\left(\left(-399+133\,\mathrm{i}\right) A+133\sqrt{2}\,A-\left(450-150\,\mathrm{i}\right) B+150\sqrt{2}\,B-\left(528-176\,\mathrm{i}\right) C+176\sqrt{2}\,C\right)$$
$$\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\mathrm{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}\right]$$
$$\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+\frac{1}{1024\left(\mathrm{i}+\sqrt{2}\right) d}$$
$$\left(266\,A+133\,\mathrm{i}\sqrt{2}\,A+300\,B+150\,\mathrm{i}\sqrt{2}\,B+352\,C+176\,\mathrm{i}\sqrt{2}\,C\right)$$
$$\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3-$$
$$\frac{1}{\sqrt{2}\left(\mathrm{i}+\sqrt{2}\right) d}\left(\frac{1}{4096}-\frac{\mathrm{i}}{4096}\right)\left(\left(-1+\mathrm{i}\right)+\sqrt{2}\right)$$
$$\left(\left(399+133\,\mathrm{i}\right) A+133\sqrt{2}\,A+\left(450+150\,\mathrm{i}\right) B+150\sqrt{2}\,B+\left(528+176\,\mathrm{i}\right) C+176\sqrt{2}\,C\right)$$
$$\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Log}\left[2-\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+$$
$$\frac{1}{\sqrt{2}\left(\mathrm{i}+\sqrt{2}\right) d}\left(\frac{1}{4096}+\frac{\mathrm{i}}{4096}\right)\left(\left(1+\mathrm{i}\right)+\sqrt{2}\right)$$
$$\left(\left(-399+133\,\mathrm{i}\right) A+133\sqrt{2}\,A-\left(450-150\,\mathrm{i}\right) B+150\sqrt{2}\,B-\left(528-176\,\mathrm{i}\right) C+176\sqrt{2}\,C\right)$$
$$\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Log}\left[2+\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3+$$
$$\frac{A\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{80\,d\left(\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^5}+$$
$$\frac{\left(29\,A+30\,B+16\,C\right)\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{384\,d\left(\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^3}+$$
$$\frac{\left(133\,A+150\,B+176\,C\right)\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{512\,d\left(\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)}-$$
$$\frac{A\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{80\,d\left(\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^5}+$$
$$\frac{\left(-29\,A-30\,B-16\,C\right)\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{384\,d\left(\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^3}+$$
$$\frac{\left(-133\,A-150\,B-176\,C\right)\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{512\,d\left(\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)}+$$
$$\left(\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(3\,A\,\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+2\,B\,\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\right)\Big/$$
$$\left(64\,d\left(\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^4\right)+$$

$$\left(\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(3\,A\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+2\,B\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\right)\Big/$$
$$\left(64\,d\left(\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^4\right)+\left(\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\right.$$
$$\left.\left(37\,A\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+38\,B\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+48\,C\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\right)\Big/$$
$$\left(256\,d\left(\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^2\right)+\left(\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\right.$$
$$\left.\left(37\,A\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+38\,B\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+48\,C\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\right)\Big/$$
$$\left(256\,d\left(\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^2\right)$$

Problem 394: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]\,dx$$

Optimal (type 3, 182 leaves, 6 steps):

$$\frac{2\,a^{5/2}\,A\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{d}+\frac{2\,a^3\left(245\,A+224\,B+160\,C\right)\text{Sin}[c+d\,x]}{105\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{2\,a^2\left(35\,A+56\,B+40\,C\right)\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,d}+$$
$$\frac{2\,a\left(7\,B+5\,C\right)\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\text{Sin}[c+d\,x]}{35\,d}+\frac{2\,C\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 3, 1772 leaves):

$$-\left(\left(\left(\left(\frac{1}{16}-\frac{i}{16}\right)A\left(1+e^{i\,c}\right)\right.\right.\right.$$
$$\left(\sqrt{2}-\left(1-i\right)e^{\frac{i\,c}{2}}+\left(16-16\,i\right)e^{\frac{3\,i\,c}{2}+i\,d\,x}+\left(20+20\,i\right)\sqrt{2}\,e^{2\,i\,c+\frac{3\,i\,d\,x}{2}}-\left(34-34\,i\right)e^{\frac{5\,i\,c}{2}+2\,i\,d\,x}-\right.$$
$$\left(20+20\,i\right)\sqrt{2}\,e^{3\,i\,c+\frac{5\,i\,d\,x}{2}}+\left(16-16\,i\right)e^{\frac{7\,i\,c}{2}+3\,i\,d\,x}+\left(4+4\,i\right)\sqrt{2}\,e^{4\,i\,c+\frac{7\,i\,d\,x}{2}}-$$
$$\left(1-i\right)e^{\frac{9\,i\,c}{2}+4\,i\,d\,x}+8\,i\,e^{\frac{1}{2}i\,(c+d\,x)}-16\sqrt{2}\,e^{i\,(c+d\,x)}-40\,i\,e^{\frac{3}{2}i\,(c+d\,x)}+34\sqrt{2}\,e^{2\,i\,(c+d\,x)}+$$
$$\left.40\,i\,e^{\frac{5}{2}i\,(c+d\,x)}-16\sqrt{2}\,e^{3\,i\,(c+d\,x)}-8\,i\,e^{\frac{7}{2}i\,(c+d\,x)}+\sqrt{2}\,e^{4\,i\,(c+d\,x)}-\left(4+4\,i\right)\sqrt{2}\,e^{\frac{1}{2}i\,(2\,c+d\,x)}\right)$$
$$\left.x\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\right)\Big/\left(\left(\left(-1-i\right)+\sqrt{2}\,e^{\frac{i\,c}{2}}\right)\left(-1+e^{i\,c}\right)\right.$$
$$\left.\left.\left(i-2\sqrt{2}\,e^{\frac{1}{2}i\,(c+d\,x)}-4\,i\,e^{i\,(c+d\,x)}+2\sqrt{2}\,e^{\frac{3}{2}i\,(c+d\,x)}+i\,e^{2\,i\,(c+d\,x)}\right)^2\right)\right)-$$
$$\frac{1}{4\sqrt{2}\,d}\,i\,A\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]$$
$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5-$$

$$\frac{1}{4\sqrt{2}\,d}$$

$$i$$

$$A$$

$$\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]$$

$$\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5-$$

$$\frac{1}{8\sqrt{2}\,d}A\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}$$

$$\mathrm{Log}\left[2-\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5-$$

$$\frac{1}{8\sqrt{2}\,d}A\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}$$

$$\mathrm{Log}\left[2+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+\frac{1}{16\,d}$$

$$5\,\left(4\,A+4\,B+3\,C\right)\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Sin}\left[\frac{c}{2}\right]-$$

$$\left(i\,A\,\mathrm{ArcTan}\left[\frac{2\,i\,\mathrm{Cos}\left[\frac{c}{2}\right]-i\,\left(-\sqrt{2}+2\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\mathrm{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}}\right]\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\right.$$

$$\left.\mathrm{Cot}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\right)\Big/\left(2\,d\,\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}\right)+$$

$$\left(A\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\right.$$

$$\left(-d\,x\,\mathrm{Cos}\left[\frac{c}{2}\right]+2\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\,\mathrm{Sin}\left[\frac{c}{2}\right]+2\,\mathrm{Cos}\left[\frac{c}{2}\right]\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right]\,\mathrm{Sin}\left[\frac{c}{2}\right]+\right.$$

$$\left.\left.\frac{4\,i\,\sqrt{2}\,\mathrm{ArcTan}\left[\frac{2\,i\,\mathrm{Cos}\left[\frac{c}{2}\right]-i\,\left(-\sqrt{2}+2\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\mathrm{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}}\right]\,\mathrm{Cos}\left[\frac{c}{2}\right]}{\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}}\right)\right)\Big/$$

$$\left(2\,\sqrt{2}\,d\,\left(4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2\right)\right)+\frac{1}{48\,d}\left(4\,A+10\,B+11\,C\right)\,\mathrm{Cos}\left[\frac{3\,d\,x}{2}\right]$$

$$\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Sin}\left[\frac{3\,c}{2}\right]+$$

$$\frac{\left(2\,B+5\,C\right)\,\mathrm{Cos}\left[\frac{5\,d\,x}{2}\right]\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Sin}\left[\frac{5\,c}{2}\right]}{80\,d}+$$

$$\frac{C\,\mathrm{Cos}\left[\frac{7\,d\,x}{2}\right]\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Sin}\left[\frac{7\,c}{2}\right]}{112\,d}+$$

$$\frac{1}{16\,d}$$

$$5\,\left(4\,A+4\,B+3\,C\right)\,\mathrm{Cos}\left[\frac{c}{2}\right]$$

$$\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+\frac{1}{48\,d}$$

$$\left(4\,A+10\,B+11\,C\right)\,\mathrm{Cos}\left[\frac{3\,c}{2}\right]\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]+$$

$$\frac{\left(2\,B+5\,C\right)\,\mathrm{Cos}\left[\frac{5\,c}{2}\right]\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Sin}\left[\frac{5\,d\,x}{2}\right]}{80\,d}+$$

$$\frac{C\,\mathrm{Cos}\left[\frac{7\,c}{2}\right]\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Sin}\left[\frac{7\,d\,x}{2}\right]}{112\,d}$$

Problem 395: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{5/2}\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^2\,dx$$

Optimal (type 3, 184 leaves, 6 steps):

$$\frac{a^{5/2}\,(5A+2B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{d}+\frac{a^3\,(15A+70B+64C)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{a^2\,(15A-10B-16C)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d}-\frac{a\,(5A-2C)\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}+\frac{A\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Tan}[c+d\,x]}{d}$$

Result (type 3, 584 leaves):

$$\frac{1}{d}\left(\frac{1}{1920}+\frac{i}{1920}\right)(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\Bigg(\frac{1}{i+\sqrt{2}}30\,i\,\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(5A+2B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]-\frac{1}{i+\sqrt{2}}30\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(5A+2B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+\frac{(60+60\,i)\left(-2\,i+\sqrt{2}\right)(5A+2B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]}{i+\sqrt{2}}+\frac{1}{i+\sqrt{2}}15\,i\,\sqrt{2}\,\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(5A+2B)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\frac{1}{i+\sqrt{2}}15\,\sqrt{2}\,\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(5A+2B)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\frac{(120-120\,i)\,A}{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}+(240-240\,i)\,(2A+5\,(B+C))\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-\frac{(120-120\,i)\,A}{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}+(40-40\,i)\,(2B+5C)\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+(24-24\,i)\,C\,\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]\Bigg)$$

Problem 396: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 3, 199 leaves, 6 steps):

$$\frac{a^{5/2}\,(19A+20B+8C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{4d}-\frac{a^3\,(27A-12B-56C)\,\text{Sin}[c+d x]}{12d\sqrt{a+a\,\text{Cos}[c+d x]}}-\frac{a^2\,(21A+12B-8C)\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{12d}+\frac{a\,(5A+4B)\,(a+a\,\text{Cos}[c+d x])^{3/2}\,\text{Tan}[c+d x]}{4d}+\frac{A\,(a+a\,\text{Cos}[c+d x])^{5/2}\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{2d}$$

Result (type 3, 666 leaves):

$$\frac{1}{d}\left(\frac{1}{1536}+\frac{i}{1536}\right)\left(a\,(1+\text{Cos}[c+d x])\right)^{5/2}\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5\left(\frac{1}{i+\sqrt{2}}6\,i\sqrt{2}\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(19A+20B+8C)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]-\frac{1}{i+\sqrt{2}}6\sqrt{2}\left((-1+i)+\sqrt{2}\right)$$
$$\left((3+i)+\sqrt{2}\right)(19A+20B+8C)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]+$$
$$\frac{1}{i+\sqrt{2}}(12+12\,i)\left(-2\,i+\sqrt{2}\right)(19A+20B+8C)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$\frac{1}{i+\sqrt{2}}3\,i\sqrt{2}\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(19A+20B+8C)$$
$$\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\frac{1}{i+\sqrt{2}}3\sqrt{2}\left((-3+i)+\sqrt{2}\right)$$
$$\left((1+i)+\sqrt{2}\right)(19A+20B+8C)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$\frac{(24-24\,i)\,(11A+4B)}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]}+(192-192\,i)\,(2B+5C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+$$
$$\frac{(48-48\,i)\,A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{(48-48\,i)\,A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-$$
$$\left.\frac{(24-24\,i)\,(11A+4B)}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]}+(64-64\,i)\,C\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]\right)$$

Problem 397: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a + a \operatorname{Cos}[c + d x])^{5/2} (A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2) \operatorname{Sec}[c + d x]^4 \, dx$$

Optimal (type 3, 207 leaves, 6 steps):

$$\frac{a^{5/2} (25 A + 38 B + 40 C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{8 d} - \frac{a^3 (49 A + 54 B - 24 C) \operatorname{Sin}[c + d x]}{24 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{a^2 (31 A + 42 B + 24 C) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Tan}[c + d x]}{24 d} + \frac{a (5 A + 6 B) (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{12 d} + \frac{A (a + a \operatorname{Cos}[c + d x])^{5/2} \operatorname{Sec}[c + d x]^2 \operatorname{Tan}[c + d x]}{3 d}$$

Result (type 3, 1249 leaves):

$$-\frac{1}{\sqrt{2} \left(i + \sqrt{2}\right) d} \left(\frac{1}{256} + \frac{i}{256}\right) \left((-1 + i) + \sqrt{2}\right) \left((75 + 25 i) A + 25 \sqrt{2} A + (114 + 38 i) B + 38 \sqrt{2} B + (120 + 40 i) C + 40 \sqrt{2} C\right) \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{1}{4} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{4} (c + d x)\right] - \sqrt{2} \operatorname{Sin}\left[\frac{1}{4} (c + d x)\right]}{-\operatorname{Cos}\left[\frac{1}{4} (c + d x)\right] + \sqrt{2} \operatorname{Cos}\left[\frac{1}{4} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{4} (c + d x)\right]}\right] (a (1 + \operatorname{Cos}[c + d x]))^{5/2} \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^5 - \frac{1}{\sqrt{2} \left(i + \sqrt{2}\right) d} \left(\frac{1}{256} - \frac{i}{256}\right) \left((1 + i) + \sqrt{2}\right) \left((-75 + 25 i) A + 25 \sqrt{2} A - (114 - 38 i) B + 38 \sqrt{2} B - (120 - 40 i) C + 40 \sqrt{2} C\right) \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{1}{4} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{4} (c + d x)\right] - \sqrt{2} \operatorname{Sin}\left[\frac{1}{4} (c + d x)\right]}{\operatorname{Cos}\left[\frac{1}{4} (c + d x)\right] + \sqrt{2} \operatorname{Cos}\left[\frac{1}{4} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{4} (c + d x)\right]}\right] (a (1 + \operatorname{Cos}[c + d x]))^{5/2} \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^5 + \frac{1}{128 \left(i + \sqrt{2}\right) d} \left(50 A + 25 i \sqrt{2} A + 76 B + 38 i \sqrt{2} B + 80 C + 40 i \sqrt{2} C\right) (a (1 + \operatorname{Cos}[c + d x]))^{5/2} \operatorname{Log}\left[\sqrt{2} + 2 \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^5 - \frac{1}{\sqrt{2} \left(i + \sqrt{2}\right) d} \left(\frac{1}{512} - \frac{i}{512}\right) \left((-1 + i) + \sqrt{2}\right) \left((75 + 25 i) A + 25 \sqrt{2} A + (114 + 38 i) B + 38 \sqrt{2} B + (120 + 40 i) C + 40 \sqrt{2} C\right) (a (1 + \operatorname{Cos}[c + d x]))^{5/2} \operatorname{Log}\left[2 - \sqrt{2} \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \sqrt{2} \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^5 + \frac{1}{\sqrt{2} \left(i + \sqrt{2}\right) d} \left(\frac{1}{512} + \frac{i}{512}\right) \left((1 + i) + \sqrt{2}\right)$$

$$\left(\left((-75+25\,i)\,A+25\sqrt{2}\,A-(114-38\,i)\,B+38\sqrt{2}\,B-(120-40\,i)\,C+40\sqrt{2}\,C\right)\right.$$
$$\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+$$
$$\frac{A\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{48\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+$$
$$\frac{(25\,A+22\,B+8\,C)\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{64\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$
$$\frac{C\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{2\,d}-$$
$$\frac{A\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{48\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+$$
$$\frac{(-25\,A-22\,B-8\,C)\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{64\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$
$$\left(\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(5\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+2\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(32\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\right)+$$
$$\left(\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(5\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+2\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(32\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\right)$$

Problem 398: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 3, 215 leaves, 6 steps):

$$\frac{a^{5/2}\,(163\,A+200\,B+304\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{64\,d}+\frac{a^3\,(299\,A+392\,B+432\,C)\,\text{Tan}[c+d\,x]}{192\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a^2\,(17\,A+24\,B+16\,C)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{32\,d}+$$
$$\frac{a\,(5\,A+8\,B)\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{24\,d}+$$
$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 1382 leaves):

$$-\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}\left(\frac{1}{2048}+\frac{i}{2048}\right)\left(\left(-1+i\right)+\sqrt{2}\right)$$
$$\left(\left(489+163\,i\right)A+163\sqrt{2}\,A+\left(600+200\,i\right)B+200\sqrt{2}\,B+\left(912+304\,i\right)C+304\sqrt{2}\,C\right)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{-\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}\right]$$
$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5-\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}\left(\frac{1}{2048}-\frac{i}{2048}\right)\left(\left(1+i\right)+\sqrt{2}\right)$$
$$\left(\left(-489+163\,i\right)A+163\sqrt{2}\,A-\left(600-200\,i\right)B+200\sqrt{2}\,B-\left(912-304\,i\right)C+304\sqrt{2}\,C\right)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}\right]$$
$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+\frac{1}{1024\left(i+\sqrt{2}\right)d}$$
$$\left(326\,A+163\,i\sqrt{2}\,A+400\,B+200\,i\sqrt{2}\,B+608\,C+304\,i\sqrt{2}\,C\right)$$
$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5-$$
$$\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}\left(\frac{1}{4096}-\frac{i}{4096}\right)\left(\left(-1+i\right)+\sqrt{2}\right)$$
$$\left(\left(489+163\,i\right)A+163\sqrt{2}\,A+\left(600+200\,i\right)B+200\sqrt{2}\,B+\left(912+304\,i\right)C+304\sqrt{2}\,C\right)$$
$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+$$
$$\frac{1}{\sqrt{2}\left(i+\sqrt{2}\right)d}\left(\frac{1}{4096}+\frac{i}{4096}\right)\left(\left(1+i\right)+\sqrt{2}\right)$$
$$\left(\left(-489+163\,i\right)A+163\sqrt{2}\,A-\left(600-200\,i\right)B+200\sqrt{2}\,B-\left(912-304\,i\right)C+304\sqrt{2}\,C\right)$$
$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+$$
$$\frac{\left(23\,A+8\,B\right)\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{384\,d\left(\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^3}+$$
$$\frac{\left(163\,A+200\,B+176\,C\right)\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{512\,d\left(\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)}+$$
$$\frac{A\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{64\,d\left(\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^4}+$$
$$\frac{A\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{64\,d\left(\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^4}+$$

$$\frac{(-23\,A-8\,B)\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{384\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+$$

$$\frac{(-163\,A-200\,B-176\,C)\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{512\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$

$$\left(\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\right.$$
$$\left.\left(43\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+40\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+16\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(256\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\right)+\left(\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\right.$$
$$\left.\left(43\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+40\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+16\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(256\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\right)$$

Problem 399: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^6\,dx$$

Optimal (type 3, 261 leaves, 7 steps):

$$\frac{a^{5/2}\,(283\,A+326\,B+400\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{128\,d}+$$
$$\frac{a^3\,(283\,A+326\,B+400\,C)\,\text{Tan}[c+d\,x]}{128\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a^3\,(787\,A+950\,B+1040\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{960\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a^2\,(79\,A+110\,B+80\,C)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{240\,d}+$$
$$\frac{a\,(A+2\,B)\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{8\,d}+$$
$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d}$$

Result (type 3, 1542 leaves):

$$-\frac{1}{\sqrt{2}\,\left(i+\sqrt{2}\right)\,d}\left(\frac{1}{4096}+\frac{i}{4096}\right)\,\left((-1+i)+\sqrt{2}\right)$$
$$\left(\left((849+283\,i)\,A+283\,\sqrt{2}\,A+(978+326\,i)\,B+326\,\sqrt{2}\,B+(1200+400\,i)\,C+400\,\sqrt{2}\,C\right)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{-\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]$$

$$\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5-\frac{1}{\sqrt{2}\,\left(\mathrm{i}+\sqrt{2}\right)\,d}\left(\frac{1}{4096}-\frac{\mathrm{i}}{4096}\right)\,\left(\left(1+\mathrm{i}\right)+\sqrt{2}\right)$$

$$\left(\left(-849+283\,\mathrm{i}\right)\,A+283\,\sqrt{2}\,A-\left(978-326\,\mathrm{i}\right)\,B+326\,\sqrt{2}\,B-\left(1200-400\,\mathrm{i}\right)\,C+400\,\sqrt{2}\,C\right)$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{4}\,\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\,\left(c+d\,x\right)\right]}{\text{Cos}\left[\frac{1}{4}\,\left(c+d\,x\right)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\,\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\,\left(c+d\,x\right)\right]}\right]$$

$$\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+\frac{1}{2048\,\left(\mathrm{i}+\sqrt{2}\right)\,d}$$

$$\left(566\,A+283\,\mathrm{i}\,\sqrt{2}\,A+652\,B+326\,\mathrm{i}\,\sqrt{2}\,B+800\,C+400\,\mathrm{i}\,\sqrt{2}\,C\right)$$

$$\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5-$$

$$\frac{1}{\sqrt{2}\,\left(\mathrm{i}+\sqrt{2}\right)\,d}\left(\frac{1}{8192}-\frac{\mathrm{i}}{8192}\right)\,\left(\left(-1+\mathrm{i}\right)+\sqrt{2}\right)$$

$$\left(\left(849+283\,\mathrm{i}\right)\,A+283\,\sqrt{2}\,A+\left(978+326\,\mathrm{i}\right)\,B+326\,\sqrt{2}\,B+\left(1200+400\,\mathrm{i}\right)\,C+400\,\sqrt{2}\,C\right)$$

$$\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+$$

$$\frac{1}{\sqrt{2}\,\left(\mathrm{i}+\sqrt{2}\right)\,d}\left(\frac{1}{8192}+\frac{\mathrm{i}}{8192}\right)\,\left(\left(1+\mathrm{i}\right)+\sqrt{2}\right)$$

$$\left(\left(-849+283\,\mathrm{i}\right)\,A+283\,\sqrt{2}\,A-\left(978-326\,\mathrm{i}\right)\,B+326\,\sqrt{2}\,B-\left(1200-400\,\mathrm{i}\right)\,C+400\,\sqrt{2}\,C\right)$$

$$\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+$$

$$\frac{A\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{160\,d\,\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^5}+$$

$$\frac{\left(59\,A+46\,B+16\,C\right)\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{768\,d\,\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^3}+$$

$$\frac{\left(283\,A+326\,B+400\,C\right)\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{1024\,d\,\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)}-$$

$$\frac{A\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{160\,d\,\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^5}+$$

$$\frac{\left(-59\,A-46\,B-16\,C\right)\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{768\,d\,\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^3}+$$

$$\frac{\left(-283\,A-326\,B-400\,C\right)\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{1024\,d\,\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)}+$$

$$\left(\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(5 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+2 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/\left(128 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4\right)+\left(\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(5 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+2 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/\left(128 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4\right)+\left(\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(75 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+86 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+80 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/\left(512 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)+\left(\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(75 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+86 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+80 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/\left(512 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)$$

Problem 400: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\operatorname{Cos}[c+d x]\right)^{5/2}\left(A+B\operatorname{Cos}[c+d x]+C\operatorname{Cos}[c+d x]^2\right)\operatorname{Sec}[c+d x]^7\,dx$$

Optimal (type 3, 311 leaves, 8 steps):

$$\frac{a^{5/2}(1015 A+1132 B+1304 C)\operatorname{ArcTanh}\left[\frac{\sqrt{a}\operatorname{Sin}[c+d x]}{\sqrt{a+a\operatorname{Cos}[c+d x]}}\right]}{512 d}+\frac{a^3(1015 A+1132 B+1304 C)\operatorname{Tan}[c+d x]}{512 d\sqrt{a+a\operatorname{Cos}[c+d x]}}+\frac{a^3(1015 A+1132 B+1304 C)\operatorname{Sec}[c+d x]\operatorname{Tan}[c+d x]}{768 d\sqrt{a+a\operatorname{Cos}[c+d x]}}+\frac{a^3(545 A+628 B+680 C)\operatorname{Sec}[c+d x]^2\operatorname{Tan}[c+d x]}{960 d\sqrt{a+a\operatorname{Cos}[c+d x]}}+\frac{1}{480 d}a^2(115 A+156 B+120 C)\sqrt{a+a\operatorname{Cos}[c+d x]}\operatorname{Sec}[c+d x]^3\operatorname{Tan}[c+d x]+\frac{a(5 A+12 B)\left(a+a\operatorname{Cos}[c+d x]\right)^{3/2}\operatorname{Sec}[c+d x]^4\operatorname{Tan}[c+d x]}{60 d}+\frac{A\left(a+a\operatorname{Cos}[c+d x]\right)^{5/2}\operatorname{Sec}[c+d x]^5\operatorname{Tan}[c+d x]}{6 d}$$

Result (type 3, 1045 leaves):

$$-\frac{1}{\sqrt{2}\left(\mathrm{i}+\sqrt{2}\right)d}\left(\frac{1}{16384}+\frac{\mathrm{i}}{16384}\right)\left(\left(-1+\mathrm{i}\right)+\sqrt{2}\right)$$
$$\left(\left(3045+1015\,\mathrm{i}\right)A+1015\sqrt{2}\,A+\left(3396+1132\,\mathrm{i}\right)B+1132\sqrt{2}\,B+\left(3912+1304\,\mathrm{i}\right)C+1304\sqrt{2}\,C\right)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{-\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}\right]$$
$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5-\frac{1}{\sqrt{2}\left(\mathrm{i}+\sqrt{2}\right)d}\left(\frac{1}{16384}-\frac{\mathrm{i}}{16384}\right)\left(\left(1+\mathrm{i}\right)+\sqrt{2}\right)$$
$$\left(\left(-3045+1015\,\mathrm{i}\right)A+1015\sqrt{2}\,A-\left(3396-1132\,\mathrm{i}\right)B+1132\sqrt{2}\,B-\left(3912-1304\,\mathrm{i}\right)C+1304\sqrt{2}\,C\right)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}\right]$$
$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+\frac{1}{8192\left(\mathrm{i}+\sqrt{2}\right)d}$$
$$\left(2030\,A+1015\,\mathrm{i}\sqrt{2}\,A+2264\,B+1132\,\mathrm{i}\sqrt{2}\,B+2608\,C+1304\,\mathrm{i}\sqrt{2}\,C\right)$$
$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5-$$
$$\frac{1}{\sqrt{2}\left(\mathrm{i}+\sqrt{2}\right)d}\left(\frac{1}{32768}-\frac{\mathrm{i}}{32768}\right)\left(\left(-1+\mathrm{i}\right)+\sqrt{2}\right)$$
$$\left(\left(3045+1015\,\mathrm{i}\right)A+1015\sqrt{2}\,A+\left(3396+1132\,\mathrm{i}\right)B+1132\sqrt{2}\,B+\left(3912+1304\,\mathrm{i}\right)C+1304\sqrt{2}\,C\right)$$
$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+$$
$$\frac{1}{\sqrt{2}\left(\mathrm{i}+\sqrt{2}\right)d}\left(\frac{1}{32768}+\frac{\mathrm{i}}{32768}\right)\left(\left(1+\mathrm{i}\right)+\sqrt{2}\right)$$
$$\left(\left(-3045+1015\,\mathrm{i}\right)A+1015\sqrt{2}\,A-\left(3396-1132\,\mathrm{i}\right)B+1132\sqrt{2}\,B-\left(3912-1304\,\mathrm{i}\right)C+1304\sqrt{2}\,C\right)$$
$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+$$
$$\frac{1}{983040\,d}\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\text{Sec}[c+d\,x]^6$$
$$\left(-47250\,A\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]-78120\,B\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]-96720\,C\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\right.$$
$$184490\,A\,\text{Sin}\left[\frac{3}{2}\left(c+d\,x\right)\right]+167944\,B\,\text{Sin}\left[\frac{3}{2}\left(c+d\,x\right)\right]+164240\,C\,\text{Sin}\left[\frac{3}{2}\left(c+d\,x\right)\right]+$$
$$28275\,A\,\text{Sin}\left[\frac{5}{2}\left(c+d\,x\right)\right]+13980\,B\,\text{Sin}\left[\frac{5}{2}\left(c+d\,x\right)\right]-7560\,C\,\text{Sin}\left[\frac{5}{2}\left(c+d\,x\right)\right]+$$
$$88305\,A\,\text{Sin}\left[\frac{7}{2}\left(c+d\,x\right)\right]+98484\,B\,\text{Sin}\left[\frac{7}{2}\left(c+d\,x\right)\right]+101160\,C\,\text{Sin}\left[\frac{7}{2}\left(c+d\,x\right)\right]+$$
$$5075\,A\,\text{Sin}\left[\frac{9}{2}\left(c+d\,x\right)\right]+5660\,B\,\text{Sin}\left[\frac{9}{2}\left(c+d\,x\right)\right]+6520\,C\,\text{Sin}\left[\frac{9}{2}\left(c+d\,x\right)\right]+$$
$$\left.15225\,A\,\text{Sin}\left[\frac{11}{2}\left(c+d\,x\right)\right]+16980\,B\,\text{Sin}\left[\frac{11}{2}\left(c+d\,x\right)\right]+19560\,C\,\text{Sin}\left[\frac{11}{2}\left(c+d\,x\right)\right]\right)$$

Problem 405: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 118 leaves, 6 steps):

$$\frac{2\,A\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{\sqrt{a}\,d}-\frac{\sqrt{2}\,(A-B+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{2\,C\,\text{Sin}[c+d\,x]}{d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 2315 leaves):

$$-\Bigg(\Bigg(\Big((1-i)\,A\,\left(1+e^{i\,c}\right)\Big(\sqrt{2}-(1-i)\,e^{\frac{i\,c}{2}}+(16-16\,i)\,e^{\frac{3\,i\,c}{2}+i\,d\,x}+(20+20\,i)\,\sqrt{2}\,e^{2\,i\,c+\frac{3\,i\,d\,x}{2}}-(34-34\,i)\,e^{\frac{5\,i\,c}{2}+2\,i\,d\,x}-$$
$$(20+20\,i)\,\sqrt{2}\,e^{3\,i\,c+\frac{5\,i\,d\,x}{2}}+(16-16\,i)\,e^{\frac{7\,i\,c}{2}+3\,i\,d\,x}+(4+4\,i)\,\sqrt{2}\,e^{4\,i\,c+\frac{7\,i\,d\,x}{2}}-$$
$$(1-i)\,e^{\frac{9\,i\,c}{2}+4\,i\,d\,x}+8\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}-16\,\sqrt{2}\,e^{i\,(c+d\,x)}-40\,i\,e^{\frac{3}{2}\,i\,(c+d\,x)}+34\,\sqrt{2}\,e^{2\,i\,(c+d\,x)}+$$
$$40\,i\,e^{\frac{5}{2}\,i\,(c+d\,x)}-16\,\sqrt{2}\,e^{3\,i\,(c+d\,x)}-8\,i\,e^{\frac{7}{2}\,i\,(c+d\,x)}+\sqrt{2}\,e^{4\,i\,(c+d\,x)}-(4+4\,i)\,\sqrt{2}\,e^{\frac{1}{2}\,i\,(2\,c+d\,x)}\Big)\times$$
$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Cos}[c+d\,x]\,\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\Big)\Big/\Bigg(\Big(\left(-1-i\right)+\sqrt{2}\,e^{\frac{i\,c}{2}}\Big)$$
$$\left(-1+e^{i\,c}\right)\,\left(i-2\,\sqrt{2}\,e^{\frac{1}{2}\,i\,(c+d\,x)}-4\,i\,e^{i\,(c+d\,x)}+2\,\sqrt{2}\,e^{\frac{3}{2}\,i\,(c+d\,x)}+i\,e^{2\,i\,(c+d\,x)}\right)^2$$
$$\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\Bigg)\Bigg)-$$
$$\Bigg(2\,i\,\sqrt{2}\,A\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]$$
$$\text{Cos}[c+d\,x]\,\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\Bigg)\Big/$$
$$\left(d\,\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\left(4\,(A-B+C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Cos}[c+d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\right.$$
$$\left.\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\right)\Big/$$
$$\left(d\,\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)-$$
$$\left(4\,(A-B+C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Cos}[c+d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\right.$$
$$\left.\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\right)\Big/$$
$$\left(d\,\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)-$$

$$\left(\sqrt{2}\, A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Cos}[c+d x] \operatorname{Log}\left[2-\sqrt{2} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2} \operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\right.$$
$$\left.(B+C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x])\right) \Big/$$
$$\left(d \sqrt{a (1+\operatorname{Cos}[c+d x])}\, (2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 c+2 d x])\right)+$$
$$\left(8 C \operatorname{Cos}\left[\frac{d x}{2}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Cos}[c+d x]\, (B+C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]) \operatorname{Sin}\left[\frac{c}{2}\right]\right) \Big/$$
$$\left(d \sqrt{a (1+\operatorname{Cos}[c+d x])}\, (2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 c+2 d x])\right)+$$
$$\left((1-i) \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2} \operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2} \operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]\right.$$
$$\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Cos}[c+d x]\, (B+C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x])$$
$$\left((1+i) \operatorname{Cos}\left[\frac{c}{4}\right]+\sqrt{2} \operatorname{Cos}\left[\frac{c}{4}\right]-(1-i) \operatorname{Sin}\left[\frac{c}{4}\right]-i \sqrt{2} \operatorname{Sin}\left[\frac{c}{4}\right]\right)$$
$$\left.\left((-1-i) A \operatorname{Cos}\left[\frac{c}{4}\right]+\sqrt{2} A \operatorname{Cos}\left[\frac{c}{4}\right]+(1-i) A \operatorname{Sin}\left[\frac{c}{4}\right]-i \sqrt{2} A \operatorname{Sin}\left[\frac{c}{4}\right]\right)\right) \Big/$$
$$\left(\sqrt{2}\, d \sqrt{a (1+\operatorname{Cos}[c+d x])}\, (2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right)\right)-$$
$$\left(\left(\frac{1}{2}+\frac{i}{2}\right) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Cos}[c+d x] \operatorname{Log}\left[2+\sqrt{2} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2} \operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\right.$$
$$(B+C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x])$$
$$\left((1+i) \operatorname{Cos}\left[\frac{c}{4}\right]+\sqrt{2} \operatorname{Cos}\left[\frac{c}{4}\right]-(1-i) \operatorname{Sin}\left[\frac{c}{4}\right]-i \sqrt{2} \operatorname{Sin}\left[\frac{c}{4}\right]\right)$$
$$\left.\left((-1-i) A \operatorname{Cos}\left[\frac{c}{4}\right]+\sqrt{2} A \operatorname{Cos}\left[\frac{c}{4}\right]+(1-i) A \operatorname{Sin}\left[\frac{c}{4}\right]-i \sqrt{2} A \operatorname{Sin}\left[\frac{c}{4}\right]\right)\right) \Big/$$
$$\left(\sqrt{2}\, d \sqrt{a (1+\operatorname{Cos}[c+d x])}\, (2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 c+2 d x]) \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right)\right)-$$
$$\left(8 i A \operatorname{ArcTan}\left[\frac{2 i \operatorname{Cos}\left[\frac{c}{2}\right]-i \left(-\sqrt{2}+2 \operatorname{Sin}\left[\frac{c}{2}\right]\right) \operatorname{Tan}\left[\frac{d x}{4}\right]}{\sqrt{-2+4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2}}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]\right.$$
$$\left.\operatorname{Cos}[c+d x] \operatorname{Cot}\left[\frac{c}{2}\right] (B+C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x])\right) \Big/$$
$$\left(d \sqrt{a (1+\operatorname{Cos}[c+d x])}\, (2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 c+2 d x])\right.$$
$$\left.\sqrt{-2+4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2}\right)+$$

$$\left(4\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\left(-d\,x\,\text{Cos}\left[\frac{c}{2}\right]+2\,\text{Log}\left[\sqrt{2}+2\,\text{Cos}\left[\frac{d\,x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]+2\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]\right]\text{Sin}\left[\frac{c}{2}\right]+\frac{4\,i\,\sqrt{2}\,\text{ArcTan}\left[\frac{2\,i\,\text{Cos}\left[\frac{c}{2}\right]-i\left(-\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}\right]\right)\text{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right]\text{Cos}\left[\frac{c}{2}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right)\right)\Big/$$

$$\left(d\sqrt{a\left(1+\text{Cos}[c+d\,x]\right)}\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\left(4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2\right)\right)+$$

$$\left(8\,C\,\text{Cos}\left[\frac{c}{2}\right]\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Cos}[c+d\,x]\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\text{Sin}\left[\frac{d\,x}{2}\right]\right)\Big/$$

$$\left(d\sqrt{a\left(1+\text{Cos}[c+d\,x]\right)}\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)$$

Problem 406: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^2}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 120 leaves, 6 steps):

$$-\frac{(A-2\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{\sqrt{2}\,(A-B+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{A\,\text{Tan}[c+d\,x]}{d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 588 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\text{Cos}[c+d\,x]^2\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left(-8(A-B+C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]+8(A-B+C)\right.$$
$$\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]-2\sqrt{2}\,(A-2B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-$$
$$\left(2\,i\,(A-2B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)-\left(2\,i\,(A-2B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\right.$$
$$\left.\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)-$$
$$\left((A-2B)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)-\left((A-2B)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right.$$
$$\left.\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)+$$
$$\left.\left.\frac{4A}{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}-\frac{4A}{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}\right)\right)\Big/$$
$$\left(2\,d\,\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\left(2A+C+2B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2(c+d\,x)]\right)\right)$$

Problem 407: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^3}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 169 leaves, 7 steps):

$$\frac{(7A-4B+8C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\sqrt{a}\,d}-\frac{\sqrt{2}\,(A-B+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{\sqrt{a}\,d}-$$
$$\frac{(A-4B)\,\text{Tan}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 689 leaves):

$$\frac{1}{d\sqrt{a\left(1+\text{Cos}[c+d x]\right)}}\left(\frac{1}{64}+\frac{i}{64}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(\frac{1}{i+\sqrt{2}}2 i\sqrt{2}\left((-3+i)+\sqrt{2}\right)\left((1+i)+\sqrt{2}\right)(7 A-4 B+8 C)\right.$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]-\frac{1}{i+\sqrt{2}}2\sqrt{2}\left((-1+i)+\sqrt{2}\right)$$
$$\left((3+i)+\sqrt{2}\right)(7 A-4 B+8 C)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]+$$
$$(64-64 i)(A-B+C)\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]-$$
$$(64-64 i)(A-B+C)\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]+\frac{1}{i+\sqrt{2}}$$
$$(4+4 i)\left(-2 i+\sqrt{2}\right)(7 A-4 B+8 C)\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$\frac{1}{i+\sqrt{2}}i\sqrt{2}\left((-1+i)+\sqrt{2}\right)\left((3+i)+\sqrt{2}\right)(7 A-4 B+8 C)$$
$$\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\frac{1}{i+\sqrt{2}}\sqrt{2}\left((-3+i)+\sqrt{2}\right)$$
$$\left((1+i)+\sqrt{2}\right)(7 A-4 B+8 C)\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-$$
$$\frac{(8-8 i)(A-4 B)}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]}+\frac{(16-16 i)A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\left.\frac{(16-16 i)A\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{(8-8 i)(A-4 B)}{\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]}\right)$$

Problem 408: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]^4}{\sqrt{a+a\,\text{Cos}[c+d x]}}\,dx$$

Optimal (type 3, 213 leaves, 8 steps):

$$-\frac{(9 A-14 B+8 C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{8\sqrt{a}\,d}+\frac{\sqrt{2}\,(A-B+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{2}\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{\sqrt{a}\,d}+$$
$$\frac{(7 A-2 B+8 C)\,\text{Tan}[c+d x]}{8 d\sqrt{a+a\,\text{Cos}[c+d x]}}-\frac{(A-6 B)\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{12 d\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{A\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{3 d\sqrt{a+a\,\text{Cos}[c+d x]}}$$

Result (type 3, 1310 leaves):

$$-\left(\left(\left(\left(\frac{1}{32}-\frac{i}{32}\right)\left((1+i)-i\sqrt{2}\right)\left((27+9i)A+9\sqrt{2}A-(42+14i)B-14\sqrt{2}B+(24+8i)C+8\sqrt{2}C\right)\right.\right.\right.$$
$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{-\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\Big/$$
$$\left.\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{a\left(1+\text{Cos}[c+dx]\right)}\right)\right)+$$
$$\left(\left(\frac{1}{32}-\frac{i}{32}\right)\left((1+i)+\sqrt{2}\right)\left((-27+9i)A+9\sqrt{2}A+(42-14i)B-14\sqrt{2}B-(24-8i)C+8\sqrt{2}C\right)\right.$$
$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+dx)\right]}{\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\Big/$$
$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{a\left(1+\text{Cos}[c+dx]\right)}\right)-$$
$$\frac{2(A-B+C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+dx)\right]-\text{Sin}\left[\frac{1}{4}(c+dx)\right]\right]}{d\sqrt{a\left(1+\text{Cos}[c+dx]\right)}}+$$
$$\frac{2(A-B+C)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+dx)\right]+\text{Sin}\left[\frac{1}{4}(c+dx)\right]\right]}{d\sqrt{a\left(1+\text{Cos}[c+dx]\right)}}+$$
$$\left(\left(-18A-9i\sqrt{2}A+28B+14i\sqrt{2}B-16C-8i\sqrt{2}C\right)\right.$$
$$\left.\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right)\Big/$$
$$\left(16\left(i+\sqrt{2}\right)d\sqrt{a\left(1+\text{Cos}[c+dx]\right)}\right)+\left(\left(\frac{1}{64}+\frac{i}{64}\right)\left((1+i)-i\sqrt{2}\right)\right.$$
$$\left((27+9i)A+9\sqrt{2}A-(42+14i)B-14\sqrt{2}B+(24+8i)C+8\sqrt{2}C\right)\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Log}\Big[$$
$$\left.2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\Big]\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{a\left(1+\text{Cos}[c+dx]\right)}\right)-$$
$$\left(\left(\frac{1}{64}+\frac{i}{64}\right)\left((1+i)+\sqrt{2}\right)\left((-27+9i)A+9\sqrt{2}A+(42-14i)B-14\sqrt{2}B-(24-8i)C+8\sqrt{2}C\right)\right.$$
$$\left.\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right)\Big/$$
$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{a\left(1+\text{Cos}[c+dx]\right)}\right)+$$
$$\frac{A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]}{6d\sqrt{a\left(1+\text{Cos}[c+dx]\right)}\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}+$$

$$\frac{(7A-2B+8C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]}{8d\sqrt{a(1+\mathrm{Cos}[c+dx])}\left(\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}-\frac{A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]}{6d\sqrt{a(1+\mathrm{Cos}[c+dx])}\left(\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}+\frac{(-7A+2B-8C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]}{8d\sqrt{a(1+\mathrm{Cos}[c+dx])}\left(\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}+\frac{\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(-A\,\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]+2B\,\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}{4d\sqrt{a(1+\mathrm{Cos}[c+dx])}\left(\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+\frac{\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(-A\,\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]+2B\,\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}{4d\sqrt{a(1+\mathrm{Cos}[c+dx])}\left(\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}$$

Problem 409: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B\,\mathrm{Cos}[c+dx]+C\,\mathrm{Cos}[c+dx]^2\right)\mathrm{Sec}[c+dx]^5}{\sqrt{a+a\,\mathrm{Cos}[c+dx]}}\,dx$$

Optimal (type 3, 259 leaves, 9 steps):

$$\frac{(107A-72B+112C)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+dx]}{\sqrt{a+a\,\mathrm{Cos}[c+dx]}}\right]}{64\sqrt{a}\,d}-\frac{\sqrt{2}\,(A-B+C)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+dx]}{\sqrt{2}\sqrt{a+a\,\mathrm{Cos}[c+dx]}}\right]}{\sqrt{a}\,d}-\frac{(21A-56B+16C)\,\mathrm{Tan}[c+dx]}{64d\sqrt{a+a\,\mathrm{Cos}[c+dx]}}+\frac{(43A-8B+48C)\,\mathrm{Sec}[c+dx]\,\mathrm{Tan}[c+dx]}{96d\sqrt{a+a\,\mathrm{Cos}[c+dx]}}-\frac{(A-8B)\,\mathrm{Sec}[c+dx]^2\,\mathrm{Tan}[c+dx]}{24d\sqrt{a+a\,\mathrm{Cos}[c+dx]}}+\frac{A\,\mathrm{Sec}[c+dx]^3\,\mathrm{Tan}[c+dx]}{4d\sqrt{a+a\,\mathrm{Cos}[c+dx]}}$$

Result (type 3, 1476 leaves):

$$-\left(\left(\left(\frac{1}{256}+\frac{i}{256}\right)\left((-1+i)+\sqrt{2}\right)\left((321+107i)A+107\sqrt{2}A-(216+72i)B-72\sqrt{2}B+(336+112i)C+112\sqrt{2}C\right)\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}(c+dx)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+dx)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{4}(c+dx)\right]}{-\mathrm{Cos}\left[\frac{1}{4}(c+dx)\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{4}(c+dx)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+dx)\right]}\right]\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\Big/\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{a(1+\mathrm{Cos}[c+dx])}\right)\right)-\left(\left(\frac{1}{256}-\frac{i}{256}\right)\left((1+i)+\sqrt{2}\right)\right.$$

$$\left(\left((-321+107\,i)\,A+107\sqrt{2}\,A+(216-72\,i)\,B-72\sqrt{2}\,B-(336-112\,i)\,C+112\sqrt{2}\,C\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{a\,(1+\text{Cos}[c+d\,x])}\right)+$$

$$\frac{2\,(A-B+C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]}{d\sqrt{a\,(1+\text{Cos}[c+d\,x])}}-$$

$$\frac{2\,(A-B+C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]\right]}{d\sqrt{a\,(1+\text{Cos}[c+d\,x])}}+$$

$$\left(\left(214\,A+107\,i\sqrt{2}\,A-144\,B-72\,i\sqrt{2}\,B+224\,C+112\,i\sqrt{2}\,C\right)\right.$$

$$\left.\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)\Big/$$

$$\left(128\left(i+\sqrt{2}\right)d\sqrt{a\,(1+\text{Cos}[c+d\,x])}\right)-\left(\left(\frac{1}{512}-\frac{i}{512}\right)\left((-1+i)+\sqrt{2}\right)\right.$$

$$\left((321+107\,i)\,A+107\sqrt{2}\,A-(216+72\,i)\,B-72\sqrt{2}\,B+(336+112\,i)\,C+112\sqrt{2}\,C\right)$$

$$\left.\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{a\,(1+\text{Cos}[c+d\,x])}\right)+\left(\left(\frac{1}{512}+\frac{i}{512}\right)\left((1+i)+\sqrt{2}\right)\right.$$

$$\left((-321+107\,i)\,A+107\sqrt{2}\,A+(216-72\,i)\,B-72\sqrt{2}\,B-(336-112\,i)\,C+112\sqrt{2}\,C\right)$$

$$\left.\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)\Big/$$

$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\sqrt{a\,(1+\text{Cos}[c+d\,x])}\right)+$$

$$\frac{(-A+8\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]}{48\,d\sqrt{a\,(1+\text{Cos}[c+d\,x])}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+$$

$$\frac{(-21\,A+56\,B-16\,C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]}{64\,d\sqrt{a\,(1+\text{Cos}[c+d\,x])}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}+$$

$$\frac{A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{8\,d\sqrt{a\,(1+\text{Cos}[c+d\,x])}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+$$

$$\frac{A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{8\,d\sqrt{a\,(1+\text{Cos}[c+d\,x])}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4}+$$

$$\frac{(A-8\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]}{48\,d\sqrt{a\,(1+\text{Cos}[c+d\,x])}\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3}+$$

$$\frac{(21 A-56 B+16 C) \cos\left[\frac{c}{2}+\frac{d x}{2}\right]}{64 d \sqrt{a (1+\cos[c+d x])} \left(\cos\left[\frac{1}{2} (c+d x)\right]+\sin\left[\frac{1}{2} (c+d x)\right]\right)}+$$
$$\left(\cos\left[\frac{c}{2}+\frac{d x}{2}\right] \left(19 A \sin\left[\frac{1}{2} (c+d x)\right]-8 B \sin\left[\frac{1}{2} (c+d x)\right]+16 C \sin\left[\frac{1}{2} (c+d x)\right]\right)\right)\Big/$$
$$\left(32 d \sqrt{a (1+\cos[c+d x])} \left(\cos\left[\frac{1}{2} (c+d x)\right]-\sin\left[\frac{1}{2} (c+d x)\right]\right)^2\right)+$$
$$\left(\cos\left[\frac{c}{2}+\frac{d x}{2}\right] \left(19 A \sin\left[\frac{1}{2} (c+d x)\right]-8 B \sin\left[\frac{1}{2} (c+d x)\right]+16 C \sin\left[\frac{1}{2} (c+d x)\right]\right)\right)\Big/$$
$$\left(32 d \sqrt{a (1+\cos[c+d x])} \left(\cos\left[\frac{1}{2} (c+d x)\right]+\sin\left[\frac{1}{2} (c+d x)\right]\right)^2\right)$$

Problem 414: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B \cos[c+d x]+C \cos[c+d x]^2\right) \sec[c+d x]}{(a+a \cos[c+d x])^{3/2}} \, dx$$

Optimal (type 3, 131 leaves, 6 steps):

$$\frac{2 A \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sin[c+d x]}{\sqrt{a+a \cos[c+d x]}}\right]}{a^{3/2} d}-\frac{(5 A-B-3 C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \sin[c+d x]}{\sqrt{2} \sqrt{a+a \cos[c+d x]}}\right]}{2 \sqrt{2} a^{3/2} d}-\frac{(A-B+C) \sin[c+d x]}{2 d (a+a \cos[c+d x])^{3/2}}$$

Result (type 3, 2385 leaves):

$$-\Bigg(\Bigg(\left((2-2 i) A \left(1+e^{i c}\right)\right.$$
$$\left(\sqrt{2}-(1-i) e^{\frac{i c}{2}}+(16-16 i) e^{\frac{3 i c}{2}+i d x}+(20+20 i) \sqrt{2} e^{2 i c+\frac{3 i d x}{2}}-(34-34 i) e^{\frac{5 i c}{2}+2 i d x}-\right.$$
$$(20+20 i) \sqrt{2} e^{3 i c+\frac{5 i d x}{2}}+(16-16 i) e^{\frac{7 i c}{2}+3 i d x}+(4+4 i) \sqrt{2} e^{4 i c+\frac{7 i d x}{2}}-$$
$$(1-i) e^{\frac{9 i c}{2}+4 i d x}+8 i e^{\frac{1}{2} i (c+d x)}-16 \sqrt{2} e^{i (c+d x)}-40 i e^{\frac{3}{2} i (c+d x)}+34 \sqrt{2} e^{2 i (c+d x)}+$$
$$\left.40 i e^{\frac{5}{2} i (c+d x)}-16 \sqrt{2} e^{3 i (c+d x)}-8 i e^{\frac{7}{2} i (c+d x)}+\sqrt{2} e^{4 i (c+d x)}-(4+4 i) \sqrt{2} e^{\frac{1}{2} i (2 c+d x)}\right) \times$$
$$\left.\cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \cos[c+d x] (B+C \cos[c+d x]+A \sec[c+d x])\right)\Big/\Bigg(\left(\left((-1-i)+\sqrt{2} e^{\frac{i c}{2}}\right)\right.$$
$$\left.\left(-1+e^{i c}\right) \left(i-2 \sqrt{2} e^{\frac{1}{2} i (c+d x)}-4 i e^{i (c+d x)}+2 \sqrt{2} e^{\frac{3}{2} i (c+d x)}+i e^{2 i (c+d x)}\right)^2\right.$$
$$\left.(a (1+\cos[c+d x]))^{3/2} (2 A+C+2 B \cos[c+d x]+C \cos[2 c+2 d x])\right)\Bigg)-$$
$$\left(4 i \sqrt{2} A \operatorname{ArcTan}\left[\frac{\cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2} \sin\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2} \cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]}\right] \cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3\right.$$
$$\left.\cos[c+d x] (B+C \cos[c+d x]+A \sec[c+d x])\right)\Big/$$
$$\left(d (a (1+\cos[c+d x]))^{3/2} (2 A+C+2 B \cos[c+d x]+C \cos[2 c+2 d x])\right)+$$

$$\left(2\left(5A-B-3C\right)\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\text{Cos}[c+dx]\right.$$
$$\left.\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]\right]\left(B+C\,\text{Cos}[c+dx]+A\,\text{Sec}[c+dx]\right)\right)\Big/$$
$$\left(d\left(a\left(1+\text{Cos}[c+dx]\right)\right)^{3/2}\left(2A+C+2B\,\text{Cos}[c+dx]+C\,\text{Cos}[2c+2dx]\right)\right)-$$
$$\left(2\left(5A-B-3C\right)\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\text{Cos}[c+dx]\right.$$
$$\left.\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]\right]\left(B+C\,\text{Cos}[c+dx]+A\,\text{Sec}[c+dx]\right)\right)\Big/$$
$$\left(d\left(a\left(1+\text{Cos}[c+dx]\right)\right)^{3/2}\left(2A+C+2B\,\text{Cos}[c+dx]+C\,\text{Cos}[2c+2dx]\right)\right)-$$
$$\left(2\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\text{Cos}[c+dx]\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\right.$$
$$\left.\left(B+C\,\text{Cos}[c+dx]+A\,\text{Sec}[c+dx]\right)\right)\Big/$$
$$\left(d\left(a\left(1+\text{Cos}[c+dx]\right)\right)^{3/2}\left(2A+C+2B\,\text{Cos}[c+dx]+C\,\text{Cos}[2c+2dx]\right)\right)+$$
$$\left(\left(1-\text{i}\right)\sqrt{2}\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}\right]\right.$$
$$\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\text{Cos}[c+dx]\left(B+C\,\text{Cos}[c+dx]+A\,\text{Sec}[c+dx]\right)$$
$$\left(\left(1+\text{i}\right)\text{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}\right]-\left(1-\text{i}\right)\text{Sin}\left[\frac{c}{4}\right]-\text{i}\sqrt{2}\,\text{Sin}\left[\frac{c}{4}\right]\right)$$
$$\left.\left(\left(-1-\text{i}\right)A\,\text{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{4}\right]+\left(1-\text{i}\right)A\,\text{Sin}\left[\frac{c}{4}\right]-\text{i}\sqrt{2}\,A\,\text{Sin}\left[\frac{c}{4}\right]\right)\right)\Big/$$
$$\left(d\left(a\left(1+\text{Cos}[c+dx]\right)\right)^{3/2}\left(2A+C+2B\,\text{Cos}[c+dx]+C\,\text{Cos}[2c+2dx]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\right)-$$
$$\left(\left(1+\text{i}\right)\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\text{Cos}[c+dx]\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\right.$$
$$\left(B+C\,\text{Cos}[c+dx]+A\,\text{Sec}[c+dx]\right)$$
$$\left(\left(1+\text{i}\right)\text{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}\right]-\left(1-\text{i}\right)\text{Sin}\left[\frac{c}{4}\right]-\text{i}\sqrt{2}\,\text{Sin}\left[\frac{c}{4}\right]\right)$$
$$\left.\left(\left(-1-\text{i}\right)A\,\text{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{4}\right]+\left(1-\text{i}\right)A\,\text{Sin}\left[\frac{c}{4}\right]-\text{i}\sqrt{2}\,A\,\text{Sin}\left[\frac{c}{4}\right]\right)\right)\Big/$$
$$\left(\sqrt{2}\,d\left(a\left(1+\text{Cos}[c+dx]\right)\right)^{3/2}\left(2A+C+2B\,\text{Cos}[c+dx]+C\,\text{Cos}[2c+2dx]\right)\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\right)-$$
$$\left(16\,\text{i}\,A\,\text{ArcTan}\left[\frac{2\,\text{i}\,\text{Cos}\left[\frac{c}{2}\right]-\text{i}\left(-\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}\right]\right)\text{Tan}\left[\frac{dx}{4}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right]\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\right.$$

$$\left.\operatorname{Cos}[c+d x] \operatorname{Cot}\left[\frac{c}{2}\right]\left(B+C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)\right) \Big/$$

$$\left(d\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\left(2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 c+2 d x]\right)\right.$$
$$\left.\sqrt{-2+4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2}\right)+$$

$$\left(8 \sqrt{2} A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{c}{2}\right]\left(B+C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)\right.$$

$$\left(-d x \operatorname{Cos}\left[\frac{c}{2}\right]+2 \operatorname{Log}\left[\sqrt{2}+2 \operatorname{Cos}\left[\frac{d x}{2}\right] \operatorname{Sin}\left[\frac{c}{2}\right]+2 \operatorname{Cos}\left[\frac{c}{2}\right] \operatorname{Sin}\left[\frac{d x}{2}\right]\right] \operatorname{Sin}\left[\frac{c}{2}\right]+\right.$$

$$\left.\left.\frac{4 i \sqrt{2} \operatorname{ArcTan}\left[\frac{2 i \operatorname{Cos}\left[\frac{c}{2}\right]-i\left(-\sqrt{2}+2 \operatorname{Sin}\left[\frac{c}{2}\right]\right) \operatorname{Tan}\left[\frac{d x}{4}\right]}{\sqrt{-2+4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2}}\right] \operatorname{Cos}\left[\frac{c}{2}\right]}{\sqrt{-2+4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2}}\right)\right) \Big/$$

$$\left(d\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\left(2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 c+2 d x]\right)\right.$$
$$\left.\left(4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2\right)\right)+$$

$$\left(\left(-A+B-C\right) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Cos}[c+d x]\left(B+C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)\right) \Big/$$

$$\left(d\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\left(2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 c+2 d x]\right)\right.$$
$$\left.\left(\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right)^2\right)+$$

$$\left(\left(A-B+C\right) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Cos}[c+d x]\left(B+C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)\right) \Big/$$

$$\left(d\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\right.$$
$$\left.\left(2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 c+2 d x]\right)\left(\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right)^2\right)$$

Problem 415: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B\cos[c+d x]+C\cos[c+d x]^2\right)\sec[c+d x]^2}{(a+a\cos[c+d x])^{3/2}}\,dx$$

Optimal (type 3, 173 leaves, 7 steps):

$$-\frac{(3A-2B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sin[c+d x]}{\sqrt{a+a\cos[c+d x]}}\right]}{a^{3/2}d}+\frac{(9A-5B+C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\sin[c+d x]}{\sqrt{2}\sqrt{a+a\cos[c+d x]}}\right]}{2\sqrt{2}\,a^{3/2}d}-\frac{(A-B+C)\tan[c+d x]}{2d(a+a\cos[c+d x])^{3/2}}+\frac{(3A-B+C)\tan[c+d x]}{2ad\sqrt{a+a\cos[c+d x]}}$$

Result (type 3, 1661 leaves):

$$-\left(\left(2(9A-5B+C)\cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3\cos[c+d x]^2\right.\right.$$
$$\left.\text{Log}\left[\cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]\right]\left(C+B\sec[c+d x]+A\sec[c+d x]^2\right)\right)\Big/$$
$$\left.\left(d\,(a(1+\cos[c+d x]))^{3/2}(2A+C+2B\cos[c+d x]+C\cos[2c+2d x])\right)\right)+$$
$$\left(2(9A-5B+C)\cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3\cos[c+d x]^2\,\text{Log}\left[\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sin\left[\frac{c}{4}+\frac{d x}{4}\right]\right]\right.$$
$$\left.\left(C+B\sec[c+d x]+A\sec[c+d x]^2\right)\right)\Big/$$
$$\left(d\,(a(1+\cos[c+d x]))^{3/2}(2A+C+2B\cos[c+d x]+C\cos[2c+2d x])\right)-$$
$$\left(2\sqrt{2}\,(3A-2B)\cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3\cos[c+d x]^2\right.$$
$$\left.\text{Log}\left[\sqrt{2}+2\sin\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\left(C+B\sec[c+d x]+A\sec[c+d x]^2\right)\right)\Big/$$
$$\left(d\,(a(1+\cos[c+d x]))^{3/2}(2A+C+2B\cos[c+d x]+C\cos[2c+2d x])\right)-$$
$$\left(2\,i\,(3A-2B)\,\text{ArcTan}\left[\frac{\cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\sin\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]\cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3\right.$$
$$\left.\cos[c+d x]^2\left(C+B\sec[c+d x]+A\sec[c+d x]^2\right)\left(\sqrt{2}-2\sin\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(d\,(a(1+\cos[c+d x]))^{3/2}(2A+C+2B\cos[c+d x]+C\cos[2c+2d x])\left(-1+\sqrt{2}\sin\left[\frac{c}{2}\right]\right)\right)-$$
$$\left(2\,i\,(3A-2B)\,\text{ArcTan}\left[\frac{\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sin\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\sin\left[\frac{c}{4}+\frac{d x}{4}\right]}{\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]\cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3\right.$$
$$\left.\cos[c+d x]^2\left(C+B\sec[c+d x]+A\sec[c+d x]^2\right)\left(\sqrt{2}-2\sin\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(d\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\left(2A+C+2B\operatorname{Cos}[c+d x]+C\operatorname{Cos}[2c+2d x]\right)\left(-1+\sqrt{2}\operatorname{Sin}\left[\frac{c}{2}\right]\right)\right)-$$

$$\left(\left(3A-2B\right)\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\operatorname{Cos}[c+d x]^2\operatorname{Log}\left[2-\sqrt{2}\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\right.$$

$$\left.\left(C+B\operatorname{Sec}[c+d x]+A\operatorname{Sec}[c+d x]^2\right)\left(\sqrt{2}-2\operatorname{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(d\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\left(2A+C+2B\operatorname{Cos}[c+d x]+C\operatorname{Cos}[2c+2d x]\right)\left(-1+\sqrt{2}\operatorname{Sin}\left[\frac{c}{2}\right]\right)\right)-$$

$$\left(\left(3A-2B\right)\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\operatorname{Cos}[c+d x]^2\operatorname{Log}\left[2+\sqrt{2}\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\right.$$

$$\left.\left(C+B\operatorname{Sec}[c+d x]+A\operatorname{Sec}[c+d x]^2\right)\left(\sqrt{2}-2\operatorname{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

$$\left(d\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\left(2A+C+2B\operatorname{Cos}[c+d x]+C\operatorname{Cos}[2c+2d x]\right)\left(-1+\sqrt{2}\operatorname{Sin}\left[\frac{c}{2}\right]\right)\right)+$$

$$\left(\left(A-B+C\right)\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\operatorname{Cos}[c+d x]^2\left(C+B\operatorname{Sec}[c+d x]+A\operatorname{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(d\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\right.$$

$$\left.\left(2A+C+2B\operatorname{Cos}[c+d x]+C\operatorname{Cos}[2c+2d x]\right)\left(\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right)^2\right)+$$

$$\left(\left(-A+B-C\right)\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\operatorname{Cos}[c+d x]^2\left(C+B\operatorname{Sec}[c+d x]+A\operatorname{Sec}[c+d x]^2\right)\right)\Big/$$

$$\left(d\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\left(2A+C+2B\operatorname{Cos}[c+d x]+C\operatorname{Cos}[2c+2d x]\right)\right.$$

$$\left.\left(\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right)^2\right)+$$

$$\left(4A\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\operatorname{Cos}[c+d x]^2\left(C+B\operatorname{Sec}[c+d x]+A\operatorname{Sec}[c+d x]^2\right)\right)\Big/\left(d\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\right.$$

$$\left.\left(2A+C+2B\operatorname{Cos}[c+d x]+C\operatorname{Cos}[2c+2d x]\right)\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)-$$

$$\left(4A\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\operatorname{Cos}[c+d x]^2\left(C+B\operatorname{Sec}[c+d x]+A\operatorname{Sec}[c+d x]^2\right)\right)\Big/\left(d\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\right.$$

$$\left.\left(2A+C+2B\operatorname{Cos}[c+d x]+C\operatorname{Cos}[2c+2d x]\right)\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)$$

Problem 416: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\operatorname{Cos}[c+d x]+C\operatorname{Cos}[c+d x]^2\right)\operatorname{Sec}[c+d x]^3}{\left(a+a\operatorname{Cos}[c+d x]\right)^{3/2}}\,dx$$

Optimal (type 3, 232 leaves, 8 steps):

$$\frac{(19 A-12 B+8 C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{4 a^{3/2} d}-\frac{(13 A-9 B+5 C) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{2 \sqrt{2} a^{3/2} d}-\frac{(7 A-6 B+2 C) \operatorname{Tan}[c+d x]}{4 a d \sqrt{a+a \operatorname{Cos}[c+d x]}}-\frac{(A-B+C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 d (a+a \operatorname{Cos}[c+d x])^{3/2}}+\frac{(2 A-B+C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 a d \sqrt{a+a \operatorname{Cos}[c+d x]}}$$

Result (type 3, 1302 leaves):

$$-\left(\left(\left(\frac{1}{8}+\frac{i}{8}\right)\left((-1+i)+\sqrt{2}\right)\left((57+19 i) A+19 \sqrt{2} A-(36+12 i) B-12 \sqrt{2} B+(24+8 i) C+8 \sqrt{2} C\right) \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2} \operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}{-\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2} \operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\right) \Big/ \left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(a(1+\operatorname{Cos}[c+d x]))^{3/2}\right)\right)-\left(\left(\frac{1}{8}-\frac{i}{8}\right)\left((1+i)+\sqrt{2}\right)\left((-57+19 i) A+19 \sqrt{2} A+(36-12 i) B-12 \sqrt{2} B-(24-8 i) C+8 \sqrt{2} C\right) \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2} \operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}{\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2} \operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\right) \Big/ \left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(a(1+\operatorname{Cos}[c+d x]))^{3/2}\right)+\left((13 A-9 B+5 C) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right]\right) \Big/ \left(d\,(a(1+\operatorname{Cos}[c+d x]))^{3/2}\right)+\left((-13 A+9 B-5 C) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{4}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{4}(c+d x)\right]\right]\right) \Big/ \left(d\,(a(1+\operatorname{Cos}[c+d x]))^{3/2}\right)+\left(\left(38 A+19 i \sqrt{2} A-24 B-12 i \sqrt{2} B+16 C+8 i \sqrt{2} C\right) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Log}\left[\sqrt{2}+2 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right) \Big/ \left(4\left(i+\sqrt{2}\right) d\,(a(1+\operatorname{Cos}[c+d x]))^{3/2}\right)-\left(\left(\frac{1}{16}-\frac{i}{16}\right)\left((-1+i)+\sqrt{2}\right)\left((57+19 i) A+19 \sqrt{2} A-(36+12 i) B-12 \sqrt{2} B+(24+8 i) C+8 \sqrt{2} C\right) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Log}\left[2-\sqrt{2} \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2} \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right) \Big/ \left(\sqrt{2}\left(i+\sqrt{2}\right) d\,(a(1+\operatorname{Cos}[c+d x]))^{3/2}\right)+\left(\left(\frac{1}{16}+\frac{i}{16}\right)\left((1+i)+\sqrt{2}\right)\left((-57+19 i) A+19 \sqrt{2} A+(36-12 i) B-12 \sqrt{2} B-(24-8 i) C+8 \sqrt{2} C\right)\right.$$

$$\left.\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)\Big/$$
$$\left(\sqrt{2}\,\left(\text{i}+\sqrt{2}\right)\,d\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\right)+$$
$$\frac{(-A+B-C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{2\,d\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\left(\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{(A-B+C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{2\,d\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\left(\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{(-5\,A+4\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{2\,d\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$
$$\frac{A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{d\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{d\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{(5\,A-4\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{2\,d\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}$$

Problem 417: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^4}{(a+a\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 284 leaves, 9 steps):

$$-\frac{(47\,A-38\,B+24\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{8\,a^{3/2}\,d}+\frac{(17\,A-13\,B+9\,C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}+$$
$$\frac{(21\,A-14\,B+12\,C)\,\text{Tan}[c+d\,x]}{8\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{(13\,A-12\,B+6\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{12\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-$$
$$\frac{(A-B+C)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{2\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(5\,A-3\,B+3\,C)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{6\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 1476 leaves):

$$-\left(\left(\left(\left(\frac{1}{16}-\frac{\text{i}}{16}\right)\,\left((1+\text{i})-\text{i}\,\sqrt{2}\right)\right.\right.\right.$$
$$\left(\left(141+47\,\text{i}\right)\,A+47\,\sqrt{2}\,A-\left(114+38\,\text{i}\right)\,B-38\,\sqrt{2}\,B+\left(72+24\,\text{i}\right)\,C+24\,\sqrt{2}\,C\right)$$

$$\text{ArcTan}\Big[\frac{\text{Cos}\big[\frac{1}{4}(c+d x)\big]-\text{Sin}\big[\frac{1}{4}(c+d x)\big]-\sqrt{2}\,\text{Sin}\big[\frac{1}{4}(c+d x)\big]}{-\text{Cos}\big[\frac{1}{4}(c+d x)\big]+\sqrt{2}\,\text{Cos}\big[\frac{1}{4}(c+d x)\big]-\text{Sin}\big[\frac{1}{4}(c+d x)\big]}\Big]\,\text{Cos}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^3\Bigg)\Bigg/$$

$$\Big(\sqrt{2}\,\big(i+\sqrt{2}\big)\,d\,\big(a\,(1+\text{Cos}[c+d x])\big)^{3/2}\Big)+\Bigg(\Big(\frac{1}{16}-\frac{i}{16}\Big)\,\Big((1+i)+\sqrt{2}\Big)$$

$$\Big((-141+47 i)\,A+47\sqrt{2}\,A+(114-38 i)\,B-38\sqrt{2}\,B-(72-24 i)\,C+24\sqrt{2}\,C\Big)$$

$$\text{ArcTan}\Big[\frac{\text{Cos}\big[\frac{1}{4}(c+d x)\big]+\text{Sin}\big[\frac{1}{4}(c+d x)\big]-\sqrt{2}\,\text{Sin}\big[\frac{1}{4}(c+d x)\big]}{\text{Cos}\big[\frac{1}{4}(c+d x)\big]+\sqrt{2}\,\text{Cos}\big[\frac{1}{4}(c+d x)\big]-\text{Sin}\big[\frac{1}{4}(c+d x)\big]}\Big]\,\text{Cos}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^3\Bigg)\Bigg/$$

$$\Big(\sqrt{2}\,\big(i+\sqrt{2}\big)\,d\,\big(a\,(1+\text{Cos}[c+d x])\big)^{3/2}\Big)+$$

$$\Big((-17 A+13 B-9 C)\,\text{Cos}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^3\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{4}(c+d x)\Big]-\text{Sin}\Big[\frac{1}{4}(c+d x)\Big]\Big]\Big)\Big/$$

$$\Big(d\,\big(a\,(1+\text{Cos}[c+d x])\big)^{3/2}\Big)+$$

$$\Big((17 A-13 B+9 C)\,\text{Cos}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^3\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{4}(c+d x)\Big]+\text{Sin}\Big[\frac{1}{4}(c+d x)\Big]\Big]\Big)\Big/$$

$$\Big(d\,\big(a\,(1+\text{Cos}[c+d x])\big)^{3/2}\Big)+$$

$$\Big(\Big(-94 A-47 i\sqrt{2}\,A+76 B+38 i\sqrt{2}\,B-48 C-24 i\sqrt{2}\,C\Big)\,\text{Cos}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^3$$

$$\text{Log}\Big[\sqrt{2}+2\,\text{Sin}\Big[\frac{1}{2}(c+d x)\Big]\Big]\Big)\Big/\Big(8\,\big(i+\sqrt{2}\big)\,d\,\big(a\,(1+\text{Cos}[c+d x])\big)^{3/2}\Big)+$$

$$\Bigg(\Big(\frac{1}{32}+\frac{i}{32}\Big)\,\Big((1+i)-i\sqrt{2}\Big)\,\Big((141+47 i)\,A+47\sqrt{2}\,A-(114+38 i)\,B-38\sqrt{2}\,B+(72+24 i)\,C+$$

$$24\sqrt{2}\,C\Big)\,\text{Cos}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^3\,\text{Log}\Big[2-\sqrt{2}\,\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]-\sqrt{2}\,\text{Sin}\Big[\frac{1}{2}(c+d x)\Big]\Big]\Bigg)\Bigg/$$

$$\Big(\sqrt{2}\,\big(i+\sqrt{2}\big)\,d\,\big(a\,(1+\text{Cos}[c+d x])\big)^{3/2}\Big)-\Bigg(\Big(\frac{1}{32}+\frac{i}{32}\Big)\,\Big((1+i)+\sqrt{2}\Big)$$

$$\Big((-141+47 i)\,A+47\sqrt{2}\,A+(114-38 i)\,B-38\sqrt{2}\,B-(72-24 i)\,C+24\sqrt{2}\,C\Big)$$

$$\text{Cos}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^3\,\text{Log}\Big[2+\sqrt{2}\,\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]-\sqrt{2}\,\text{Sin}\Big[\frac{1}{2}(c+d x)\Big]\Big]\Bigg)\Bigg/$$

$$\Big(\sqrt{2}\,\big(i+\sqrt{2}\big)\,d\,\big(a\,(1+\text{Cos}[c+d x])\big)^{3/2}\Big)+$$

$$\frac{(A-B+C)\,\text{Cos}\big[\frac{c}{2}+\frac{d x}{2}\big]^3}{2\,d\,\big(a\,(1+\text{Cos}[c+d x])\big)^{3/2}\,\Big(\text{Cos}\big[\frac{1}{4}(c+d x)\big]-\text{Sin}\big[\frac{1}{4}(c+d x)\big]\Big)^2}+$$

$$\frac{(-A+B-C)\,\text{Cos}\big[\frac{c}{2}+\frac{d x}{2}\big]^3}{2\,d\,\big(a\,(1+\text{Cos}[c+d x])\big)^{3/2}\,\Big(\text{Cos}\big[\frac{1}{4}(c+d x)\big]+\text{Sin}\big[\frac{1}{4}(c+d x)\big]\Big)^2}+$$

$$\frac{A\,\text{Cos}\big[\frac{c}{2}+\frac{d x}{2}\big]^3}{3\,d\,\big(a\,(1+\text{Cos}[c+d x])\big)^{3/2}\,\Big(\text{Cos}\big[\frac{1}{2}(c+d x)\big]-\text{Sin}\big[\frac{1}{2}(c+d x)\big]\Big)^3}+$$

$$\frac{(17 A-10 B+8 C)\,\text{Cos}\big[\frac{c}{2}+\frac{d x}{2}\big]^3}{4\,d\,\big(a\,(1+\text{Cos}[c+d x])\big)^{3/2}\,\Big(\text{Cos}\big[\frac{1}{2}(c+d x)\big]-\text{Sin}\big[\frac{1}{2}(c+d x)\big]\Big)}-$$

$$\frac{A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{3\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+$$
$$\frac{(-17\,A+10\,B-8\,C)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3}{4\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$
$$\frac{\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(-3\,A\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+2\,B\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}{2\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(-3\,A\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+2\,B\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}{2\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}$$

Problem 422: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]}{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 3, 171 leaves, 7 steps):

$$\frac{2\,A\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{a^{5/2}\,d}-\frac{(43\,A-3\,B-5\,C)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-$$
$$\frac{(A-B+C)\,\mathrm{Sin}[c+d\,x]}{4\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{5/2}}-\frac{(11\,A-3\,B-5\,C)\,\mathrm{Sin}[c+d\,x]}{16\,a\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}$$

Result (type 3, 2329 leaves):

$$-\left(\left(\left((4-4\,i)\,A\,\left(1+e^{i\,c}\right)\right.\right.\right.$$
$$\left(\sqrt{2}-(1-i)\,e^{\frac{i\,c}{2}}+(16-16\,i)\,e^{\frac{3\,i\,c}{2}+i\,d\,x}+(20+20\,i)\,\sqrt{2}\,e^{2\,i\,c+\frac{3\,i\,d\,x}{2}}-(34-34\,i)\,e^{\frac{5\,i\,c}{2}+2\,i\,d\,x}-\right.$$
$$(20+20\,i)\,\sqrt{2}\,e^{3\,i\,c+\frac{5\,i\,d\,x}{2}}+(16-16\,i)\,e^{\frac{7\,i\,c}{2}+3\,i\,d\,x}+(4+4\,i)\,\sqrt{2}\,e^{4\,i\,c+\frac{7\,i\,d\,x}{2}}-$$
$$(1-i)\,e^{\frac{9\,i\,c}{2}+4\,i\,d\,x}+8\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}-16\,\sqrt{2}\,e^{i\,(c+d\,x)}-40\,i\,e^{\frac{3}{2}\,i\,(c+d\,x)}+34\,\sqrt{2}\,e^{2\,i\,(c+d\,x)}+$$
$$\left.40\,i\,e^{\frac{5}{2}\,i\,(c+d\,x)}-16\,\sqrt{2}\,e^{3\,i\,(c+d\,x)}-8\,i\,e^{\frac{7}{2}\,i\,(c+d\,x)}+\sqrt{2}\,e^{4\,i\,(c+d\,x)}-(4+4\,i)\,\sqrt{2}\,e^{\frac{1}{2}\,i\,(2\,c+d\,x)}\right)\times$$
$$\left.\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Cos}[c+d\,x]\,\left(B+C\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x]\right)\right)\Big/\left(\left(\left((-1-i)+\sqrt{2}\,e^{\frac{i\,c}{2}}\right)\right.\right.$$
$$\left(-1+e^{i\,c}\right)\,\left(i-2\,\sqrt{2}\,e^{\frac{1}{2}\,i\,(c+d\,x)}-4\,i\,e^{i\,(c+d\,x)}+2\,\sqrt{2}\,e^{\frac{3}{2}\,i\,(c+d\,x)}+i\,e^{2\,i\,(c+d\,x)}\right)^2$$
$$\left.\left.\left.\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+2\,B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[2\,c+2\,d\,x]\right)\right)\right)-$$
$$\left(8\,i\,\sqrt{2}\,A\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\right.$$

$$\text{Cos}[c+d\,x]\,\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\Bigg)\Bigg/$$

$$\left(d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$

$$\Bigg(\left(43\,A-3\,B-5\,C\right)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]$$

$$\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\,\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\Bigg)\Bigg/$$

$$\left(2\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$

$$\Bigg(\left(-43\,A+3\,B+5\,C\right)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]$$

$$\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\,\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\Bigg)\Bigg/$$

$$\left(2\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)-$$

$$\Bigg(4\,\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]$$

$$\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\Bigg)\Bigg/$$

$$\left(d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$

$$\Bigg(\left(2-2\,i\right)\,\sqrt{2}\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]$$

$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]\,\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)$$

$$\left(\left(1+i\right)\,\text{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}\right]-\left(1-i\right)\,\text{Sin}\left[\frac{c}{4}\right]-i\,\sqrt{2}\,\text{Sin}\left[\frac{c}{4}\right]\right)$$

$$\left(\left(-1-i\right)\,A\,\text{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{4}\right]+\left(1-i\right)\,A\,\text{Sin}\left[\frac{c}{4}\right]-i\,\sqrt{2}\,A\,\text{Sin}\left[\frac{c}{4}\right]\right)\Bigg)\Bigg/$$

$$\left(d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\right)-$$

$$\Bigg(\left(1+i\right)\,\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]$$

$$\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)$$

$$\left(\left(1+i\right)\,\text{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}\right]-\left(1-i\right)\,\text{Sin}\left[\frac{c}{4}\right]-i\,\sqrt{2}\,\text{Sin}\left[\frac{c}{4}\right]\right)$$

$$\left(\left(-1-i\right)\,A\,\text{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{4}\right]+\left(1-i\right)\,A\,\text{Sin}\left[\frac{c}{4}\right]-i\,\sqrt{2}\,A\,\text{Sin}\left[\frac{c}{4}\right]\right)\Bigg)\Bigg/$$

$$\left(d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\right)-$$

$$\Bigg(32\,i\,A\,\text{ArcTan}\left[\frac{2\,i\,\text{Cos}\left[\frac{c}{2}\right]-i\,\left(-\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\text{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right]\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5$$

$$\left.\operatorname{Cos}[c+d x] \operatorname{Cot}\left[\frac{c}{2}\right] \left(B+C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)\right) \Big/$$

$$\left(d \left(a \left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2} \left(2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 c+2 d x]\right)\right.$$
$$\left.\sqrt{-2+4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2}\right)+$$

$$\left(16 \sqrt{2} A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{c}{2}\right] \left(B+C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)\right.$$

$$\left(-d x \operatorname{Cos}\left[\frac{c}{2}\right]+2 \operatorname{Log}\left[\sqrt{2}+2 \operatorname{Cos}\left[\frac{d x}{2}\right] \operatorname{Sin}\left[\frac{c}{2}\right]+2 \operatorname{Cos}\left[\frac{c}{2}\right] \operatorname{Sin}\left[\frac{d x}{2}\right]\right] \operatorname{Sin}\left[\frac{c}{2}\right]+\right.$$

$$\left.\left.\frac{4 i \sqrt{2} \operatorname{ArcTan}\left[\frac{2 i \operatorname{Cos}\left[\frac{c}{2}\right]-i \left(-\sqrt{2}+2 \operatorname{Sin}\left[\frac{c}{2}\right]\right) \operatorname{Tan}\left[\frac{d x}{4}\right]}{\sqrt{-2+4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2}}\right] \operatorname{Cos}\left[\frac{c}{2}\right]}{\sqrt{-2+4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2}}\right)\right) \Big/$$

$$\left(d \left(a \left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2} \left(2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 c+2 d x]\right)\right.$$
$$\left.\left(4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2\right)\right)-$$

$$\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Cos}[c+d x] \left(B+C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right)\right.$$
$$\left(19 A \operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]-11 B \operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+3 C \operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+\right.$$
$$\left.\left.11 A \operatorname{Sin}\left[\frac{3 c}{2}+\frac{3 d x}{2}\right]-3 B \operatorname{Sin}\left[\frac{3 c}{2}+\frac{3 d x}{2}\right]-5 C \operatorname{Sin}\left[\frac{3 c}{2}+\frac{3 d x}{2}\right]\right)\right) \Big/$$
$$\left(8 d \left(a \left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2} \left(2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 c+2 d x]\right)\right)$$

Problem 423: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^2}{\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 3, 217 leaves, 8 steps):

$$-\frac{(5A-2B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{a^{5/2}\,d}+\frac{(115A-43B+3C)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{16\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B+C)\,\text{Tan}[c+d\,x]}{4\,d\,(a+a\,\text{Cos}[c+d\,x])^{5/2}}-\frac{(15A-7B-C)\,\text{Tan}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(35A-11B+3C)\,\text{Tan}[c+d\,x]}{16\,a^2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 1411 leaves):

$$\left((-115A+43B-3C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(2\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,(2A+C+2B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2c+2d\,x])\right)+$$
$$\left((115A-43B+3C)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(2\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,(2A+C+2B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2c+2d\,x])\right)-$$
$$\left(4\sqrt{2}\,(5A-2B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\text{Cos}[c+d\,x]^2\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,(2A+C+2B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2c+2d\,x])\right)-$$
$$\left(4\,i\,(5A-2B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\right.$$
$$\left.\text{Cos}[c+d\,x]^2\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,(2A+C+2B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2c+2d\,x])\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)-$$
$$\left(4\,i\,(5A-2B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\right.$$
$$\left.\text{Cos}[c+d\,x]^2\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,(2A+C+2B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2c+2d\,x])\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)-$$
$$\left(2\,(5A-2B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\text{Cos}[c+d\,x]^2\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\right.$$

$$\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)\Bigg)\Bigg/$$
$$\left(d\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)-$$
$$\Bigg(2\left(5\,A-2\,B\right)\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\text{Cos}[c+d\,x]^2\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]$$
$$\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)\Bigg)\Bigg/$$
$$\left(d\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\left(-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)+$$
$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\text{Cos}[c+d\,x]\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\Bigg(24\,A\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+$$
$$8\,B\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-8\,C\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+75\,A\,\text{Sin}\left[\frac{3\,c}{2}+\frac{3\,d\,x}{2}\right]-19\,B\,\text{Sin}\left[\frac{3\,c}{2}+\frac{3\,d\,x}{2}\right]+$$
$$11\,C\,\text{Sin}\left[\frac{3\,c}{2}+\frac{3\,d\,x}{2}\right]+35\,A\,\text{Sin}\left[\frac{5\,c}{2}+\frac{5\,d\,x}{2}\right]-11\,B\,\text{Sin}\left[\frac{5\,c}{2}+\frac{5\,d\,x}{2}\right]+3\,C\,\text{Sin}\left[\frac{5\,c}{2}+\frac{5\,d\,x}{2}\right]\Bigg)\Bigg)\Bigg/$$
$$\left(16\,d\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)$$

Problem 424: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^3}{\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 3, 280 leaves, 9 steps):

$$\frac{\left(39\,A-20\,B+8\,C\right)\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,a^{5/2}\,d}-\frac{\left(219\,A-115\,B+43\,C\right)\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-$$
$$\frac{\left(63\,A-35\,B+11\,C\right)\text{Tan}[c+d\,x]}{16\,a^2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{\left(A-B+C\right)\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{4\,d\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}}-$$
$$\frac{\left(19\,A-11\,B+3\,C\right)\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{16\,a\,d\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}}+\frac{\left(31\,A-15\,B+7\,C\right)\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{16\,a^2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 1444 leaves):

$$-\Bigg(\Bigg(\Bigg(\left(\frac{1}{4}+\frac{i}{4}\right)\left(\left(-1+i\right)+\sqrt{2}\right)$$
$$\Big(\left(117+39\,i\right)A+39\,\sqrt{2}\,A-\left(60+20\,i\right)B-20\,\sqrt{2}\,B+\left(24+8\,i\right)C+8\,\sqrt{2}\,C\Big)$$
$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{-\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\Bigg)\Bigg/$$
$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\right)\Bigg)-\Bigg(\left(\frac{1}{4}-\frac{i}{4}\right)\left(\left(1+i\right)+\sqrt{2}\right)$$

$$\left(\left((-117+39\,i)\,A+39\sqrt{2}\,A+(60-20\,i)\,B-20\sqrt{2}\,B-(24-8\,i)\,C+8\sqrt{2}\,C\right)\right.$$
$$\left.\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{4}(c+d x)\right]}{\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\sqrt{2}\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\right)\Big/$$
$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\right)+$$
$$\left((219\,A-115\,B+43\,C)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]\right)\Big/$$
$$\left(4\,d\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\right)+$$
$$\left((-219\,A+115\,B-43\,C)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\text{Log}\left[\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right]\right)\Big/$$
$$\left(4\,d\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\right)+$$
$$\left(\left(78\,A+39\,i\sqrt{2}\,A-40\,B-20\,i\sqrt{2}\,B+16\,C+8\,i\sqrt{2}\,C\right)\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\right.$$
$$\left.\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)\Big/\left(2\left(i+\sqrt{2}\right)d\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\right)-$$
$$\left(\left(\frac{1}{8}-\frac{i}{8}\right)\left((-1+i)+\sqrt{2}\right)\left((117+39\,i)\,A+39\sqrt{2}\,A-(60+20\,i)\,B-20\sqrt{2}\,B+(24+8\,i)\,C+\right.\right.$$
$$\left.\left.8\sqrt{2}\,C\right)\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)\Big/$$
$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\right)+\left(\left(\frac{1}{8}+\frac{i}{8}\right)\left((1+i)+\sqrt{2}\right)\right.$$
$$\left((-117+39\,i)\,A+39\sqrt{2}\,A+(60-20\,i)\,B-20\sqrt{2}\,B-(24-8\,i)\,C+8\sqrt{2}\,C\right)$$
$$\left.\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)\Big/$$
$$\left(\sqrt{2}\left(i+\sqrt{2}\right)d\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\right)+$$
$$\frac{(-A+B-C)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5}{8\,d\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^4}+$$
$$\frac{(-27\,A+19\,B-11\,C)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5}{8\,d\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]-\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2}+$$
$$\frac{(A-B+C)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5}{8\,d\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^4}+$$
$$\frac{(27\,A-19\,B+11\,C)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5}{8\,d\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\left(\text{Cos}\left[\frac{1}{4}(c+d x)\right]+\text{Sin}\left[\frac{1}{4}(c+d x)\right]\right)^2}+$$
$$\frac{(-9\,A+4\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5}{d\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$

$$\frac{2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{d\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{d\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{(9\,A-4\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5}{d\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}$$

Problem 431: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Cos}[c+d\,x])\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 211 leaves, 8 steps):

$$\frac{2\,a\,(9\,A+7\,(B+C))\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{15\,d}+\frac{10\,a\,(11\,A+11\,B+9\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{231\,d}+$$
$$\frac{10\,a\,(11\,A+11\,B+9\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{231\,d}+$$
$$\frac{2\,a\,(9\,A+7\,(B+C))\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{45\,d}+\frac{2\,a\,(11\,A+11\,B+9\,C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{77\,d}+$$
$$\frac{2\,a\,(B+C)\,\text{Cos}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{9\,d}+\frac{2\,a\,C\,\text{Cos}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{11\,d}$$

Result (type 5, 1344 leaves):

$$a\,\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$
$$\left(-\frac{(9\,A+7\,B+7\,C)\,\text{Cot}[c]}{15\,d}+\frac{(506\,A+506\,B+435\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{1848\,d}+\right.$$
$$\frac{(18\,A+19\,B+19\,C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{180\,d}+\frac{(44\,A+44\,B+57\,C)\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{1232\,d}+$$
$$\frac{(B+C)\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{72\,d}+\frac{C\,\text{Cos}[5\,d\,x]\,\text{Sin}[5\,c]}{176\,d}+\frac{(506\,A+506\,B+435\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{1848\,d}+$$
$$\frac{(18\,A+19\,B+19\,C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{180\,d}+\frac{(44\,A+44\,B+57\,C)\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{1232\,d}+$$
$$\left.\frac{(B+C)\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{72\,d}+\frac{C\,\text{Cos}[5\,c]\,\text{Sin}[5\,d\,x]}{176\,d}\right)-$$

$$\left(5\,A\,\left(1+\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\left.\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/\left(21\,d\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-$$
$$\left(5\,B\,\left(1+\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\left.\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/\left(21\,d\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-$$
$$\left(15\,C\,\left(1+\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$
$$\left(77\,d\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-\frac{1}{10\,d}3\,A\,\left(1+\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$
$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\right.\right.$$
$$\left.\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\Big/$$
$$\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\right.$$
$$\left.\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{30\,d}$$

$$7\,B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\right.$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{30\,d}7\,C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$

$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

Problem 432: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \mathrm{Cos}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Cos}[c+d\,x])\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 177 leaves, 7 steps):

$$\frac{2\,a\,(9\,A+9\,B+7\,C)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+\frac{2\,a\,(7\,A+5\,(B+C))\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+\frac{2\,a\,(7\,A+5\,(B+C))\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{21\,d}+\frac{2\,a\,(9\,A+9\,B+7\,C)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{45\,d}+\frac{2\,a\,(B+C)\,\mathrm{Cos}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{7\,d}+\frac{2\,a\,C\,\mathrm{Cos}[c+d\,x]^{7/2}\,\mathrm{Sin}[c+d\,x]}{9\,d}$$

Result (type 5, 1292 leaves):

$$a\left(\sqrt{\mathrm{Cos}[c+d\,x]}\,(1+\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$
$$\left(-\frac{(9\,A+9\,B+7\,C)\,\mathrm{Cot}[c]}{15\,d}+\frac{(28\,A+23\,B+23\,C)\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{84\,d}+\frac{(18\,A+18\,B+19\,C)\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{180\,d}+\frac{(B+C)\,\mathrm{Cos}[3\,d\,x]\,\mathrm{Sin}[3\,c]}{28\,d}+\frac{C\,\mathrm{Cos}[4\,d\,x]\,\mathrm{Sin}[4\,c]}{72\,d}+\frac{(28\,A+23\,B+23\,C)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{84\,d}+\frac{(18\,A+18\,B+19\,C)\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{180\,d}+\frac{(B+C)\,\mathrm{Cos}[3\,c]\,\mathrm{Sin}[3\,d\,x]}{28\,d}+\frac{C\,\mathrm{Cos}[4\,c]\,\mathrm{Sin}[4\,d\,x]}{72\,d}\right)-$$
$$\left(A\,(1+\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\left.\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/\left(3\,d\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-$$
$$\left(5\,B\,(1+\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(21\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(5\,C\,\left(1+\text{Cos}[c+d\,x]\right)\text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(21\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{10\,d}3\,A\,\left(1+\text{Cos}[c+d\,x]\right)\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$

$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{10\,d}$$

$$3\,B\,\left(1+\text{Cos}[c+d\,x]\right)\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\right.\right.\right.$$

$$\left.\left.\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{30\,d}7\,C\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$

$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

Problem 433: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 144 leaves, 6 steps):

$$\frac{2\,a\,\left(5\,A+3\,\left(B+C\right)\right)\,\text{EllipticE}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]}{5\,d}+$$
$$\frac{2\,a\,\left(7\,A+7\,B+5\,C\right)\,\text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]}{21\,d}+\frac{2\,a\,\left(7\,A+7\,B+5\,C\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+$$
$$\frac{2\,a\,\left(B+C\right)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}+\frac{2\,a\,C\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 5, 1240 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$

$$\left(-\frac{(5\,A+3\,B+3\,C)\,\text{Cot}[c]}{5\,d}+\frac{(28\,A+28\,B+23\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{84\,d}+\right.$$

$$\frac{(B+C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{10\,d}+\frac{C\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{28\,d}+\frac{(28\,A+28\,B+23\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{84\,d}+$$

$$\left.\frac{(B+C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{10\,d}+\frac{C\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{28\,d}\right)-$$

$$\left(A\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(B\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(5\,C\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(21\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{2\,d}A\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$

$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{10\,d}$$

$$3\,B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\right.\right.\right.$$

$$\left.\left.\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{10\,d}3\,C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$

$$\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)$$

Problem 434: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 107 leaves, 5 steps):

$$\frac{2\,a\,(5\,A+5\,B+3\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{2\,a\,(3\,A+B+C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+\frac{2\,a\,(B+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,a\,C\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 1186 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$
$$\left(-\frac{(5\,A+5\,B+3\,C)\,\text{Cot}[c]}{5\,d}+\frac{(B+C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{C\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{10\,d}+\frac{(B+C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{C\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{10\,d}\right)-\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\left(B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{2\,d}A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$

$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{2\,d}$$

$$B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\right.\right.\right.$$

$$\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\Big)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\Bigg)-\frac{1}{10\,d}$$

$$3\,C\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\right.\right.\right.$$

$$\left.\left\{\frac{3}{4}\right\},\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\Big)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\Bigg)$$

Problem 435: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+a\,\text{Cos}[c+d\,x]\right)\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 101 leaves, 5 steps):

$$-\frac{2\,a\,\left(A-B-C\right)\,\text{EllipticE}\left[\frac{1}{2}\,\left(c+d\,x\right),\,2\right]}{d}+\frac{2\,a\,\left(3\,A+3\,B+C\right)\,\text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),\,2\right]}{3\,d}+$$

$$\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,a\,C\,\sqrt{\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 1173 leaves):

$$a\left(\sqrt{\mathrm{Cos}[c+d x]}\,(1+\mathrm{Cos}[c+d x])\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\right.$$

$$\left(-\frac{(-2 A+B+C+B\,\mathrm{Cos}[2 c]+C\,\mathrm{Cos}[2 c])\,\mathrm{Csc}[c]\,\mathrm{Sec}[c]}{2 d}+\frac{C\,\mathrm{Cos}[d x]\,\mathrm{Sin}[c]}{3 d}+\right.$$

$$\left.\frac{C\,\mathrm{Cos}[c]\,\mathrm{Sin}[d x]}{3 d}+\frac{A\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d x]\,\mathrm{Sin}[d x]}{d}\right)-\frac{1}{d\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$A\,(1+\mathrm{Cos}[c+d x])\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}-\frac{1}{d\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$B\,(1+\mathrm{Cos}[c+d x])\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}-$$

$$\left(C\,(1+\mathrm{Cos}[c+d x])\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(3 d\sqrt{1+\mathrm{Cot}[c]^2}\right)+\frac{1}{2 d}A\,(1+\mathrm{Cos}[c+d x])\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\right.\right.$$

$$\left.\mathrm{Sin}[d x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\Big/\left(\sqrt{1-\mathrm{Cos}[d x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\right.$$

$$\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\;\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}$$

$$\left.\sqrt{1+\mathrm{Tan}[c]^2}\right)-\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\Bigg)-$$

$$\frac{1}{2\,d}B\,\left(1+\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\Bigg(\Big(\mathrm{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},$$

$$\Big\{\frac{3}{4}\Big\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\Big]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\Big)\Big/$$

$$\Big(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\;\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}$$

$$\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\;\sqrt{1+\mathrm{Tan}[c]^2}\Big)-$$

$$\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\Bigg)-\frac{1}{2\,d}$$

$$C\,\left(1+\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\Bigg(\Big(\mathrm{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},$$

$$\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\Big]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\Big)\Big/$$

$$\Big(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\;\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}$$

$$\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\;\sqrt{1+\mathrm{Tan}[c]^2}\Big)-$$

$$\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\Bigg)\Bigg)$$

Problem 436: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\text{Cos}[c+d\,x])\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 100 leaves, 5 steps):

$$-\frac{2\,a\,(A+B-C)\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{d}+\frac{2\,a\,(A+3\,(B+C))\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,(A+B)\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 1180 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$
$$\left(-\frac{(-2\,A-2\,B+C+C\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{2\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+\right.$$
$$\left.\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(A\,\text{Sin}[c]+3\,A\,\text{Sin}[d\,x]+3\,B\,\text{Sin}[d\,x])}{3\,d}\right)-$$
$$\left(A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2 \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;+$$

$$\frac{1}{2\,d}A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$

$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}$$

$$\left.\left.\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+$$

$$\frac{1}{2\,d}B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\right.\right.\right.$$

$$\left.\left.\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{2\,d}$$

$$C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\right.\right.\right.$$

$$\left.\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Big)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

Problem 437: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 139 leaves, 6 steps):

$$-\frac{2\,a\,(3\,A+5\,(B+C))\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{2\,a\,(A+B+3\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+$$

$$\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,a\,(A+B)\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,(3\,A+5\,(B+C))\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 1228 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$

$$\left(\frac{(3\,A+5\,B+5\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{5\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{5\,d}+\right.$$

$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(3\,A\,\text{Sin}[c]+5\,A\,\text{Sin}[d\,x]+5\,B\,\text{Sin}[d\,x])}{15\,d}+\frac{1}{15\,d}$$

$$\left.\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(5\,A\,\text{Sin}[c]+5\,B\,\text{Sin}[c]+9\,A\,\text{Sin}[d\,x]+15\,B\,\text{Sin}[d\,x]+15\,C\,\text{Sin}[d\,x])\right)-$$

$$\left(A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}C\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\frac{1}{10\,d}3\,A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$

$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{2\,d}$$

$$B\,\big(1+\text{Cos}[c+d\,x]\big)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\right.\right.\right.$$

$$\left.\left.\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{2\,d}$$

$$C\,\big(1+\text{Cos}[c+d\,x]\big)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\right.\right.\right.$$

$$\left.\left.\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

Problem 438: Result unnecessarily involves higher level functions and more

than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\text{Cos}[c+d\,x])\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 177 leaves, 7 steps):

$$-\frac{2\,a\,(3\,A+3\,B+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{2\,a\,(5\,A+7\,(B+C))\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,a\,(A+B)\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,a\,(5\,A+7\,(B+C))\,\text{Sin}[c+d\,x]}{21\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,(3\,A+3\,B+5\,C)\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 1284 leaves):

$$a\,\left(\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$
$$\left(\frac{(3\,A+3\,B+5\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{5\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,\text{Sin}[d\,x]}{7\,d}+\right.$$
$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(5\,A\,\text{Sin}[c]+7\,A\,\text{Sin}[d\,x]+7\,B\,\text{Sin}[d\,x])}{35\,d}+\frac{1}{105\,d}$$
$$\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(21\,A\,\text{Sin}[c]+21\,B\,\text{Sin}[c]+25\,A\,\text{Sin}[d\,x]+$$
$$35\,B\,\text{Sin}[d\,x]+35\,C\,\text{Sin}[d\,x])+\frac{1}{105\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]$$
$$\left.(25\,A\,\text{Sin}[c]+35\,B\,\text{Sin}[c]+35\,C\,\text{Sin}[c]+63\,A\,\text{Sin}[d\,x]+63\,B\,\text{Sin}[d\,x]+105\,C\,\text{Sin}[d\,x])\right)-$$
$$\left(5\,A\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(21\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(C\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)+\frac{1}{10\,d}3\,A\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$

$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{10\,d}$$

$$3\,B\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\right.\right.\right.$$

$$\left.\left.\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{2\,d}$$

$$C\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\right.\right.\right.$$

$$\left.\left.\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

Problem 439: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^{3/2}\ (a+a\,\text{Cos}[c+d\,x])^2\ \left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 251 leaves, 9 steps):

$$\frac{4 a^2 (9 A+8 B+7 C) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{15 d}+\frac{4 a^2 (66 A+55 B+50 C) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{231 d}+$$
$$\frac{4 a^2 (66 A+55 B+50 C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{231 d}+$$
$$\frac{4 a^2 (9 A+8 B+7 C) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{45 d}+$$
$$\frac{2 a^2 (99 A+121 B+89 C) \text{Cos}[c+d x]^{5/2} \text{Sin}[c+d x]}{693 d}+$$
$$\frac{2 C \text{Cos}[c+d x]^{5/2} (a+a \text{Cos}[c+d x])^2 \text{Sin}[c+d x]}{11 d}+$$
$$\frac{2 (11 B+4 C) \text{Cos}[c+d x]^{5/2} \left(a^2+a^2 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{99 d}$$

Result (type 5, 1374 leaves):

$$\sqrt{\text{Cos}[c+d x]} (a+a \text{Cos}[c+d x])^2 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$
$$\left(-\frac{(9 A+8 B+7 C) \text{Cot}[c]}{15 d}+\frac{(1122 A+1012 B+941 C) \text{Cos}[d x] \text{Sin}[c]}{3696 d}+\right.$$
$$\frac{(36 A+37 B+38 C) \text{Cos}[2 d x] \text{Sin}[2 c]}{360 d}+\frac{(44 A+88 B+101 C) \text{Cos}[3 d x] \text{Sin}[3 c]}{2464 d}+$$
$$\frac{(B+2 C) \text{Cos}[4 d x] \text{Sin}[4 c]}{144 d}+\frac{C \text{Cos}[5 d x] \text{Sin}[5 c]}{352 d}+$$
$$\frac{(1122 A+1012 B+941 C) \text{Cos}[c] \text{Sin}[d x]}{3696 d}+$$
$$\frac{(36 A+37 B+38 C) \text{Cos}[2 c] \text{Sin}[2 d x]}{360 d}+\frac{(44 A+88 B+101 C) \text{Cos}[3 c] \text{Sin}[3 d x]}{2464 d}+$$
$$\left.\frac{(B+2 C) \text{Cos}[4 c] \text{Sin}[4 d x]}{144 d}+\frac{C \text{Cos}[5 c] \text{Sin}[5 d x]}{352 d}\right)-\frac{1}{7 d \sqrt{1+\text{Cot}[c]^2}}$$
$$2 A (a+a \text{Cos}[c+d x])^2 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\left(5 B (a+a \text{Cos}[c+d x])^2 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/\left(21\,d\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-$$

$$\Bigg(50\,C\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\Big]$$

$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(231\,d\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-\frac{1}{10\,d}3\,A\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Csc}[c]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4$$

$$\Bigg(\Bigg(\mathrm{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\Big]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]$$

$$\left.\mathrm{Tan}[c]\right)\Big/\Bigg(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}$$

$$\left.\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\right)-$$

$$\frac{1}{15\,d}4\,B\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Csc}[c]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4$$

$$\Bigg(\Bigg(\mathrm{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\Big]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]$$

$$\left.\mathrm{Tan}[c]\right)\Big/\Bigg(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}$$

$$\left.\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{30\,d}7\,C\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 440: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 215 leaves, 8 steps):

$$\frac{4\,a^2\,(12\,A+9\,B+8\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+$$
$$\frac{4\,a^2\,(7\,A+6\,B+5\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+\frac{4\,a^2\,(7\,A+6\,B+5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+$$
$$\frac{2\,a^2\,(21\,A+27\,B+19\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{105\,d}+$$
$$\frac{2\,C\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{9\,d}+$$
$$\frac{2\,(9\,B+4\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{63\,d}$$

Result (type 5, 1322 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\ \left(a+a\,\text{Cos}[c+d\,x]\right)^2 \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(-\frac{(12\,A+9\,B+8\,C)\ \text{Cot}[c]}{15\,d}+\frac{(56\,A+51\,B+46\,C)\ \text{Cos}[d\,x]\ \text{Sin}[c]}{168\,d}+\right.$$
$$\frac{(18\,A+36\,B+37\,C)\ \text{Cos}[2\,d\,x]\ \text{Sin}[2\,c]}{360\,d}+\frac{(B+2\,C)\ \text{Cos}[3\,d\,x]\ \text{Sin}[3\,c]}{56\,d}+\frac{C\,\text{Cos}[4\,d\,x]\ \text{Sin}[4\,c]}{144\,d}+$$
$$\frac{(56\,A+51\,B+46\,C)\ \text{Cos}[c]\ \text{Sin}[d\,x]}{168\,d}+\frac{(18\,A+36\,B+37\,C)\ \text{Cos}[2\,c]\ \text{Sin}[2\,d\,x]}{360\,d}+$$
$$\left.\frac{(B+2\,C)\ \text{Cos}[3\,c]\ \text{Sin}[3\,d\,x]}{56\,d}+\frac{C\,\text{Cos}[4\,c]\ \text{Sin}[4\,d\,x]}{144\,d}\right)-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2 \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4 \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{7\,d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$2\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2 \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4 \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\left(5\,C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2 \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4 \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(21\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{5\,d}2\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2 \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$
$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{10\,d}3\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{15\,d}4\,C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 441: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^2\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 179 leaves, 7 steps):

$$\frac{4\,a^2\,(5\,A+4\,B+3\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+\frac{4\,a^2\,(14\,A+7\,B+6\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+$$
$$\frac{2\,a^2\,(35\,A+49\,B+33\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,d}+$$
$$\frac{2\,C\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{7\,d}+$$
$$\frac{2\,(7\,B+4\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{35\,d}$$

Result (type 5, 1270 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(-\frac{(5\,A+4\,B+3\,C)\,\text{Cot}[c]}{5\,d}+\frac{(28\,A+56\,B+51\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{168\,d}+\right.$$
$$\frac{(B+2\,C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{20\,d}+\frac{C\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{56\,d}+\frac{(28\,A+56\,B+51\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{168\,d}+$$
$$\left.\frac{(B+2\,C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{20\,d}+\frac{C\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{56\,d}\right)-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$2\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$B\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} - \frac{1}{7 d \sqrt{1+\text{Cot}[c]^2}}$$

$$2 C\ (a+a \text{Cos}[c+d x])^2 \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} -$$

$$\frac{1}{2 d} A\ (a+a \text{Cos}[c+d x])^2 \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right) \Big/ \left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right) -$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2 \text{Cos}[c]^2 \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}}}\right) -$$

$$\frac{1}{5 d} 2 B\ (a+a \text{Cos}[c+d x])^2 \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right) \Big/ \left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]] \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right) -$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{10\,d}3\,C\,\left(a+a\,\text{Cos}[c+d x]\right)^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\right.$$

$$\left.\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 442: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+a\,\text{Cos}[c+d x]\right)^2\,\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)}{\text{Cos}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 172 leaves, 7 steps):

$$\frac{4\,a^2\,(5\,B+4\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d x),2\right]}{5\,d}+\frac{4\,a^2\,(3\,A+2\,B+C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),2\right]}{3\,d}-$$

$$\frac{2\,a^2\,(15\,A-5\,B-7\,C)\,\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{15\,d}+\frac{2\,A\,\left(a+a\,\text{Cos}[c+d x]\right)^2\,\text{Sin}[c+d x]}{d\,\sqrt{\text{Cos}[c+d x]}}-$$

$$\frac{2\,(5\,A-C)\,\sqrt{\text{Cos}[c+d x]}\,\left(a^2+a^2\,\text{Cos}[c+d x]\right)\,\text{Sin}[c+d x]}{5\,d}$$

Result (type 5, 1039 leaves):

$$\sqrt{\text{Cos}[c+d x]}\,\left(a+a\,\text{Cos}[c+d x]\right)^2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$

$$\left(-\frac{1}{20\,d}\left(-5\,A+10\,B+8\,C+5\,A\,\text{Cos}[2\,c]+10\,B\,\text{Cos}[2\,c]+8\,C\,\text{Cos}[2\,c]\right)\,\text{Csc}[c]\,\text{Sec}[c]+\right.$$

$$\frac{(B+2C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{6\,d}+\frac{C\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{20\,d}+\frac{(B+2C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{6\,d}+$$

$$\left.\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{2\,d}+\frac{C\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{20\,d}\right)-\frac{1}{d\sqrt{1+\text{Cot}[c]^2}}$$

$$A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3\,d\sqrt{1+\text{Cot}[c]^2}}$$

$$2\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3\,d\sqrt{1+\text{Cot}[c]^2}}$$

$$C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{2\,d}B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{5\,d}2\,C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 443: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 172 leaves, 7 steps):

$$-\frac{4\,a^2\,(A-C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{d}+$$

$$\frac{4\,a^2\,(2\,A+3\,B+2\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}-\frac{2\,a^2\,(5\,A+3\,B-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+$$

$$\frac{2\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,(4\,A+3\,B)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 1025 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(-\frac{\left(-4\,A-B+2\,C+B\,\text{Cos}[2\,c]+2\,C\,\text{Cos}[2\,c]\right)\,\text{Csc}[c]\,\text{Sec}[c]}{4\,d}+\right.$$

$$\frac{C\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{6\,d}+\frac{C\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{6\,d}+\frac{A\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}[d\,x]}{6\,d}+$$

$$\left.\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,\left(A\,\mathrm{Sin}[c]+6\,A\,\mathrm{Sin}[d\,x]+3\,B\,\mathrm{Sin}[d\,x]\right)}{6\,d}\right)-\frac{1}{3\,d\,\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$2\,A\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}-\frac{1}{d\,\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$B\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}-\frac{1}{3\,d\,\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$2\,C\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}+$$

$$\frac{1}{2\,d}A\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\right.\right.$$

$$\left.\mathrm{Tan}[c]\right)\Big/\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\right.$$

$$\left.\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{2\,d}C\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 444: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^2\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 174 leaves, 7 steps):

$$-\frac{4\,a^2\,(4\,A+5\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+$$
$$\frac{4\,a^2\,(A+2\,B+3\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+\frac{2\,a^2\,(17\,A+25\,B+15\,C)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}}+$$
$$\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,(4\,A+5\,B)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{15\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 5, 1041 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(-\frac{(-16\,A-20\,B-5\,C+5\,C\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{20\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{10\,d}+\right.$$

$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\left(3\,A\,\text{Sin}[c]+10\,A\,\text{Sin}[d\,x]+5\,B\,\text{Sin}[d\,x]\right)}{30\,d}+\frac{1}{30\,d}$$

$$\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\left(10\,A\,\text{Sin}[c]+5\,B\,\text{Sin}[c]+24\,A\,\text{Sin}[d\,x]+30\,B\,\text{Sin}[d\,x]+15\,C\,\text{Sin}[d\,x]\right)\Bigg)-$$

$$\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.$$

$$\left.\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$2\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\frac{1}{5\,d}2\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\Bigg(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+$$

$$\frac{1}{2\,d}B\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 445: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^2\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 215 leaves, 8 steps):

$$-\frac{4\,a^2\,(3\,A+4\,B+5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{4\,a^2\,(6\,A+7\,B+14\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+$$
$$\frac{2\,a^2\,(33\,A+49\,B+35\,C)\,\text{Sin}[c+d\,x]}{105\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{4\,a^2\,(3\,A+4\,B+5\,C)\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}+$$
$$\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,(4\,A+7\,B)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{35\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 1310 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\frac{(3\,A+4\,B+5\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{5\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,\text{Sin}[d\,x]}{14\,d}+\right.$$

$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\left(5\,A\,\text{Sin}[c]+14\,A\,\text{Sin}[d\,x]+7\,B\,\text{Sin}[d\,x]\right)}{70\,d}+\frac{1}{210\,d}$$

$$\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\left(42\,A\,\text{Sin}[c]+21\,B\,\text{Sin}[c]+60\,A\,\text{Sin}[d\,x]+70\,B\,\text{Sin}[d\,x]+35\,C\,\text{Sin}[d\,x]\right)+$$

$$\frac{1}{210\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]$$

$$\left.\left(60\,A\,\text{Sin}[c]+70\,B\,\text{Sin}[c]+35\,C\,\text{Sin}[c]+126\,A\,\text{Sin}[d\,x]+168\,B\,\text{Sin}[d\,x]+210\,C\,\text{Sin}[d\,x]\right)\right)-$$

$$\frac{1}{7\,d\,\sqrt{1+\text{Cot}[c]^2}}2\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\right.$$

$$\left.\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$2\,C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\frac{1}{10\,d}3\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)+$$

$$\frac{1}{5\,d}2\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)+$$

$$\frac{1}{2\,d}C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)$$

Problem 446: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^2\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 251 leaves, 9 steps):

$$-\frac{4\,a^2\,(8\,A+9\,B+12\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+\frac{4\,a^2\,(5\,A+6\,B+7\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+\frac{2\,a^2\,(19\,A+27\,B+21\,C)\,\text{Sin}[c+d\,x]}{105\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{4\,a^2\,(5\,A+6\,B+7\,C)\,\text{Sin}[c+d\,x]}{21\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{4\,a^2\,(8\,A+9\,B+12\,C)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{9\,d\,\text{Cos}[c+d\,x]^{9/2}}+\frac{2\,(4\,A+9\,B)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{63\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 1364 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\Bigg(\frac{(8\,A+9\,B+12\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{15\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^5\,\text{Sin}[d\,x]}{18\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^4\,(7\,A\,\text{Sin}[c]+18\,A\,\text{Sin}[d\,x]+9\,B\,\text{Sin}[d\,x])}{126\,d}+\frac{1}{630\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(90\,A\,\text{Sin}[c]+45\,B\,\text{Sin}[c]+112\,A\,\text{Sin}[d\,x]+126\,B\,\text{Sin}[d\,x]+63\,C\,\text{Sin}[d\,x])+\frac{1}{105\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(25\,A\,\text{Sin}[c]+30\,B\,\text{Sin}[c]+35\,C\,\text{Sin}[c]+56\,A\,\text{Sin}[d\,x]+63\,B\,\text{Sin}[d\,x]+84\,C\,\text{Sin}[d\,x])+\frac{1}{630\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(112\,A\,\text{Sin}[c]+126\,B\,\text{Sin}[c]+63\,C\,\text{Sin}[c]+150\,A\,\text{Sin}[d\,x]+180\,B\,\text{Sin}[d\,x]+210\,C\,\text{Sin}[d\,x])\Bigg)-$$

$$\Bigg(5\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(21\,d\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{7\,d\sqrt{1+\text{Cot}[c]^2}}2\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\text{Csc}[c]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3\,d\sqrt{1+\text{Cot}[c]^2}}$$

$$C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ +$$

$$\frac{1}{15\,d}4\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)+$$

$$\frac{1}{10\,d}3\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+$$

$$\frac{1}{5\,d}2\,C\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 447: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^3\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 303 leaves, 10 steps):

$$\frac{4 a^3 \left(221 A+195 B+175 C\right) \text{EllipticE}\left[\frac{1}{2} \left(c+d x\right),2\right]}{195 d}+\frac{4 a^3 \left(121 A+105 B+95 C\right) \text{EllipticF}\left[\frac{1}{2} \left(c+d x\right),2\right]}{231 d}+\frac{4 a^3 \left(121 A+105 B+95 C\right) \sqrt{\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{231 d}+\frac{4 a^3 \left(221 A+195 B+175 C\right) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{585 d}+\frac{20 a^3 \left(286 A+273 B+236 C\right) \text{Cos}[c+d x]^{5/2} \text{Sin}[c+d x]}{9009 d}+\frac{2 C \text{Cos}[c+d x]^{5/2} \left(a+a \text{Cos}[c+d x]\right)^3 \text{Sin}[c+d x]}{13 d}+\frac{2 \left(13 B+6 C\right) \text{Cos}[c+d x]^{5/2} \left(a^2+a^2 \text{Cos}[c+d x]\right)^2 \text{Sin}[c+d x]}{143 a d}+\frac{1}{1287 d} 2 \left(143 A+195 B+145 C\right) \text{Cos}[c+d x]^{5/2} \left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]$$

Result (type 5, 1426 leaves):

$$\sqrt{\text{Cos}[c+d x]}\, \left(a+a \text{Cos}[c+d x]\right)^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(-\frac{\left(221 A+195 B+175 C\right) \text{Cot}[c]}{390 d}+\frac{\left(2134 A+1953 B+1811 C\right) \text{Cos}[d x] \text{Sin}[c]}{7392 d}+\frac{\left(7592 A+7800 B+7825 C\right) \text{Cos}[2 d x] \text{Sin}[2 c]}{74880 d}+\frac{\left(132 A+189 B+215 C\right) \text{Cos}[3 d x] \text{Sin}[3 c]}{4928 d}+\frac{\left(13 A+39 B+59 C\right) \text{Cos}[4 d x] \text{Sin}[4 c]}{3744 d}+\frac{\left(B+3 C\right) \text{Cos}[5 d x] \text{Sin}[5 c]}{704 d}+\frac{C \text{Cos}[6 d x] \text{Sin}[6 c]}{1664 d}+\frac{\left(2134 A+1953 B+1811 C\right) \text{Cos}[c] \text{Sin}[d x]}{7392 d}+\frac{\left(7592 A+7800 B+7825 C\right) \text{Cos}[2 c] \text{Sin}[2 d x]}{74880 d}+\frac{\left(132 A+189 B+215 C\right) \text{Cos}[3 c] \text{Sin}[3 d x]}{4928 d}+\frac{\left(13 A+39 B+59 C\right) \text{Cos}[4 c] \text{Sin}[4 d x]}{3744 d}+\frac{\left(B+3 C\right) \text{Cos}[5 c] \text{Sin}[5 d x]}{704 d}+\frac{C \text{Cos}[6 c] \text{Sin}[6 d x]}{1664 d}\right)-$$

$$\left(11 A \left(a+a \text{Cos}[c+d x]\right)^3 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2}\, \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right) \Big/ \left(42 d \sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(5\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(22\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(95\,C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(462\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{60\,d}17\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$
$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$
$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$
$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$
$$\frac{1}{4\,d}B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\left.\mathrm{Tan}[c]\right)\middle/\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\ \sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\ \sqrt{\mathrm{Cos}[c]\ \mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \sqrt{1+\mathrm{Tan}[c]^2}}\ \sqrt{1+\mathrm{Tan}[c]^2}\right)-\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\ \mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \sqrt{1+\mathrm{Tan}[c]^2}}}\right)-$$

$$\frac{1}{156\,d}35\,C\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\mathrm{Csc}[c]\ \mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\ \mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\right.\right.$$

$$\left.\left.\mathrm{Tan}[c]\right)\middle/\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\ \sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\ \sqrt{\mathrm{Cos}[c]\ \mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \sqrt{1+\mathrm{Tan}[c]^2}}\ \sqrt{1+\mathrm{Tan}[c]^2}\right)-\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\ \mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\ \sqrt{1+\mathrm{Tan}[c]^2}}}\right)$$

Problem 448: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\sqrt{\mathrm{Cos}[c+d\,x]}\ \left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)dx$$

Optimal (type 4, 267 leaves, 9 steps):

$$\frac{4 a^3 (21 A+17 B+15 C) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{15 d}+\frac{4 a^3 (143 A+121 B+105 C) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{231 d}+\frac{4 a^3 (143 A+121 B+105 C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{231 d}+\frac{4 a^3 (264 A+253 B+210 C) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{1155 d}+\frac{2 C \text{Cos}[c+d x]^{3/2} (a+a \text{Cos}[c+d x])^3 \text{Sin}[c+d x]}{11 d}+\frac{2 (11 B+6 C) \text{Cos}[c+d x]^{3/2} \left(a^2+a^2 \text{Cos}[c+d x]\right)^2 \text{Sin}[c+d x]}{99 a d}+\frac{1}{693 d}2 (99 A+143 B+105 C) \text{Cos}[c+d x]^{3/2} \left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]$$

Result (type 5, 1374 leaves):

$$\sqrt{\text{Cos}[c+d x]} (a+a \text{Cos}[c+d x])^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(-\frac{(21 A+17 B+15 C) \text{Cot}[c]}{30 d}+\frac{(2354 A+2134 B+1953 C) \text{Cos}[d x] \text{Sin}[c]}{7392 d}+\frac{(54 A+73 B+75 C) \text{Cos}[2 d x] \text{Sin}[2 c]}{720 d}+\frac{(44 A+132 B+189 C) \text{Cos}[3 d x] \text{Sin}[3 c]}{4928 d}+\frac{(B+3 C) \text{Cos}[4 d x] \text{Sin}[4 c]}{288 d}+\frac{C \text{Cos}[5 d x] \text{Sin}[5 c]}{704 d}+\frac{(2354 A+2134 B+1953 C) \text{Cos}[c] \text{Sin}[d x]}{7392 d}+\frac{(54 A+73 B+75 C) \text{Cos}[2 c] \text{Sin}[2 d x]}{720 d}+\frac{(44 A+132 B+189 C) \text{Cos}[3 c] \text{Sin}[3 d x]}{4928 d}+\frac{(B+3 C) \text{Cos}[4 c] \text{Sin}[4 d x]}{288 d}+\frac{C \text{Cos}[5 c] \text{Sin}[5 d x]}{704 d}\right)-$$

$$\left(13 A (a+a \text{Cos}[c+d x])^3 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right) \Big/ \left(42 d \sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(11 B (a+a \text{Cos}[c+d x])^3 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 \mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/\left(42\,d\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-$$

$$\left(5\,C\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 \mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(22\,d\,\sqrt{1+\mathrm{Cot}[c]^2}\right)-\frac{1}{20\,d}7\,A\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\right.\right.$$

$$\left.\mathrm{Tan}[c]\right)\Big/\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\right.$$

$$\left.\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\right)-$$

$$\frac{1}{60\,d}17\,B\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\right.\right.$$

$$\left.\mathrm{Tan}[c]\right)\Big/\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{4\,d}C\,(a+a\,\text{Cos}[c+d\,x])^3\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 449: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^3\ \left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 231 leaves, 8 steps):

$$\frac{4 a^3 (27 A+21 B+17 C) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{15 d}+\frac{4 a^3 (21 A+13 B+11 C) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{21 d}+\frac{4 a^3 (42 A+41 B+32 C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{105 d}+\frac{2 C \sqrt{\text{Cos}[c+d x]} (a+a \text{Cos}[c+d x])^3 \text{Sin}[c+d x]}{9 d}+\frac{2 (3 B+2 C) \sqrt{\text{Cos}[c+d x]} \left(a^2+a^2 \text{Cos}[c+d x]\right)^2 \text{Sin}[c+d x]}{21 a d}+\frac{2 (63 A+99 B+73 C) \sqrt{\text{Cos}[c+d x]} \left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{315 d}$$

Result (type 5, 1322 leaves):

$$\sqrt{\text{Cos}[c+d x]} (a+a \text{Cos}[c+d x])^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(-\frac{(27 A+21 B+17 C) \text{Cot}[c]}{30 d}+\frac{(84 A+107 B+97 C) \text{Cos}[d x] \text{Sin}[c]}{336 d}+\frac{(18 A+54 B+73 C) \text{Cos}[2 d x] \text{Sin}[2 c]}{720 d}+\frac{(B+3 C) \text{Cos}[3 d x] \text{Sin}[3 c]}{112 d}+\frac{C \text{Cos}[4 d x] \text{Sin}[4 c]}{288 d}+\frac{(84 A+107 B+97 C) \text{Cos}[c] \text{Sin}[d x]}{336 d}+\frac{(18 A+54 B+73 C) \text{Cos}[2 c] \text{Sin}[2 d x]}{720 d}+\frac{(B+3 C) \text{Cos}[3 c] \text{Sin}[3 d x]}{112 d}+\frac{C \text{Cos}[4 c] \text{Sin}[4 d x]}{288 d}\right)-\frac{1}{2 d \sqrt{1+\text{Cot}[c]^2}}$$

$$A (a+a \text{Cos}[c+d x])^3 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\left(13 B (a+a \text{Cos}[c+d x])^3 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(42 d \sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(11\, C\, (a + a \operatorname{Cos}[c + d\, x])^3 \operatorname{Csc}[c]\, \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d\, x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d\, x}{2}\right]^6 \operatorname{Sec}[d\, x - \operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1 - \operatorname{Sin}[d\, x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1 + \operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d\, x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1 + \operatorname{Sin}[d\, x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/$$

$$\left(42\, d \sqrt{1 + \operatorname{Cot}[c]^2}\right) - \frac{1}{20\, d} 9\, A\, (a + a \operatorname{Cos}[c + d\, x])^3 \operatorname{Csc}[c] \operatorname{Sec}\left[\frac{c}{2} + \frac{d\, x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \operatorname{Cos}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]]^2\right] \operatorname{Sin}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]\right) \Big/ \left(\sqrt{1 - \operatorname{Cos}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{1 + \operatorname{Cos}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1 + \operatorname{Tan}[c]^2}} \sqrt{1 + \operatorname{Tan}[c]^2}\right) - \frac{\frac{\operatorname{Sin}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]}{\sqrt{1 + \operatorname{Tan}[c]^2}} + \frac{2 \operatorname{Cos}[c]^2 \operatorname{Cos}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1 + \operatorname{Tan}[c]^2}}{\operatorname{Cos}[c]^2 + \operatorname{Sin}[c]^2}}{\sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1 + \operatorname{Tan}[c]^2}}}\right) -$$

$$\frac{1}{20\, d} 7\, B\, (a + a \operatorname{Cos}[c + d\, x])^3 \operatorname{Csc}[c] \operatorname{Sec}\left[\frac{c}{2} + \frac{d\, x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \operatorname{Cos}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]]^2\right] \operatorname{Sin}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]\right) \Big/ \left(\sqrt{1 - \operatorname{Cos}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{1 + \operatorname{Cos}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1 + \operatorname{Tan}[c]^2}} \sqrt{1 + \operatorname{Tan}[c]^2}\right) - \frac{\frac{\operatorname{Sin}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]}{\sqrt{1 + \operatorname{Tan}[c]^2}} + \frac{2 \operatorname{Cos}[c]^2 \operatorname{Cos}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1 + \operatorname{Tan}[c]^2}}{\operatorname{Cos}[c]^2 + \operatorname{Sin}[c]^2}}{\sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d\, x + \operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1 + \operatorname{Tan}[c]^2}}}\right) -$$

$$\frac{1}{60\,d}17\,C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 450: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 229 leaves, 8 steps):

$$\frac{4\,a^3\,(5\,A+9\,B+7\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{4\,a^3\,(35\,A+21\,B+13\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}-$$

$$\frac{4\,a^3\,(35\,A-42\,B-41\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,d}+\frac{2\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}-$$

$$\frac{2\,(7\,A-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{7\,a\,d}-$$

$$\frac{2\,(35\,A-7\,B-11\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{35\,d}$$

Result (type 5, 1313 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(-\frac{1}{40\,d}(5\,A+18\,B+14\,C+15\,A\,\text{Cos}[2\,c]+18\,B\,\text{Cos}[2\,c]+14\,C\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]+\right.$$

$$\frac{(28\,A+84\,B+107\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{336\,d}+\frac{(B+3\,C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{40\,d}+\frac{C\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{112\,d}+$$

$$\frac{(28\,A+84\,B+107\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{336\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{4\,d}+$$

$$\left.\frac{(B+3\,C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{40\,d}+\frac{C\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{112\,d}\right)-\frac{1}{6\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$5\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{2\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$B\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\left(13\,C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(42\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{4\,d}A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{20\,d}9\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{20\,d}7\,C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

Problem 451: Result unnecessarily involves higher level functions and more

than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\mathrm{Cos}[c+d\,x])^3\,(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2)}{\mathrm{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 227 leaves, 8 steps):

$$-\frac{4\,a^3\,(5\,A-5\,B-9\,C)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{4\,a^3\,(5\,A+5\,B+3\,C)\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}-\frac{4\,a^3\,(20\,A+5\,B-6\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{15\,d}+\frac{2\,A\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sin}[c+d\,x]}{3\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}+\frac{2\,(2\,A+B)\,(a^2+a^2\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sin}[c+d\,x]}{a\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}-\frac{2\,(35\,A+15\,B-3\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,(a^3+a^3\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sin}[c+d\,x]}{15\,d}$$

Result (type 5, 1297 leaves):

$$\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(-\frac{1}{40\,d}(-25\,A+5\,B+18\,C+5\,A\,\mathrm{Cos}[2\,c]+15\,B\,\mathrm{Cos}[2\,c]+18\,C\,\mathrm{Cos}[2\,c])\,\mathrm{Csc}[c]\,\mathrm{Sec}[c]+\frac{(B+3\,C)\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{12\,d}+\frac{C\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{40\,d}+\frac{(B+3\,C)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{12\,d}+\frac{A\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}[d\,x]}{12\,d}+\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,(A\,\mathrm{Sin}[c]+9\,A\,\mathrm{Sin}[d\,x]+3\,B\,\mathrm{Sin}[d\,x])}{12\,d}+\frac{C\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{40\,d}\right)-\frac{1}{6\,d\,\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$5\,A\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}-\frac{1}{6\,d\,\sqrt{1+\mathrm{Cot}[c]^2}}$$

$$5\,B\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}[c]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;-\;\frac{1}{2\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$C\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;+$$

$$\frac{1}{4\,d}A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)\;-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\;-$$

$$\frac{1}{4\,d}B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)\;-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{20\,d}9\,C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 452: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^3\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 230 leaves, 8 steps):

$$-\frac{4\,a^3\,(9\,A+5\,B-5\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{4\,a^3\,(3\,A+5\,(B+C))\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}-\frac{4\,a^3\,(21\,A+20\,B+5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d}+\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,(6\,A+5\,B)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{15\,a\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,(33\,A+35\,B+15\,C)\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 1298 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(-\frac{(-36\,A-25\,B+5\,C+5\,B\,\text{Cos}[2\,c]+15\,C\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{40\,d}+\right.$$

$$\frac{C\,\text{Cos}[d\,x]\,\text{Sin}[c]}{12\,d}+\frac{C\,\text{Cos}[c]\,\text{Sin}[d\,x]}{12\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{20\,d}+$$

$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(3\,A\,\text{Sin}[c]+15\,A\,\text{Sin}[d\,x]+5\,B\,\text{Sin}[d\,x])}{60\,d}+\frac{1}{60\,d}$$

$$\left.\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(15\,A\,\text{Sin}[c]+5\,B\,\text{Sin}[c]+54\,A\,\text{Sin}[d\,x]+45\,B\,\text{Sin}[d\,x]+15\,C\,\text{Sin}[d\,x])\right)-$$

$$\frac{1}{2\,d\,\sqrt{1+\text{Cot}[c]^2}}A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},$$

$$\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{6\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$5\,B\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{6\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$5\,C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\frac{1}{20\,d}9\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6$$

$$\left(\left(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+$$

$$\frac{1}{4\,d}B\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-$$

$$\frac{1}{4\,d}C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\frac{\frac{\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)$$

Problem 453: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d x])^3\,\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)}{\text{Cos}[c+d x]^{9/2}}\,dx$$

Optimal (type 4, 231 leaves, 8 steps):

$$-\frac{4 a^3 (7 A+9 B+5 C)\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5 d}+\frac{4 a^3 (13 A+21 B+35 C)\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{21 d}+$$
$$\frac{4 a^3 (106 A+147 B+140 C)\,\text{Sin}[c+d x]}{105 d\sqrt{\text{Cos}[c+d x]}}+\frac{2 A\,(a+a\,\text{Cos}[c+d x])^3\,\text{Sin}[c+d x]}{7 d\,\text{Cos}[c+d x]^{7/2}}+$$
$$\frac{2 (6 A+7 B)\left(a^2+a^2\,\text{Cos}[c+d x]\right)^2\text{Sin}[c+d x]}{35\,a\,d\,\text{Cos}[c+d x]^{5/2}}+\frac{2 (7 A+9 B+5 C)\left(a^3+a^3\,\text{Cos}[c+d x]\right)\text{Sin}[c+d x]}{15 d\,\text{Cos}[c+d x]^{3/2}}$$

Result (type 5, 1317 leaves):

$$\sqrt{\text{Cos}[c+d x]}\,(a+a\,\text{Cos}[c+d x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$
$$\Bigg(-\frac{(-28 A-36 B-25 C+5 C\,\text{Cos}[2 c])\,\text{Csc}[c]\,\text{Sec}[c]}{40 d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d x]^4\,\text{Sin}[d x]}{28 d}+$$
$$\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^3\,(5 A\,\text{Sin}[c]+21 A\,\text{Sin}[d x]+7 B\,\text{Sin}[d x])}{140 d}+\frac{1}{420 d}\text{Sec}[c]$$
$$\text{Sec}[c+d x]^2\,(63 A\,\text{Sin}[c]+21 B\,\text{Sin}[c]+130 A\,\text{Sin}[d x]+105 B\,\text{Sin}[d x]+35 C\,\text{Sin}[d x])+$$
$$\frac{1}{420 d}\text{Sec}[c]\,\text{Sec}[c+d x]\,(130 A\,\text{Sin}[c]+105 B\,\text{Sin}[c]+35 C\,\text{Sin}[c]+$$
$$294 A\,\text{Sin}[d x]+378 B\,\text{Sin}[d x]+315 C\,\text{Sin}[d x])\Bigg)-$$
$$\Bigg(13 A\,(a+a\,\text{Cos}[c+d x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$
$$\left(42 d\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{2 d\sqrt{1+\text{Cot}[c]^2}}B\,(a+a\,\text{Cos}[c+d x])^3\,\text{Csc}[c]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;-\;\frac{1}{6\,d\sqrt{1+\text{Cot}[c]^2}}$$

$$5\,C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\;\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\;\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;+$$

$$\frac{1}{20\,d}7\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\;\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}\;\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\;\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\;\sqrt{1+\text{Tan}[c]^2}}}\right)+$$

$$\frac{1}{20\,d}9\,B\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\;\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\Bigg) -$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\Bigg) +$$

$$\frac{1}{4\,d}C\ (a+a\,\text{Cos}[c+d\,x])^3\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\Bigg(\Bigg(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]$$

$$\text{Tan}[c]\Bigg)\Big/\Bigg(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}$$

$$\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\Bigg) -$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\Bigg)$$

Problem 454: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\text{Cos}[c+d\,x])^3\ (A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2)}{\text{Cos}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 267 leaves, 9 steps):

$$-\frac{4 a^3 (17 A+21 B+27 C) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{15 d}+\frac{4 a^3 (11 A+13 B+21 C) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{21 d}+\frac{4 a^3 (32 A+41 B+42 C) \text{Sin}[c+d x]}{105 d \text{Cos}[c+d x]^{3/2}}+\frac{4 a^3 (17 A+21 B+27 C) \text{Sin}[c+d x]}{15 d \sqrt{\text{Cos}[c+d x]}}+\frac{2 A (a+a \text{Cos}[c+d x])^3 \text{Sin}[c+d x]}{9 d \text{Cos}[c+d x]^{9/2}}+\frac{2 (2 A+3 B) \left(a^2+a^2 \text{Cos}[c+d x]\right)^2 \text{Sin}[c+d x]}{21 a d \text{Cos}[c+d x]^{7/2}}+\frac{2 (73 A+99 B+63 C) \left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{315 d \text{Cos}[c+d x]^{5/2}}$$

Result (type 5, 1364 leaves):

$$\sqrt{\text{Cos}[c+d x]} (a+a \text{Cos}[c+d x])^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(\frac{(17 A+21 B+27 C) \text{Csc}[c] \text{Sec}[c]}{30 d}+\frac{A \text{Sec}[c] \text{Sec}[c+d x]^5 \text{Sin}[d x]}{36 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^4 (7 A \text{Sin}[c]+27 A \text{Sin}[d x]+9 B \text{Sin}[d x])}{252 d}+\frac{1}{1260 d}\text{Sec}[c] \text{Sec}[c+d x]^3 (135 A \text{Sin}[c]+45 B \text{Sin}[c]+238 A \text{Sin}[d x]+189 B \text{Sin}[d x]+63 C \text{Sin}[d x])+\frac{1}{1260 d}\text{Sec}[c] \text{Sec}[c+d x]^2 (238 A \text{Sin}[c]+189 B \text{Sin}[c]+63 C \text{Sin}[c]+330 A \text{Sin}[d x]+390 B \text{Sin}[d x]+315 C \text{Sin}[d x])+\frac{1}{420 d}\text{Sec}[c] \text{Sec}[c+d x] (110 A \text{Sin}[c]+130 B \text{Sin}[c]+105 C \text{Sin}[c]+238 A \text{Sin}[d x]+294 B \text{Sin}[d x]+378 C \text{Sin}[d x])\right)-$$

$$\left(11 A (a+a \text{Cos}[c+d x])^3 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right) \Big/ \left(42 d \sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(13 B (a+a \text{Cos}[c+d x])^3 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(42\, d\, \sqrt{1+\text{Cot}[c]^2}\right) - \frac{1}{2\, d\, \sqrt{1+\text{Cot}[c]^2}} C\, (a + a\,\text{Cos}[c+d\,x])^3\, \text{Csc}[c]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^6 \text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]} +$$

$$\frac{1}{60\, d} 17\, A\, (a + a\,\text{Cos}[c+d\,x])^3\, \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^6$$

$$\Bigg(\Bigg(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \text{Cos}[d\,x + \text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d\,x + \text{ArcTan}[\text{Tan}[c]]]$$

$$\text{Tan}[c]\Bigg) \Big/ \Bigg(\sqrt{1 - \text{Cos}[d\,x + \text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1 + \text{Cos}[d\,x + \text{ArcTan}[\text{Tan}[c]]]}$$

$$\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x + \text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\Bigg) -$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}} + \frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x + \text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\Bigg) +$$

$$\frac{1}{20\, d} 7\, B\, (a + a\,\text{Cos}[c+d\,x])^3\, \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^6$$

$$\Bigg(\Bigg(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \text{Cos}[d\,x + \text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d\,x + \text{ArcTan}[\text{Tan}[c]]]$$

$$\text{Tan}[c]\Bigg) \Big/ \Bigg(\sqrt{1 - \text{Cos}[d\,x + \text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1 + \text{Cos}[d\,x + \text{ArcTan}[\text{Tan}[c]]]}$$

$$\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x + \text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\Bigg) -$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+$$

$$\frac{1}{20\,d}9\,C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 455: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^3\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{13/2}}\,dx$$

Optimal (type 4, 303 leaves, 10 steps):

$$-\frac{4\,a^3\,(15\,A+17\,B+21\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+$$
$$\frac{4\,a^3\,(105\,A+121\,B+143\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{231\,d}+\frac{4\,a^3\,(210\,A+253\,B+264\,C)\,\text{Sin}[c+d\,x]}{1155\,d\,\text{Cos}[c+d\,x]^{5/2}}+$$
$$\frac{4\,a^3\,(105\,A+121\,B+143\,C)\,\text{Sin}[c+d\,x]}{231\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{4\,a^3\,(15\,A+17\,B+21\,C)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}}+$$
$$\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sin}[c+d\,x]}{11\,d\,\text{Cos}[c+d\,x]^{11/2}}+\frac{2\,(6\,A+11\,B)\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{99\,a\,d\,\text{Cos}[c+d\,x]^{9/2}}+$$
$$\frac{2\,(105\,A+143\,B+99\,C)\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{693\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 1418 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\ \left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$
$$\left(\frac{(15\,A+17\,B+21\,C)\,\text{Csc}[c]\,\text{Sec}[c]}{30\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^6\,\text{Sin}[d\,x]}{44\,d}+\right.$$
$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^5\,(9\,A\,\text{Sin}[c]+33\,A\,\text{Sin}[d\,x]+11\,B\,\text{Sin}[d\,x])}{396\,d}+\frac{1}{2772\,d}\text{Sec}[c]$$
$$\text{Sec}[c+d\,x]^4\,(231\,A\,\text{Sin}[c]+77\,B\,\text{Sin}[c]+378\,A\,\text{Sin}[d\,x]+297\,B\,\text{Sin}[d\,x]+99\,C\,\text{Sin}[d\,x])+$$
$$\frac{1}{2310\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(525\,A\,\text{Sin}[c]+605\,B\,\text{Sin}[c]+715\,C\,\text{Sin}[c]+$$
$$1155\,A\,\text{Sin}[d\,x]+1309\,B\,\text{Sin}[d\,x]+1617\,C\,\text{Sin}[d\,x])+\frac{1}{13\,860\,d}$$
$$\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,(1890\,A\,\text{Sin}[c]+1485\,B\,\text{Sin}[c]+495\,C\,\text{Sin}[c]+2310\,A\,\text{Sin}[d\,x]+$$
$$2618\,B\,\text{Sin}[d\,x]+2079\,C\,\text{Sin}[d\,x])+\frac{1}{13\,860\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(2310\,A\,\text{Sin}[c]+$$
$$\left.2618\,B\,\text{Sin}[c]+2079\,C\,\text{Sin}[c]+3150\,A\,\text{Sin}[d\,x]+3630\,B\,\text{Sin}[d\,x]+4290\,C\,\text{Sin}[d\,x])\right)-$$

$$\left(5\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(22\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(11\,B\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(42\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(13\,C\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(42\, d \sqrt{1+\text{Cot}[c]^2}\right) + \frac{1}{4\, d} A \left(a + a \,\text{Cos}[c+d\, x]\right)^3 \text{Csc}[c]\, \text{Sec}\left[\frac{c}{2}+\frac{d\, x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\, x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d\, x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right) \Big/ \left(\sqrt{1-\text{Cos}[d\, x+\text{ArcTan}[\text{Tan}[c]]]}\, \sqrt{1+\text{Cos}[d\, x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\, \text{Cos}[d\, x+\text{ArcTan}[\text{Tan}[c]]]\, \sqrt{1+\text{Tan}[c]^2}}\, \sqrt{1+\text{Tan}[c]^2}\right) -$$

$$\left.\frac{\frac{\text{Sin}[d\, x+\text{ArcTan}[\text{Tan}[c]]]\, \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}} + \frac{2\, \text{Cos}[c]^2\, \text{Cos}[d\, x+\text{ArcTan}[\text{Tan}[c]]]\, \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\, \text{Cos}[d\, x+\text{ArcTan}[\text{Tan}[c]]]\, \sqrt{1+\text{Tan}[c]^2}}}\right) +$$

$$\frac{1}{60\, d} 17\, B \left(a + a \,\text{Cos}[c+d\, x]\right)^3 \text{Csc}[c]\, \text{Sec}\left[\frac{c}{2}+\frac{d\, x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\, x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d\, x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right) \Big/ \left(\sqrt{1-\text{Cos}[d\, x+\text{ArcTan}[\text{Tan}[c]]]}\, \sqrt{1+\text{Cos}[d\, x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\, \text{Cos}[d\, x+\text{ArcTan}[\text{Tan}[c]]]\, \sqrt{1+\text{Tan}[c]^2}}\, \sqrt{1+\text{Tan}[c]^2}\right) -$$

$$\left.\frac{\frac{\text{Sin}[d\, x+\text{ArcTan}[\text{Tan}[c]]]\, \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}} + \frac{2\, \text{Cos}[c]^2\, \text{Cos}[d\, x+\text{ArcTan}[\text{Tan}[c]]]\, \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\, \text{Cos}[d\, x+\text{ArcTan}[\text{Tan}[c]]]\, \sqrt{1+\text{Tan}[c]^2}}}\right) +$$

$$\frac{1}{20\, d} 7\, C \left(a + a \,\text{Cos}[c+d\, x]\right)^3 \text{Csc}[c]\, \text{Sec}\left[\frac{c}{2}+\frac{d\, x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\, x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d\, x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\text{Tan}[c]\Big) \Big/ \Big(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}$$
$$\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\Big) -$$
$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\Bigg)$$

Problem 456: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d\,x]^{5/2}\ \left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 4, 210 leaves, 7 steps):

$$-\frac{3\,(5\,A-7\,B+7\,C)\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,a\,d}+\frac{5\,(7\,A-7\,B+9\,C)\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,a\,d}+$$
$$\frac{5\,(7\,A-7\,B+9\,C)\ \sqrt{\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{21\,a\,d}-\frac{(5\,A-7\,B+7\,C)\ \text{Cos}[c+d\,x]^{3/2}\ \text{Sin}[c+d\,x]}{5\,a\,d}+$$
$$\frac{(7\,A-7\,B+9\,C)\ \text{Cos}[c+d\,x]^{5/2}\ \text{Sin}[c+d\,x]}{7\,a\,d}-\frac{(A-B+C)\ \text{Cos}[c+d\,x]^{7/2}\ \text{Sin}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1752 leaves):

$$-\Bigg(\Bigg(3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\ \text{Csc}\left[\frac{c}{2}\right]\ \text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\ \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,(1+e^{2\,i\,d\,x})\ \text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\ \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$
$$\left(3\,i\,d\,(1+e^{2\,i\,d\,x})\ \text{Cos}[c]-3\,d\,(-1+e^{2\,i\,d\,x})\ \text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,(1+e^{2\,i\,d\,x})\ \text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\ \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$
$$\left(-i\,d\,(1+e^{2\,i\,d\,x})\ \text{Cos}[c]+d\,(-1+e^{2\,i\,d\,x})\ \text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(4\,(a+a\,\text{Cos}[c+d\,x])\right)\Bigg)+\Bigg(21\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.\right.$$

$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$

$$\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$

$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$

$$\left.\left.\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)\right)\Big/$$

$$\left(20\left(a+a\,\text{Cos}[c+d\,x]\right)\right)-\left(21\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\right.$$

$$\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.\right.$$

$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$

$$\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$

$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$

$$\left.\left.\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)\right)\Big/$$

$$\left(20\left(a+a\,\text{Cos}[c+d\,x]\right)\right)+\frac{1}{a+a\,\text{Cos}[c+d\,x]}$$

$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\sqrt{\text{Cos}[c+d\,x]}$$

$$\left(\frac{2\left(5\,A-5\,B+5\,C+10\,A\,\text{Cos}[c]-16\,B\,\text{Cos}[c]+16\,C\,\text{Cos}[c]\right)\text{Csc}[c]}{5\,d}+\right.$$

$$\frac{(28 A - 28 B + 51 C) \operatorname{Cos}[d x] \operatorname{Sin}[c]}{21 d} +$$
$$\frac{2 (B - C) \operatorname{Cos}[2 d x] \operatorname{Sin}[2 c]}{5 d} +$$
$$\frac{C \operatorname{Cos}[3 d x] \operatorname{Sin}[3 c]}{7 d} +$$
$$\frac{2 \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right] \left(A \operatorname{Sin}\left[\frac{d x}{2}\right] - B \operatorname{Sin}\left[\frac{d x}{2}\right] + C \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{d} +$$
$$\frac{(28 A - 28 B + 51 C) \operatorname{Cos}[c] \operatorname{Sin}[d x]}{21 d} +$$
$$\frac{2 (B - C) \operatorname{Cos}[2 c] \operatorname{Sin}[2 d x]}{5 d} +$$
$$\left.\frac{C \operatorname{Cos}[3 c] \operatorname{Sin}[3 d x]}{7 d}\right) -$$

$$\left(5 A \operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right]\right.$$
$$\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]$$
$$\sqrt{1 - \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1 + \operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$
$$\left.\sqrt{1 + \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/$$
$$\left(3 d (a + a \operatorname{Cos}[c + d x]) \sqrt{1 + \operatorname{Cot}[c]^2}\right) +$$

$$\left(5 B \operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right]\right.$$
$$\operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right]$$
$$\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]$$
$$\sqrt{1 - \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1 + \operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$
$$\left.\sqrt{1 + \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/$$
$$\left(3 d (a + a \operatorname{Cos}[c + d x]) \sqrt{1 + \operatorname{Cot}[c]^2}\right) -$$

$$\left(15\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$
$$\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$
$$\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$
$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\left.\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$
$$\left(7\,d\,(a+a\,\mathrm{Cos}[c+d\,x])\sqrt{1+\mathrm{Cot}[c]^2}\right)$$

Problem 457: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+d\,x]^{3/2}\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{a+a\,\mathrm{Cos}[c+d\,x]}\,dx$$

Optimal (type 4, 174 leaves, 6 steps):

$$\frac{3\,(5\,A-5\,B+7\,C)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,a\,d}-\frac{(3\,A-5\,B+5\,C)\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a\,d}-\frac{(3\,A-5\,B+5\,C)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{3\,a\,d}+\frac{(5\,A-5\,B+7\,C)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{5\,a\,d}-\frac{(A-B+C)\,\mathrm{Cos}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{d\,(a+a\,\mathrm{Cos}[c+d\,x])}$$

Result (type 5, 1697 leaves):

$$\left(3\,i\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)-$$
$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/$$

$$\left(-i\, d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(4\left(a+a \operatorname{Cos}[c+d x]\right)\right)-\left(3\, i\, B \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(\left(2\, e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x}\left(\operatorname{Cos}[c]+i \operatorname{Sin}[c]\right)^2\right]\right.\right.$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2\, i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i\, e^{2 i d x} \operatorname{Sin}[2 c]}\right)\Big/$$

$$\left(3\, i\, d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x}\left(\operatorname{Cos}[c]+i \operatorname{Sin}[c]\right)^2\right]\right.$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2\, i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i\, e^{2 i d x} \operatorname{Sin}[2 c]}\right)\Big/$$

$$\left(-i\, d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(4\left(a+a \operatorname{Cos}[c+d x]\right)\right)+\left(21\, i\, C \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right]\right.$$

$$\operatorname{Sec}\left[\frac{c}{2}\right]$$

$$\left(\left(2\, e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x}\left(\operatorname{Cos}[c]+i \operatorname{Sin}[c]\right)^2\right]\right.\right.$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2\, i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i\, e^{2 i d x} \operatorname{Sin}[2 c]}\right)\Big/$$

$$\left(3\, i\, d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-$$

$$\left(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x}\left(\operatorname{Cos}[c]+i \operatorname{Sin}[c]\right)^2\right]\right.$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2\, i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i\, e^{2 i d x} \operatorname{Sin}[2 c]}\right)\Big/$$

$$\left(-i\, d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(20\left(a+a \operatorname{Cos}[c+d x]\right)\right)+\frac{1}{a+a \operatorname{Cos}[c+d x]}$$

$$\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\sqrt{\operatorname{Cos}[c+d x]}$$

$$\left(-\frac{1}{5 d} 2\left(5 A-5 B+5 C+10 A \operatorname{Cos}[c]-10 B \operatorname{Cos}[c]+16 C \operatorname{Cos}[c]\right) \operatorname{Csc}[c]+\right.$$

$$\frac{4\left(B-C\right) \operatorname{Cos}[d x] \operatorname{Sin}[c]}{3 d}+$$

$$\frac{2 C \operatorname{Cos}[2 d x] \operatorname{Sin}[2 c]}{5 d}-$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+$$

$$\frac{4\,(B-C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+$$

$$\left.\frac{2\,C\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}\right)+$$

$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(5\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\left(5\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

Problem 458: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 4, 134 leaves, 5 steps):

$$-\frac{(A-3\,B+3\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{a\,d}+\frac{(3\,A-3\,B+5\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,a\,d}+\frac{(3\,A-3\,B+5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a\,d}-\frac{(A-B+C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1644 leaves):

$$-\Bigg(\Bigg(\bigg(i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/$$
$$\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Bigg/$$
$$(4\,(a+a\,\text{Cos}[c+d\,x]))\Bigg)+\Bigg(3\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$
$$\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\Bigg) \Bigg/$$
$$\left(3 i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-$$
$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4},-e^{2 i d x}(\operatorname{Cos}[c]+i \operatorname{Sin}[c])^{2}\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\Bigg) \Bigg/$$
$$\left(-i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\Bigg)\Bigg) \Bigg/$$
$$(4(a+a \operatorname{Cos}[c+d x]))-\Bigg(3 i C \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^{2}$$
$$\operatorname{Csc}\left[\frac{c}{2}\right]$$
$$\operatorname{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4},-e^{2 i d x}(\operatorname{Cos}[c]+i \operatorname{Sin}[c])^{2}\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\Bigg) \Bigg/$$
$$\left(3 i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)-$$
$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4},-e^{2 i d x}(\operatorname{Cos}[c]+i \operatorname{Sin}[c])^{2}\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \operatorname{Cos}[2 c]+i e^{2 i d x} \operatorname{Sin}[2 c]}\Bigg) \Bigg/$$
$$\left(-i d\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)\Bigg)\Bigg) \Bigg/$$
$$(4(a+a \operatorname{Cos}[c+d x]))+\frac{1}{a+a \operatorname{Cos}[c+d x]}$$
$$\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^{2}$$
$$\sqrt{\operatorname{Cos}[c+d x]}$$
$$\Bigg(-\frac{2(-A+B-C+2 B \operatorname{Cos}[c]-2 C \operatorname{Cos}[c]) \operatorname{Csc}[c]}{d}+$$
$$\frac{4 C \operatorname{Cos}[d x] \operatorname{Sin}[c]}{3 d}+$$
$$\frac{2 \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(A \operatorname{Sin}\left[\frac{d x}{2}\right]-B \operatorname{Sin}\left[\frac{d x}{2}\right]+C \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{d}+$$
$$\frac{4 C \operatorname{Cos}[c] \operatorname{Sin}[d x]}{3 d}\Bigg)-$$

$$\left(A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/ \left(d\,(a + a \operatorname{Cos}[c + d x]) \sqrt{1+\operatorname{Cot}[c]^2}\right) +$$

$$\left(B \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/ \left(d\,(a + a \operatorname{Cos}[c + d x]) \sqrt{1+\operatorname{Cot}[c]^2}\right) -$$

$$\left(5\, C \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/ \left(3\, d\,(a + a \operatorname{Cos}[c + d x]) \sqrt{1+\operatorname{Cot}[c]^2}\right)$$

Problem 459: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)}\,dx$$

Optimal (type 4, 90 leaves, 4 steps):

$$\frac{(A-B+3\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}+\frac{(A+B-C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}-\frac{(A-B+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\left(a+a\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1607 leaves):

$$\Bigg(i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$
$$\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(4\,\left(a+a\,\text{Cos}[c+d\,x]\right)\right)-\Bigg(i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$
$$\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(4\left(a+a\,\mathrm{Cos}[c+d\,x]\right)\right)+\left(3\,\mathrm{i}\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\mathrm{Sec}\left[\frac{c}{2}\right]$$

$$\left(\left(2\,e^{2\,\mathrm{i}\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,\mathrm{i}\,d\,x}\left(\mathrm{Cos}[c]+\mathrm{i}\,\mathrm{Sin}[c]\right)^2\right]\right.\right.$$

$$\sqrt{e^{-\mathrm{i}\,d\,x}\left(2\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Cos}[c]+2\,\mathrm{i}\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2\,\mathrm{i}\,d\,x}\,\mathrm{Cos}[2\,c]+\mathrm{i}\,e^{2\,\mathrm{i}\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/$$

$$\left(3\,\mathrm{i}\,d\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Sin}[c]\right)-$$

$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,\mathrm{i}\,d\,x}\left(\mathrm{Cos}[c]+\mathrm{i}\,\mathrm{Sin}[c]\right)^2\right]\right.$$

$$\sqrt{e^{-\mathrm{i}\,d\,x}\left(2\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Cos}[c]+2\,\mathrm{i}\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2\,\mathrm{i}\,d\,x}\,\mathrm{Cos}[2\,c]+\mathrm{i}\,e^{2\,\mathrm{i}\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/$$

$$\left.\left.\left.\left(-\mathrm{i}\,d\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Cos}[c]+d\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Sin}[c]\right)\right)\right)\right/$$

$$\left(4\left(a+a\,\mathrm{Cos}[c+d\,x]\right)\right)+\frac{1}{a+a\,\mathrm{Cos}[c+d\,x]}$$

$$\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\sqrt{\mathrm{Cos}[c+d\,x]}$$

$$\left(-\frac{2\left(A-B+C+2\,C\,\mathrm{Cos}[c]\right)\mathrm{Csc}[c]}{d}-\right.$$

$$\left.\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}\right)-$$

$$\left(A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$

$$\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(d\left(a+a\,\mathrm{Cos}[c+d\,x]\right)\sqrt{1+\mathrm{Cot}[c]^2}\right)-$$

$$\left(B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\bigg/$$

$$\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\left(C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\bigg/$$

$$\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

Problem 460: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])}\,dx$$

Optimal (type 4, 125 leaves, 5 steps):

$$-\frac{(3\,A-B+C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}-\frac{(A-B-C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}+\frac{(3\,A-B+C)\,\text{Sin}[c+d\,x]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1642 leaves):

$$-\left(\left(3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\right.\right.$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.\right.$$

$$\sqrt{e^{-i\,d\,x}\left(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/$$
$$\left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/$$
$$\left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg) \Bigg/$$
$$(4 (a+a \text{Cos}[c+d x]))\Bigg)+\Bigg(i B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$
$$\text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/$$
$$\left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/$$
$$\left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg) \Bigg/$$
$$(4 (a+a \text{Cos}[c+d x]))-\Bigg(i C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$
$$\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Bigg/$$
$$\left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/$$

$$\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\Bigg)\Bigg)\Bigg/$$

$$\left(4\,\left(a+a\,\text{Cos}[c+d\,x]\right)\right)+\frac{1}{a+a\,\text{Cos}[c+d\,x]}$$

$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\sqrt{\text{Cos}[c+d\,x]}$$

$$\left(\frac{\left(2\,A+A\,\text{Cos}[c]-B\,\text{Cos}[c]+C\,\text{Cos}[c]\right)\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]}{d}+\right.$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+$$

$$\left.\frac{4\,A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}\right)+$$

$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.\right.$$

$$\left.\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Bigg/$$

$$\left(d\,\left(a+a\,\text{Cos}[c+d\,x]\right)\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Bigg/$$

$$\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right) - \left(C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\bigg/$$
$$\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

Problem 461: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Cos}[c+d\,x])}\,dx$$

Optimal (type 4, 165 leaves, 6 steps):

$$\frac{(3\,A-3\,B+C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}+\frac{(5\,A-3\,B+3\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a\,d}+$$
$$\frac{(5\,A-3\,B+3\,C)\,\text{Sin}[c+d\,x]}{3\,a\,d\,\text{Cos}[c+d\,x]^{3/2}}-\frac{(3\,A-3\,B+C)\,\text{Sin}[c+d\,x]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{d\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1686 leaves):

$$\left(3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\bigg/$$
$$\left(3\,i\,d\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]-3\,d\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\bigg/$$

$$\left(-\mathrm{i}\, d \left(1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Cos}[c] + d \left(-1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Sin}[c]\right)\Big)\Big) \Big/$$

$$\left(4 \left(a + a\,\mathrm{Cos}[c+d\,x]\right)\right) - \Bigg(3\,\mathrm{i}\, B\, \mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2 \mathrm{Csc}\left[\frac{c}{2}\right] \mathrm{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\, e^{2\,\mathrm{i}\,d\,x}\, \mathrm{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2\,\mathrm{i}\,d\,x} \left(\mathrm{Cos}[c] + \mathrm{i}\,\mathrm{Sin}[c]\right)^2\right]$$

$$\sqrt{e^{-\mathrm{i}\,d\,x} \left(2 \left(1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Cos}[c] + 2\,\mathrm{i} \left(-1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Sin}[c]\right)}$$

$$\sqrt{1 + e^{2\,\mathrm{i}\,d\,x}\, \mathrm{Cos}[2\,c] + \mathrm{i}\, e^{2\,\mathrm{i}\,d\,x}\, \mathrm{Sin}[2\,c]}\Bigg) \Big/$$

$$\left(3\,\mathrm{i}\, d \left(1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Cos}[c] - 3\, d \left(-1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Sin}[c]\right) -$$

$$\Bigg(2\, \mathrm{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2\,\mathrm{i}\,d\,x} \left(\mathrm{Cos}[c] + \mathrm{i}\,\mathrm{Sin}[c]\right)^2\right]$$

$$\sqrt{e^{-\mathrm{i}\,d\,x} \left(2 \left(1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Cos}[c] + 2\,\mathrm{i} \left(-1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Sin}[c]\right)}$$

$$\sqrt{1 + e^{2\,\mathrm{i}\,d\,x}\, \mathrm{Cos}[2\,c] + \mathrm{i}\, e^{2\,\mathrm{i}\,d\,x}\, \mathrm{Sin}[2\,c]}\Bigg) \Big/$$

$$\left(-\mathrm{i}\, d \left(1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Cos}[c] + d \left(-1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Sin}[c]\right)\Big)\Big) \Big/$$

$$\left(4 \left(a + a\,\mathrm{Cos}[c+d\,x]\right)\right) + \Bigg(\mathrm{i}\, C\, \mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2 \mathrm{Csc}\left[\frac{c}{2}\right] \mathrm{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\, e^{2\,\mathrm{i}\,d\,x}\, \mathrm{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2\,\mathrm{i}\,d\,x} \left(\mathrm{Cos}[c] + \mathrm{i}\,\mathrm{Sin}[c]\right)^2\right]$$

$$\sqrt{e^{-\mathrm{i}\,d\,x} \left(2 \left(1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Cos}[c] + 2\,\mathrm{i} \left(-1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Sin}[c]\right)}$$

$$\sqrt{1 + e^{2\,\mathrm{i}\,d\,x}\, \mathrm{Cos}[2\,c] + \mathrm{i}\, e^{2\,\mathrm{i}\,d\,x}\, \mathrm{Sin}[2\,c]}\Bigg) \Big/$$

$$\left(3\,\mathrm{i}\, d \left(1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Cos}[c] - 3\, d \left(-1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Sin}[c]\right) -$$

$$\Bigg(2\, \mathrm{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2\,\mathrm{i}\,d\,x} \left(\mathrm{Cos}[c] + \mathrm{i}\,\mathrm{Sin}[c]\right)^2\right]$$

$$\sqrt{e^{-\mathrm{i}\,d\,x} \left(2 \left(1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Cos}[c] + 2\,\mathrm{i} \left(-1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Sin}[c]\right)}$$

$$\sqrt{1 + e^{2\,\mathrm{i}\,d\,x}\, \mathrm{Cos}[2\,c] + \mathrm{i}\, e^{2\,\mathrm{i}\,d\,x}\, \mathrm{Sin}[2\,c]}\Bigg) \Big/$$

$$\left(-\mathrm{i}\, d \left(1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Cos}[c] + d \left(-1+e^{2\,\mathrm{i}\,d\,x}\right) \mathrm{Sin}[c]\right)\Big)\Big) \Big/$$

$$\left(4 \left(a + a\,\mathrm{Cos}[c+d\,x]\right)\right) + \frac{1}{a + a\,\mathrm{Cos}[c+d\,x]}$$

$$\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\sqrt{\mathrm{Cos}[c+d\,x]}$$

$$\Bigg(-\frac{1}{d}\left(2\,A - 2\,B + A\,\mathrm{Cos}[c] - B\,\mathrm{Cos}[c] + C\,\mathrm{Cos}[c]\right) \mathrm{Csc}\left[\frac{c}{2}\right] \mathrm{Sec}\left[\frac{c}{2}\right] \mathrm{Sec}[c] -$$

$$\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right] \mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right] \left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right] - B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right] + C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{d} +$$

$$\frac{4\,A\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}[d\,x]}{3\,d} +$$

$$\left.\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\left(A\,\text{Sin}[c]-3\,A\,\text{Sin}[d\,x]+3\,B\,\text{Sin}[d\,x]\right)}{3\,d}\right)-$$

$$\left(5\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\left(B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

Problem 462: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2}{\operatorname{Cos}[c + d x]^{7/2} \left(a + a \operatorname{Cos}[c + d x]\right)} \, dx$$

Optimal (type 4, 210 leaves, 7 steps):

$$-\frac{3 (7 A - 5 B + 5 C) \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right]}{5 a d} - \frac{(5 A - 5 B + 3 C) \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right]}{3 a d} + \frac{(7 A - 5 B + 5 C) \operatorname{Sin}[c + d x]}{5 a d \operatorname{Cos}[c + d x]^{5/2}} - \frac{(5 A - 5 B + 3 C) \operatorname{Sin}[c + d x]}{3 a d \operatorname{Cos}[c + d x]^{3/2}} + \frac{3 (7 A - 5 B + 5 C) \operatorname{Sin}[c + d x]}{5 a d \sqrt{\operatorname{Cos}[c + d x]}} - \frac{(A - B + C) \operatorname{Sin}[c + d x]}{d \operatorname{Cos}[c + d x]^{5/2} \left(a + a \operatorname{Cos}[c + d x]\right)}$$

Result (type 5, 1745 leaves):

$$-\Bigg(\Bigg(21 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} \operatorname{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] \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} (\operatorname{Cos}[c] + i \operatorname{Sin}[c])^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)\Bigg) + \Bigg(3 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} (\operatorname{Cos}[c] + i \operatorname{Sin}[c])^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} (\operatorname{Cos}[c] + i \operatorname{Sin}[c])^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/$$

$$\left(-i\, d\, \left(1+e^{2 i d x}\right) \text{Cos}[c]+d\, \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Big)\Big)\Big/$$

$$\left(4\, (a+a\, \text{Cos}[c+d x])\right)-\Bigg(3\, i\, C\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\, (\text{Cos}[c]+i\, \text{Sin}[c])^2\right]$$

$$\sqrt{e^{-i d x}\, \left(2\, \left(1+e^{2 i d x}\right) \text{Cos}[c]+2\, i\, \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\, \text{Cos}[2 c]+i\, e^{2 i d x}\, \text{Sin}[2 c]}\Bigg)\Big/$$

$$\left(3\, i\, d\, \left(1+e^{2 i d x}\right) \text{Cos}[c]-3\, d\, \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$

$$\Bigg(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\, (\text{Cos}[c]+i\, \text{Sin}[c])^2\right]$$

$$\sqrt{e^{-i d x}\, \left(2\, \left(1+e^{2 i d x}\right) \text{Cos}[c]+2\, i\, \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x}\, \text{Cos}[2 c]+i\, e^{2 i d x}\, \text{Sin}[2 c]}\Bigg)\Big/$$

$$\left(-i\, d\, \left(1+e^{2 i d x}\right) \text{Cos}[c]+d\, \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(4\, (a+a\, \text{Cos}[c+d x])\right)+\frac{1}{a+a\, \text{Cos}[c+d x]}$$

$$\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\sqrt{\text{Cos}[c+d x]}$$

$$\Bigg(\frac{1}{5 d}$$

$$(16 A-10 B+10 C+5 A\, \text{Cos}[c]-5 B\, \text{Cos}[c]+5 C\, \text{Cos}[c])$$

$$\text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c]+$$

$$\frac{2\, \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(A\, \text{Sin}\left[\frac{d x}{2}\right]-B\, \text{Sin}\left[\frac{d x}{2}\right]+C\, \text{Sin}\left[\frac{d x}{2}\right]\right)}{d}+$$

$$\frac{4\, A\, \text{Sec}[c]\, \text{Sec}[c+d x]^3\, \text{Sin}[d x]}{5 d}+$$

$$\frac{4\, \text{Sec}[c]\, \text{Sec}[c+d x]^2\, (3 A\, \text{Sin}[c]-5 A\, \text{Sin}[d x]+5 B\, \text{Sin}[d x])}{15 d}-$$

$$\frac{1}{15 d}$$

$$4\, \text{Sec}[c]\, \text{Sec}[c+d x]$$

$$(5 A\, \text{Sin}[c]-5 B\, \text{Sin}[c]-24 A\, \text{Sin}[d x]+15 B\, \text{Sin}[d x]-15 C\, \text{Sin}[d x])\Bigg)+$$

$$\left(5\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(5\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

Problem 463: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^{5/2}\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)}{\left(a+a\,\text{Cos}[c+d x]\right)^2}\,dx$$

Optimal (type 4, 214 leaves, 7 steps):

$$\frac{(20 A-35 B+56 C)\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{5 a^2 d}-\frac{5 (A-2 B+3 C)\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3 a^2 d}-\frac{5 (A-2 B+3 C)\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{3 a^2 d}+\frac{(20 A-35 B+56 C)\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{15 a^2 d}-\frac{(A-2 B+3 C)\,\text{Cos}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{a^2 d\,(1+\text{Cos}[c+d x])}-\frac{(A-B+C)\,\text{Cos}[c+d x]^{7/2}\,\text{Sin}[c+d x]}{3 d\,(a+a\,\text{Cos}[c+d x])^2}$$

Result (type 5, 1789 leaves):

$$\left(2\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\left(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)\right)\Big/$$

$$\left(a+a\,\text{Cos}[c+d x]\right)^2-\left(7\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\left(\left(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\right)\Big/\right.\right.$$

$$\left(-i\, d\, \left(1+e^{2\, i\, d\, x}\right) \text{Cos}[c] + d\, \left(-1+e^{2\, i\, d\, x}\right) \text{Sin}[c]\right)\Bigg)\Bigg) \Big/$$

$$\left(2\, (a + a\, \text{Cos}[c + d\, x])^2\right) + \Bigg(28\, i\, C\, \text{Cos}\left[\frac{c}{2} + \frac{d\, x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\, e^{2\, i\, d\, x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2\, i\, d\, x}\, (\text{Cos}[c] + i\, \text{Sin}[c])^2\right]$$

$$\sqrt{e^{-i\, d\, x}\, \left(2\, \left(1+e^{2\, i\, d\, x}\right) \text{Cos}[c] + 2\, i\, \left(-1+e^{2\, i\, d\, x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1 + e^{2\, i\, d\, x}\, \text{Cos}[2\, c] + i\, e^{2\, i\, d\, x}\, \text{Sin}[2\, c]}\Bigg) \Big/$$

$$\left(3\, i\, d\, \left(1+e^{2\, i\, d\, x}\right) \text{Cos}[c] - 3\, d\, \left(-1+e^{2\, i\, d\, x}\right) \text{Sin}[c]\right) -$$

$$\Bigg(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2\, i\, d\, x}\, (\text{Cos}[c] + i\, \text{Sin}[c])^2\right]$$

$$\sqrt{e^{-i\, d\, x}\, \left(2\, \left(1+e^{2\, i\, d\, x}\right) \text{Cos}[c] + 2\, i\, \left(-1+e^{2\, i\, d\, x}\right) \text{Sin}[c]\right)}$$

$$\sqrt{1 + e^{2\, i\, d\, x}\, \text{Cos}[2\, c] + i\, e^{2\, i\, d\, x}\, \text{Sin}[2\, c]}\Bigg) \Big/$$

$$\left(-i\, d\, \left(1+e^{2\, i\, d\, x}\right) \text{Cos}[c] + d\, \left(-1+e^{2\, i\, d\, x}\right) \text{Sin}[c]\right)\Bigg)\Bigg) \Big/ \left(5\, (a + a\, \text{Cos}[c + d\, x])^2\right) +$$

$$\Bigg(10\, A\, \text{Cos}\left[\frac{c}{2} + \frac{d\, x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\},\right.$$

$$\left.\text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right] \text{Sec}[d\, x - \text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1 - \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1 + \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$

$$\left(3\, d\, (a + a\, \text{Cos}[c + d\, x])^2 \sqrt{1 + \text{Cot}[c]^2}\right) -$$

$$\Bigg(20\, B\, \text{Cos}\left[\frac{c}{2} + \frac{d\, x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right] \text{Sec}[d\, x - \text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1 - \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d\, x - \text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\left(10\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\left(-\frac{1}{5\,d}4\,\left(10\,A-15\,B+20\,C+10\,A\,\text{Cos}[c]-20\,B\,\text{Cos}[c]+36\,C\,\text{Cos}[c]\right)\text{Csc}[c]+\right.$$

$$\frac{8\,(B-2\,C)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{4\,C\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}+$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{1}{d}4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]$$

$$\left(2\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-3\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+4\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+\frac{8\,(B-2\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+$$

$$\left.\left.\frac{4\,C\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}+\frac{2\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d\,x]\right)^2$$

Problem 464: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^2}\,dx$$

Optimal (type 4, 180 leaves, 6 steps) :

$$-\frac{(A-4B+7C)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{a^2 d}+\frac{(2A-5B+10C)\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{3a^2 d}+\frac{(2A-5B+10C)\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{3a^2 d}-\frac{(A-4B+7C)\,\text{Cos}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{3a^2 d\,(1+\text{Cos}[c+dx])}-\frac{(A-B+C)\,\text{Cos}[c+dx]^{5/2}\,\text{Sin}[c+dx]}{3d\,(a+a\,\text{Cos}[c+dx])^2}$$

Result (type 5, 1741 leaves):

$$-\Bigg(\Bigg(\mathrm{i}\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\Bigg(\Bigg(2\,e^{2\mathrm{i}dx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\mathrm{i}dx}(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-\mathrm{i}dx}\left(2(1+e^{2\mathrm{i}dx})\,\text{Cos}[c]+2\,\mathrm{i}\,(-1+e^{2\mathrm{i}dx})\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\mathrm{i}dx}\,\text{Cos}[2c]+\mathrm{i}\,e^{2\mathrm{i}dx}\,\text{Sin}[2c]}\Bigg)\Big/$$
$$\left(3\,\mathrm{i}\,d\,(1+e^{2\mathrm{i}dx})\,\text{Cos}[c]-3d\,(-1+e^{2\mathrm{i}dx})\,\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\mathrm{i}dx}(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-\mathrm{i}dx}\left(2(1+e^{2\mathrm{i}dx})\,\text{Cos}[c]+2\,\mathrm{i}\,(-1+e^{2\mathrm{i}dx})\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\mathrm{i}dx}\,\text{Cos}[2c]+\mathrm{i}\,e^{2\mathrm{i}dx}\,\text{Sin}[2c]}\Bigg)\Big/$$
$$\left(-\mathrm{i}\,d\,(1+e^{2\mathrm{i}dx})\,\text{Cos}[c]+d\,(-1+e^{2\mathrm{i}dx})\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(2\,(a+a\,\text{Cos}[c+dx])^2\right)\Bigg)+\Bigg(2\,\mathrm{i}\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4$$
$$\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\mathrm{i}dx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\mathrm{i}dx}(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-\mathrm{i}dx}\left(2(1+e^{2\mathrm{i}dx})\,\text{Cos}[c]+2\,\mathrm{i}\,(-1+e^{2\mathrm{i}dx})\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\mathrm{i}dx}\,\text{Cos}[2c]+\mathrm{i}\,e^{2\mathrm{i}dx}\,\text{Sin}[2c]}\Bigg)\Big/$$
$$\left(3\,\mathrm{i}\,d\,(1+e^{2\mathrm{i}dx})\,\text{Cos}[c]-3d\,(-1+e^{2\mathrm{i}dx})\,\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\mathrm{i}dx}(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-\mathrm{i}dx}\left(2(1+e^{2\mathrm{i}dx})\,\text{Cos}[c]+2\,\mathrm{i}\,(-1+e^{2\mathrm{i}dx})\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\mathrm{i}dx}\,\text{Cos}[2c]+\mathrm{i}\,e^{2\mathrm{i}dx}\,\text{Sin}[2c]}\Bigg)\Big/$$
$$\left(-\mathrm{i}\,d\,(1+e^{2\mathrm{i}dx})\,\text{Cos}[c]+d\,(-1+e^{2\mathrm{i}dx})\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$(a+a\,\text{Cos}[c+dx])^2-\Bigg(7\,\mathrm{i}\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4$$

$$\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} \left(\text{Cos}[c] + i\, \text{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\Bigg) \Big/$$
$$\left(3\, i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3\, d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) -$$
$$\Bigg(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} \left(\text{Cos}[c] + i\, \text{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2\, i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\Bigg) \Big/$$
$$\left(-i\, d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg) \Big/$$
$$\left(2 \left(a + a\, \text{Cos}[c + d x]\right)^2\right) - \Bigg(4\, A\, \text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^4$$
$$\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\},\right.$$
$$\left.\left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right] \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$
$$\left(3\, d \left(a + a\, \text{Cos}[c + d x]\right)^2 \sqrt{1 + \text{Cot}[c]^2}\right) +$$
$$\Bigg(10\, B\, \text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^4$$
$$\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\Bigg(20\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}$$

$$\Bigg(-\frac{4\,\left(-A+2\,B-3\,C+2\,B\,\text{Cos}[c]-4\,C\,\text{Cos}[c]\right)\text{Csc}[c]}{d}+\frac{8\,C\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}-$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-2\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+3\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+$$

$$\frac{8\,C\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}-\frac{2\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\Bigg)\Bigg)\Bigg/\left(a+a\,\text{Cos}[c+d\,x]\right)^2$$

Problem 465: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\ \left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^2}\,dx$$

Optimal (type 4, 139 leaves, 5 steps):

$$-\frac{(B-4C)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{a^2 d}+\frac{(A+2B-5C)\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{3a^2 d}+\frac{(A+2B-5C)\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{3a^2 d\,(1+\text{Cos}[c+dx])}-\frac{(A-B+C)\,\text{Cos}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{3d\,(a+a\,\text{Cos}[c+dx])^2}$$

Result (type 5, 1347 leaves):

$$-\Bigg(\Bigg(\Bigg(\mathrm{i}\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\Bigg(\Bigg(2\,e^{2\mathrm{i}dx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\mathrm{i}dx}(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-\mathrm{i}dx}\left(2\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]+2\,\mathrm{i}\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\mathrm{i}dx}\,\text{Cos}[2c]+\mathrm{i}\,e^{2\mathrm{i}dx}\,\text{Sin}[2c]}\Bigg)\Big/$$
$$\left(3\,\mathrm{i}\,d\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]-3d\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\mathrm{i}dx}(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-\mathrm{i}dx}\left(2\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]+2\,\mathrm{i}\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\mathrm{i}dx}\,\text{Cos}[2c]+\mathrm{i}\,e^{2\mathrm{i}dx}\,\text{Sin}[2c]}\Bigg)\Big/$$
$$\left(-\mathrm{i}\,d\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]+d\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(2\left(a+a\,\text{Cos}[c+dx]\right)^2\right)\Bigg)+\Bigg(2\,\mathrm{i}\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4$$
$$\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\mathrm{i}dx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\mathrm{i}dx}(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-\mathrm{i}dx}\left(2\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]+2\,\mathrm{i}\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\mathrm{i}dx}\,\text{Cos}[2c]+\mathrm{i}\,e^{2\mathrm{i}dx}\,\text{Sin}[2c]}\Bigg)\Big/$$
$$\left(3\,\mathrm{i}\,d\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]-3d\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\mathrm{i}dx}(\text{Cos}[c]+\mathrm{i}\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-\mathrm{i}dx}\left(2\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]+2\,\mathrm{i}\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\mathrm{i}dx}\,\text{Cos}[2c]+\mathrm{i}\,e^{2\mathrm{i}dx}\,\text{Sin}[2c]}\Bigg)\Big/$$
$$\left(-\mathrm{i}\,d\left(1+e^{2\mathrm{i}dx}\right)\text{Cos}[c]+d\left(-1+e^{2\mathrm{i}dx}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/\left(a+a\,\text{Cos}[c+dx]\right)^2-$$
$$\Bigg(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.$$

$$\text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\Big]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$
$$\left(3\,d\,(a + a\,\text{Cos}[c + d\,x])^2\sqrt{1 + \text{Cot}[c]^2}\right) -$$
$$\left(4\,B\,\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4\right.$$
$$\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$
$$\left(3\,d\,(a + a\,\text{Cos}[c + d\,x])^2\sqrt{1 + \text{Cot}[c]^2}\right) +$$
$$\left(10\,C\,\text{Cos}\left[\frac{c}{2} + \frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x - \text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1 - \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1 + \text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1 + \text{Sin}[d\,x - \text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$
$$\left(3\,d\,(a + a\,\text{Cos}[c + d\,x])^2\sqrt{1 + \text{Cot}[c]^2}\right) +$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \sqrt{\text{Cos}[c+d x]}\left(-\frac{4 (-B+2 C+2 C \text{Cos}[c]) \text{Csc}[c]}{d}+\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(B \text{Sin}\left[\frac{d x}{2}\right]-2 C \text{Sin}\left[\frac{d x}{2}\right]\right)}{d}+\frac{2 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(A \text{Sin}\left[\frac{d x}{2}\right]-B \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{3 d}+\frac{2 (A-B+C) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Tan}\left[\frac{c}{2}\right]}{3 d}\right)\right)\Big/ (a+a \text{Cos}[c+d x])^2$$

Problem 466: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2}{\sqrt{\text{Cos}[c+d x]} (a+a \text{Cos}[c+d x])^2} \, dx$$

Optimal (type 4, 133 leaves, 5 steps):

$$\frac{(A-C) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{a^2 d}+\frac{(2 A+B+2 C) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{3 a^2 d}-\frac{(A-C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{a^2 d (1+\text{Cos}[c+d x])}-\frac{(A-B+C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{3 d (a+a \text{Cos}[c+d x])^2}$$

Result (type 5, 1342 leaves):

$$\left(i A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right)\Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right)\Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)\right)\Big/ \left(2 (a+a \text{Cos}[c+d x])^2\right)-\left(i C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]\right.\right.\right.$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x} \mathrm{Cos}[2 c]+i e^{2 i d x} \mathrm{Sin}[2 c]}\right) \Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)-$$
$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x} \mathrm{Cos}[2 c]+i e^{2 i d x} \mathrm{Sin}[2 c]}\right) \Big/$$
$$\left.\left.\left(-i d\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+d\left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)\right)\right) \Big/ \left(2\left(a+a \mathrm{Cos}[c+d x]\right)^2\right)-$$
$$\left(4 A \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \mathrm{Csc}\left[\frac{c}{2}\right] \mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.\right.$$
$$\left.\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$
$$\mathrm{Sec}\left[\frac{c}{2}\right] \mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$
$$\sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\left.\sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right) \Big/$$
$$\left(3 d\left(a+a \mathrm{Cos}[c+d x]\right)^2 \sqrt{1+\mathrm{Cot}[c]^2}\right)-$$
$$\left(2 B \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \mathrm{Csc}\left[\frac{c}{2}\right]\right.$$
$$\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$
$$\mathrm{Sec}\left[\frac{c}{2}\right] \mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$
$$\sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\left.\sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right) \Big/$$
$$\left(3 d\left(a+a \mathrm{Cos}[c+d x]\right)^2 \sqrt{1+\mathrm{Cot}[c]^2}\right)-$$
$$\left(4 C \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \mathrm{Csc}\left[\frac{c}{2}\right] \mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\right.$$
$$\mathrm{Sec}\left[\frac{c}{2}\right] \mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]] \sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^2\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\left(-\frac{4\,(A-C)\,\text{Csc}[c]}{d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{2\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Bigg/(a+a\,\text{Cos}[c+d\,x])^2$$

Problem 467: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^2}\,dx$$

Optimal (type 4, 175 leaves, 6 steps):

$$-\frac{(4\,A-B)\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{a^2\,d}-\frac{(5\,A-2\,B-C)\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{3\,a^2\,d}+\frac{(4\,A-B)\,\text{Sin}[c+d\,x]}{a^2\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(5\,A-2\,B-C)\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(1+\text{Cos}[c+d\,x])}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 1380 leaves):

$$-\Bigg(\Bigg(2\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/$$
$$\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2c]+i\,e^{2 i d x}\,\text{Sin}[2c]}\right)\Big/$$
$$\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(a+a\,\text{Cos}[c+d x]\right)^2\Big)+\Bigg(i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$
$$\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2c]+i\,e^{2 i d x}\,\text{Sin}[2c]}\right)\Big/$$
$$\left(3 i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\,\text{Cos}[2c]+i\,e^{2 i d x}\,\text{Sin}[2c]}\right)\Big/$$
$$\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(2\left(a+a\,\text{Cos}[c+d x]\right)^2\right)+\Bigg(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$
$$\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$
$$\left(3 d\left(a+a\,\text{Cos}[c+d x]\right)^2\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^2\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(2\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^2\,\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\sqrt{\text{Cos}[c+d\,x]}\,\left(\frac{2\,(2\,A+2\,A\,\text{Cos}[c]-B\,\text{Cos}[c])\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]}{d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(2\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\right.\right.$$

$$\left.\left.\frac{8\,A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}+\frac{2\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d\,x]\right)^2$$

Problem 468: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{5/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}\,dx$$

Optimal (type 4, 211 leaves, 7 steps):

$$\frac{(7\,A-4\,B+C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{a^2\,d}+\frac{(10\,A-5\,B+2\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,a^2\,d}+$$
$$\frac{(10\,A-5\,B+2\,C)\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,\text{Cos}[c+d\,x]^{3/2}}-\frac{(7\,A-4\,B+C)\,\text{Sin}[c+d\,x]}{a^2\,d\,\sqrt{\text{Cos}[c+d\,x]}}-$$
$$\frac{(7\,A-4\,B+C)\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,\text{Cos}[c+d\,x]^{3/2}\,(1+\text{Cos}[c+d\,x])}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}$$

Result (type 5, 1782 leaves):

$$\left(7\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left.\left.\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)\right)\Big/$$
$$\left(2\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\right)-\left(2\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2c]+i e^{2 i d x}\text{Sin}[2c]}\right)\Big/$$
$$\left.\left.\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)\right)\Big/$$
$$\left(a+a\,\text{Cos}[c+d x]\right)^2+\left(i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(2 e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2c]+i e^{2 i d x}\text{Sin}[2c]}\right)\Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x}\text{Cos}[2c]+i e^{2 i d x}\text{Sin}[2c]}\right)\Big/$$
$$\left.\left.\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\right)\right)\Big/\left(2\left(a+a\,\text{Cos}[c+d x]\right)^2\right)-$$
$$\left(20\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.\right.$$
$$\left.\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3 d\left(a+a\,\text{Cos}[c+d x]\right)^2\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(10\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\right/$$

$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^2\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(4\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\right/$$

$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^2\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\left(-\frac{1}{d}2\,(4\,A-2\,B+3\,A\,\text{Cos}[c]-2\,B\,\text{Cos}[c]+C\,\text{Cos}[c])\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]-\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-2\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}-$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+$$

$$\frac{8\,A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+$$

$$\frac{8\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(A\,\text{Sin}[c]-6\,A\,\text{Sin}[d\,x]+3\,B\,\text{Sin}[d\,x])}{3\,d}-$$

$$\left.\left.\left.\frac{2\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\right/(a+a\,\text{Cos}[c+d\,x])^2$$

Problem 469: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{7/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{(a+a\,\text{Cos}[c+d\,x])^3}\,dx$$

Optimal (type 4, 273 leaves, 8 steps):

$$\frac{7\,(7A-17B+33C)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{10a^3d}-\frac{(13A-33B+63C)\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{6a^3d}-\frac{(13A-33B+63C)\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{6a^3d}+\frac{7\,(7A-17B+33C)\,\text{Cos}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{30a^3d}-\frac{(A-B+C)\,\text{Cos}[c+dx]^{9/2}\,\text{Sin}[c+dx]}{5d\,(a+a\,\text{Cos}[c+dx])^3}-\frac{(2A-7B+12C)\,\text{Cos}[c+dx]^{7/2}\,\text{Sin}[c+dx]}{15ad\,(a+a\,\text{Cos}[c+dx])^2}-\frac{(13A-33B+63C)\,\text{Cos}[c+dx]^{5/2}\,\text{Sin}[c+dx]}{10d\,(a^3+a^3\,\text{Cos}[c+dx])}$$

Result (type 5, 1888 leaves):

$$\Bigg(49\,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\,(1+e^{2idx})\,\text{Cos}[c]+2\,i\,(-1+e^{2idx})\,\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(3\,i\,d\,(1+e^{2idx})\,\text{Cos}[c]-3\,d\,(-1+e^{2idx})\,\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\,(1+e^{2idx})\,\text{Cos}[c]+2\,i\,(-1+e^{2idx})\,\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(-i\,d\,(1+e^{2idx})\,\text{Cos}[c]+d\,(-1+e^{2idx})\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/\left(10\,(a+a\,\text{Cos}[c+dx])^3\right)-\Bigg(119\,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\,(1+e^{2idx})\,\text{Cos}[c]+2\,i\,(-1+e^{2idx})\,\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(3\,i\,d\,(1+e^{2idx})\,\text{Cos}[c]-3\,d\,(-1+e^{2idx})\,\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\,(1+e^{2idx})\,\text{Cos}[c]+2\,i\,(-1+e^{2idx})\,\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(-i\,d\,(1+e^{2idx})\,\text{Cos}[c]+d\,(-1+e^{2idx})\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/\left(10\,(a+a\,\text{Cos}[c+dx])^3\right)+\Bigg(231\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)\Big/\left(10\,(a+a\,\text{Cos}[c+d\,x])^3\right)+$$

$$\left(26\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(22\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\left(42\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$
$$\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$
$$\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$
$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\;\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\left.\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(a+a\,\mathrm{Cos}[c+d\,x])^3\sqrt{1+\mathrm{Cot}[c]^2}\right)+$$
$$\frac{1}{(a+a\,\mathrm{Cos}[c+d\,x])^3}$$
$$\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$
$$\sqrt{\mathrm{Cos}[c+d\,x]}$$
$$\left(-\frac{1}{5\,d}4\,(29\,A-59\,B+99\,C+20\,A\,\mathrm{Cos}[c]-60\,B\,\mathrm{Cos}[c]+132\,C\,\mathrm{Cos}[c])\,\mathrm{Csc}[c]+\right.$$
$$\frac{16\,(B-3\,C)\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{3\,d}+\frac{8\,C\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{5\,d}-$$
$$\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{1}{15\,d}$$
$$4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(14\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-19\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+24\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)-$$
$$\frac{1}{5\,d}4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(29\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-59\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+99\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)+$$
$$\frac{16\,(B-3\,C)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{3\,d}+\frac{8\,C\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{5\,d}+$$
$$\left.\frac{4\,(14\,A-19\,B+24\,C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{2\,(A-B+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

Problem 470: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+d\,x]^{5/2}\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{(a+a\,\mathrm{Cos}[c+d\,x])^3}\,dx$$

Optimal (type 4, 232 leaves, 7 steps):

$$-\frac{(9 A-49 B+119 C) \text{EllipticE}\left[\frac{1}{2}(c+d x), 2\right]}{10 a^3 d}+\frac{(3 A-13 B+33 C) \text{EllipticF}\left[\frac{1}{2}(c+d x), 2\right]}{6 a^3 d}+$$
$$\frac{(3 A-13 B+33 C) \sqrt{\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{6 a^3 d}-\frac{(A-B+C) \text{Cos}[c+d x]^{7/2} \text{Sin}[c+d x]}{5 d (a+a \text{Cos}[c+d x])^3}+$$
$$\frac{(B-2 C) \text{Cos}[c+d x]^{5/2} \text{Sin}[c+d x]}{3 a d (a+a \text{Cos}[c+d x])^2}-\frac{(9 A-49 B+119 C) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{30 d \left(a^3+a^3 \text{Cos}[c+d x]\right)}$$

Result (type 5, 1841 leaves):

$$-\Bigg(\Bigg(9 \mathrm{i} A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c]+\mathrm{i} \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \text{Cos}[c]+2 \mathrm{i}\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+\mathrm{i}\, e^{2 i d x} \text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(3 \mathrm{i} d\left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c]+\mathrm{i} \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \text{Cos}[c]+2 \mathrm{i}\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+\mathrm{i}\, e^{2 i d x} \text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(-\mathrm{i} d\left(1+e^{2 i d x}\right) \text{Cos}[c]+d\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(10 (a+a \text{Cos}[c+d x])^3\right)\Bigg)+\Bigg(49 \mathrm{i} B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$
$$\text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c]+\mathrm{i} \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \text{Cos}[c]+2 \mathrm{i}\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+\mathrm{i}\, e^{2 i d x} \text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(3 \mathrm{i} d\left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c]+\mathrm{i} \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \text{Cos}[c]+2 \mathrm{i}\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+\mathrm{i}\, e^{2 i d x} \text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(-\mathrm{i} d\left(1+e^{2 i d x}\right) \text{Cos}[c]+d\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(10 (a+a \text{Cos}[c+d x])^3\right)-\Bigg(119 \mathrm{i} C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$

$$\mathrm{Csc}\left[\frac{c}{2}\right]\ \mathrm{Sec}\left[\frac{c}{2}\right]\left(\left(2\,e^{2\,i\,d\,x}\ \mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^{2}\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)-\left(2\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^{2}\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)\right)\Big/$$

$$\left(10\,(a+a\,\mathrm{Cos}[c+d\,x])^{3}\right)-\left(2\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^{6}\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{-\sqrt{1+\mathrm{Cot}[c]^{2}}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(d\,(a+a\,\mathrm{Cos}[c+d\,x])^{3}\sqrt{1+\mathrm{Cot}[c]^{2}}\right)+$$

$$\left(26\,B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^{6}\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right.$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(22\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\frac{1}{(a+a\,\text{Cos}[c+d\,x])^3}$$
$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$
$$\sqrt{\text{Cos}[c+d\,x]}$$
$$\left(-\frac{4\,(-9\,A+29\,B-59\,C+20\,B\,\text{Cos}[c]-60\,C\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}+\frac{16\,C\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\right.$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\frac{1}{15\,d}$$
$$4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-14\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+19\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+\frac{1}{5\,d}$$
$$4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-29\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+59\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+\frac{16\,C\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}-$$
$$\left.\frac{4\,(9\,A-14\,B+19\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{2\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

Problem 471: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^{3/2} \left(A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right)}{(a+a \text{Cos}[c+d x])^3} \, dx$$

Optimal (type 4, 195 leaves, 6 steps):

$$-\frac{(A+9 B-49 C) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{10 a^3 d}+\frac{(A+3 B-13 C) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{6 a^3 d}-\frac{(A-B+C) \text{Cos}[c+d x]^{5/2} \text{Sin}[c+d x]}{5 d (a+a \text{Cos}[c+d x])^3}+\frac{(2 A+3 B-8 C) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{15 a d (a+a \text{Cos}[c+d x])^2}+\frac{(A+3 B-13 C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{6 d \left(a^3+a^3 \text{Cos}[c+d x]\right)}$$

Result (type 5, 1809 leaves):

$$-\left(\left(\left(i A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]\right.\right.\right.$$
$$\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]\right.\right.$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right)\Big/$$
$$\left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]\right.$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right)\Big/$$
$$\left.\left.\left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)\right)\Big/$$
$$\left.\left(10 (a+a \text{Cos}[c+d x])^3\right)\right)-\left(9 i B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\right.$$
$$\text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]$$
$$\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]\right.\right.$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right)\Big/$$
$$\left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]\right.$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\left.\left.\left.\sqrt{1+e^{2 i d x} \mathrm{Cos}[2 c]+i e^{2 i d x} \mathrm{Sin}[2 c]}\right) \middle/ \left(-i d \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+d \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)\right)\right) \middle/$$

$$\left(10 \left(a+a \mathrm{Cos}[c+d x]\right)^3\right)+\left(49 i C \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \mathrm{Csc}\left[\frac{c}{2}\right] \mathrm{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left(\left(2 e^{2 i d x} \mathrm{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} \left(\mathrm{Cos}[c]+i \mathrm{Sin}[c]\right)^2\right]\right.\right.$$

$$\left.\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)} \sqrt{1+e^{2 i d x} \mathrm{Cos}[2 c]+i e^{2 i d x} \mathrm{Sin}[2 c]}\right) \middle/$$

$$\left(3 i d \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)-$$

$$\left(2 \mathrm{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} \left(\mathrm{Cos}[c]+i \mathrm{Sin}[c]\right)^2\right]\right.$$

$$\left.\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)} \sqrt{1+e^{2 i d x} \mathrm{Cos}[2 c]+i e^{2 i d x} \mathrm{Sin}[2 c]}\right) \middle/$$

$$\left.\left.\left(-i d \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+d \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)\right)\right) \middle/$$

$$\left(10 \left(a+a \mathrm{Cos}[c+d x]\right)^3\right)-\left(2 A \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}\right] \mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]] \sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2} \mathrm{Sin}[c] \mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right) \middle/$$

$$\left(3 d \left(a+a \mathrm{Cos}[c+d x]\right)^3 \sqrt{1+\mathrm{Cot}[c]^2}\right)-$$

$$\left(2 B \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(26\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\right.$$
$$\left(-\frac{4\,(-A-9\,B+29\,C+20\,C\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}+\frac{1}{5\,d}\right.$$
$$4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+9\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-29\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)-$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{1}{15\,d}$$
$$4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(4\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-9\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+14\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+$$
$$\frac{4\,(4\,A-9\,B+14\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-$$

$$\left.\left.\frac{2\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\,(a+a\,\text{Cos}[c+d\,x])^3$$

Problem 472: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{(a+a\,\text{Cos}[c+d\,x])^3}\,dx$$

Optimal (type 4, 191 leaves, 6 steps):

$$\frac{(A-B-9\,C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{10\,a^3\,d}+\frac{(A+B+3\,C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{6\,a^3\,d}-\frac{(A-B+C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}+\frac{(4\,A+B-6\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{(A-B-9\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1799 leaves):

$$\Bigg(i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$
$$\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(10\,(a+a\,\text{Cos}[c+d\,x])^3\right)-\Bigg(i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left.\left.\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)\right)\Big/$$
$$\left(10\,(a+a\,\text{Cos}[c+d\,x])^3\right)-\left(9\,i\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}\right]$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left.\left.\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)\right)\Big/\left(10\,(a+a\,\text{Cos}[c+d\,x])^3\right)-$$
$$\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.\right.$$
$$\left.\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(2\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\right.$$
$$\left(-\frac{4\,(A-B-9\,C)\,\text{Csc}[c]}{5\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]-9\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\right.$$
$$\frac{1}{15\,d}4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+4\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-9\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$
$$\frac{4\,(A+4\,B-9\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+$$
$$\left.\left.\frac{2\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\ (a+a\,\text{Cos}[c+d\,x])^3$$

Problem 473: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\ (a+a\,\text{Cos}[c+d\,x])^3}\,dx$$

Optimal (type 4, 193 leaves, 6 steps):

$$\frac{(9 A+B-C) \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{10 a^3 d}+\frac{(3 A+B+C) \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{6 a^3 d}-\frac{(A-B+C) \sqrt{\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{5 d (a+a \text{Cos}[c+d x])^3}-\frac{(6 A-B-4 C) \sqrt{\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{15 a d (a+a \text{Cos}[c+d x])^2}-\frac{(9 A+B-C) \sqrt{\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{10 d \left(a^3+a^3 \text{Cos}[c+d x]\right)}$$

Result (type 5, 1802 leaves):

$$\Bigg(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] \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(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(i\, C\, \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]$$

$$\Bigg(\Bigg(\Bigg(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\Bigg) \Bigg/ \left(3 i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] - 3 d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right) - \Bigg(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} (\text{Cos}[c] + i\, \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1 + e^{2 i d x}\right) \text{Cos}[c] + 2 i \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1 + e^{2 i d x}\, \text{Cos}[2 c] + i\, e^{2 i d x}\, \text{Sin}[2 c]}\Bigg) \Bigg/ \left(-i d \left(1 + e^{2 i d x}\right) \text{Cos}[c] + d \left(-1 + e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg) \Bigg/ \left(10 \left(a + a\, \text{Cos}[c + d x]\right)^3\right) -$$

$$\Bigg(2\, A\, \text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Bigg/ \left(d \left(a + a\, \text{Cos}[c + d x]\right)^3 \sqrt{1 + \text{Cot}[c]^2}\right) -$$

$$\Bigg(2\, B\, \text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[d x - \text{ArcTan}[\text{Cot}[c]]] \sqrt{1 - \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1 + \text{Cot}[c]^2}\, \text{Sin}[c]\, \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]} \sqrt{1 + \text{Sin}[d x - \text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Bigg/ \left(3 d \left(a + a\, \text{Cos}[c + d x]\right)^3 \sqrt{1 + \text{Cot}[c]^2}\right) -$$

$$\Bigg(2\, C\, \text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\left(-\frac{4\,(9\,A+B-C)\,\text{Csc}[c]}{5\,d}-\frac{1}{15\,d}\right.\right.$$
$$4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(6\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]-4\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)-$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-$$
$$\frac{4\,(6\,A-B-4\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-$$
$$\left.\left.\frac{2\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\,(a+a\,\text{Cos}[c+d\,x])^3$$

Problem 474: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^3}\,dx$$

Optimal (type 4, 237 leaves, 7 steps):

$$-\frac{(49\,A-9\,B-C)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{10\,a^3\,d}-\frac{(13\,A-3\,B-C)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{6\,a^3\,d}+$$
$$\frac{(49\,A-9\,B-C)\,\text{Sin}[c+d\,x]}{10\,a^3\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3}-$$
$$\frac{(8\,A-3\,B-2\,C)\,\text{Sin}[c+d\,x]}{15\,a\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{(13\,A-3\,B-C)\,\text{Sin}[c+d\,x]}{6\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a^3+a^3\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1841 leaves):

$$-\left(\left(49\,i\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\right.\right.$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\right.\right.$$

$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/$$

$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)-$$

$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\right.$$

$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/$$

$$\left.\left.\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)\right)\right)\Big/$$

$$\left.\left(10\,(a+a\,\mathrm{Cos}[c+d\,x])^3\right)\right)+\left(9\,i\,B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\right.$$

$$\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\right.\right.$$

$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/$$

$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)-$$

$$\left(2\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\right.$$

$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/$$

$$\left.\left.\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)\right)\right)\Big/$$

$$\left(10\,(a+a\,\mathrm{Cos}[c+d\,x])^3\right)+\left(i\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\right.$$

$$\mathrm{Csc}\left[\frac{c}{2}\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}\right]$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\mathrm{Cos}[c]+i\,\mathrm{Sin}[c])^2\right]\right.\right.$$

$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\mathrm{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\mathrm{Sin}[2\,c]}\right)\Big/$$

$$\left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]\right.$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right)\Big/$$
$$\left.\left.\left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)\right)\Big/$$
$$\left(10 (a+a \text{Cos}[c+d x])^3\right)+\left(26 A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\right.$$
$$\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\right.$$
$$\left.\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right] \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3 d (a+a \text{Cos}[c+d x])^3 \sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(2 B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d (a+a \text{Cos}[c+d x])^3 \sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(2\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\,\sqrt{1+\mathrm{Cot}[c]^2}\right)+$$

$$\frac{1}{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3}$$

$$\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\sqrt{\mathrm{Cos}[c+d\,x]}$$

$$\left(\frac{1}{5\,d}2\,\left(20\,A+29\,A\,\mathrm{Cos}[c]-9\,B\,\mathrm{Cos}[c]-C\,\mathrm{Cos}[c]\right)\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c]+\right.$$

$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(29\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-9\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$

$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(11\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-6\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+$$

$$\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$

$$\frac{16\,A\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,\mathrm{Sin}[d\,x]}{d}+$$

$$\left.\frac{4\,\left(11\,A-6\,B+C\right)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{2\,\left(A-B+C\right)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

Problem 475: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2}{\mathrm{Cos}[c+d\,x]^{5/2}\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3}\,dx$$

Optimal (type 4, 270 leaves, 8 steps):

$$\frac{(119 A-49 B+9 C)\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{10 a^3 d}+\frac{(33 A-13 B+3 C)\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{6 a^3 d}+\frac{(33 A-13 B+3 C)\ \text{Sin}[c+d x]}{6 a^3 d \,\text{Cos}[c+d x]^{3/2}}-\frac{(119 A-49 B+9 C)\ \text{Sin}[c+d x]}{10 a^3 d \sqrt{\text{Cos}[c+d x]}}-\frac{(A-B+C)\ \text{Sin}[c+d x]}{5 d \,\text{Cos}[c+d x]^{3/2}\,(a+a \,\text{Cos}[c+d x])^3}-\frac{(2 A-B)\ \text{Sin}[c+d x]}{3 a d \,\text{Cos}[c+d x]^{3/2}\,(a+a \,\text{Cos}[c+d x])^2}-\frac{(119 A-49 B+9 C)\ \text{Sin}[c+d x]}{30 d \,\text{Cos}[c+d x]^{3/2}\,(a^3+a^3 \,\text{Cos}[c+d x])}$$

Result (type 5, 1883 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(9\,i\,C\,\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]$$

$$\left(\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)\right)\Big/\left(10\,(a+a\,\text{Cos}[c+d\,x])^3\right)-$$

$$\left(22\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\left(26\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(2\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\frac{1}{(a+a\,\text{Cos}[c+d\,x])^3}$$
$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$
$$\sqrt{\text{Cos}[c+d\,x]}$$
$$\left(-\frac{1}{5\,d}2\,(60\,A-20\,B+59\,A\,\text{Cos}[c]-29\,B\,\text{Cos}[c]+9\,C\,\text{Cos}[c])\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]-\right.$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\frac{1}{15\,d}$$
$$4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(16\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-11\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+6\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)-$$
$$\frac{1}{5\,d}4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(59\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-29\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+9\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+$$
$$\frac{16\,A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+$$
$$\frac{16\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(A\,\text{Sin}[c]-9\,A\,\text{Sin}[d\,x]+3\,B\,\text{Sin}[d\,x])}{3\,d}-$$
$$\left.\frac{4\,(16\,A-11\,B+6\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{2\,(A-B+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

Problem 476: Result unnecessarily involves imaginary or complex numbers.

$$\int\text{Cos}[c+d\,x]^{3/2}\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 227 leaves, 6 steps):

$$\frac{\sqrt{a}\,(48A+40B+35C)\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+dx]}{\sqrt{a+a\,\mathrm{Cos}[c+dx]}}\right]}{64d}+\frac{a\,(48A+40B+35C)\,\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Sin}[c+dx]}{64d\sqrt{a+a\,\mathrm{Cos}[c+dx]}}+\frac{a\,(48A+40B+35C)\,\mathrm{Cos}[c+dx]^{3/2}\,\mathrm{Sin}[c+dx]}{96d\sqrt{a+a\,\mathrm{Cos}[c+dx]}}+\frac{a\,(8B+C)\,\mathrm{Cos}[c+dx]^{5/2}\,\mathrm{Sin}[c+dx]}{24d\sqrt{a+a\,\mathrm{Cos}[c+dx]}}+\frac{C\,\mathrm{Cos}[c+dx]^{5/2}\sqrt{a+a\,\mathrm{Cos}[c+dx]}\,\mathrm{Sin}[c+dx]}{4d}$$

Result (type 3, 339 leaves):

$$\frac{1}{768d}\sqrt{a\,(1+\mathrm{Cos}[c+dx])}\,\mathrm{Sec}\left[\frac{1}{2}(c+dx)\right]\Bigg(\Bigg(3\,i\,(48A+40B+35C)\,e^{\frac{idx}{2}}\Bigg(\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2idx}\right)\mathrm{Cos}[c]+i\left(-1+e^{2idx}\right)\mathrm{Sin}[c]}\right]-\mathrm{Log}\left[2\left(e^{idx}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{idx}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2idx}\right)\mathrm{Cos}[c]+i\left(-1+e^{2idx}\right)\mathrm{Sin}[c]}\right)\right]\Bigg)\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\mathrm{Sin}[c]\right)}\Bigg)\Bigg/\left(\sqrt{\left(1+e^{2idx}\right)\mathrm{Cos}[c]+i\left(-1+e^{2idx}\right)\mathrm{Sin}[c]}\right)+4\sqrt{\mathrm{Cos}[c+dx]}\,\big(144A+152B+133C+2\,(48A+40B+53C)\,\mathrm{Cos}[c+dx]+4\,(8B+7C)\,\mathrm{Cos}[2\,(c+dx)]+12\,C\,\mathrm{Cos}[3\,(c+dx)]\big)\,\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\Bigg)$$

Problem 477: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{\mathrm{Cos}[c+dx]}\,\sqrt{a+a\,\mathrm{Cos}[c+dx]}\,\left(A+B\,\mathrm{Cos}[c+dx]+C\,\mathrm{Cos}[c+dx]^2\right)dx$$

Optimal (type 3, 179 leaves, 5 steps):

$$\frac{\sqrt{a}\,(8A+6B+5C)\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+dx]}{\sqrt{a+a\,\mathrm{Cos}[c+dx]}}\right]}{8d}+\frac{a\,(8A+6B+5C)\,\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Sin}[c+dx]}{8d\sqrt{a+a\,\mathrm{Cos}[c+dx]}}+\frac{a\,(6B+C)\,\mathrm{Cos}[c+dx]^{3/2}\,\mathrm{Sin}[c+dx]}{12d\sqrt{a+a\,\mathrm{Cos}[c+dx]}}+\frac{C\,\mathrm{Cos}[c+dx]^{3/2}\sqrt{a+a\,\mathrm{Cos}[c+dx]}\,\mathrm{Sin}[c+dx]}{3d}$$

Result (type 3, 319 leaves):

$$\frac{1}{96\,d}\sqrt{a\,(1+\text{Cos}[c+d\,x])}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\left(\left(3\,i\,(8\,A+6\,B+5\,C)\,e^{\frac{i\,d\,x}{2}}\left(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\,\right]-\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\right]\right)\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right)\Big/\left(\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)+4\,\sqrt{\text{Cos}[c+d\,x]}\,(24\,A+18\,B+19\,C+2\,(6\,B+5\,C)\,\text{Cos}[c+d\,x]+4\,C\,\text{Cos}[2\,(c+d\,x)])\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 478: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 131 leaves, 4 steps):

$$\frac{\sqrt{a}\,(8\,A+4\,B+3\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,d}+\frac{a\,(4\,B+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 3, 299 leaves):

$$\frac{1}{16\,d}\sqrt{a\,(1+\text{Cos}[c+d\,x])}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\left(\left(i\,(8\,A+4\,B+3\,C)\,e^{\frac{i\,d\,x}{2}}\left(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\,\right]-\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\right]\right)\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right)\Big/\left(\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)+4\,\sqrt{\text{Cos}[c+d\,x]}\,(4\,B+3\,C+2\,C\,\text{Cos}[c+d\,x])\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 479: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 121 leaves, 4 steps):

$$\frac{\sqrt{a}\,(2B+C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{d}-\frac{a\,(2A-C)\,\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{d\,\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{2A\,\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{d\,\sqrt{\text{Cos}[c+d x]}}$$

Result (type 3, 290 leaves):

$$\frac{1}{4d}\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]\Bigg(\Bigg(\text{i}\,(2B+C)\,e^{\frac{\text{i} d x}{2}}\Bigg(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\text{i} d x}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\text{i} d x}\right)\text{Sin}[c]}\right]-$$
$$\text{Log}\left[2\left(e^{\text{i} d x}\text{Cos}\left[\frac{c}{2}\right]+\text{i}\,e^{\text{i} d x}\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\text{i} d x}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\text{i} d x}\right)\text{Sin}[c]}\right)\right]\Bigg)$$
$$\sqrt{e^{-\text{i} d x}\left(2\left(1+e^{2\text{i} d x}\right)\text{Cos}[c]+2\,\text{i}\left(-1+e^{2\text{i} d x}\right)\text{Sin}[c]\right)}\Bigg)\Bigg/$$
$$\left(\sqrt{\left(1+e^{2\text{i} d x}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\text{i} d x}\right)\text{Sin}[c]}\right)+\frac{4\left(2A+C\,\text{Cos}[c+d x]\right)\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\Bigg)$$

Problem 480: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+a\,\text{Cos}[c+d x]}\,\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)}{\text{Cos}[c+d x]^{5/2}}\,dx$$

Optimal (type 3, 120 leaves, 4 steps):

$$\frac{2\sqrt{a}\,C\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{d}+\frac{2a\,(A+3B)\,\text{Sin}[c+d x]}{3d\,\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{2A\,\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{3d\,\text{Cos}[c+d x]^{3/2}}$$

Result (type 3, 700 leaves):

$$\frac{1}{6\sqrt{2}\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\sqrt{\mathrm{Cos}[c+d\,x]\,\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}}$$

$$\sqrt{a\,\left(1+\mathrm{Cos}[c+d\,x]\right)}\;\mathrm{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]$$

$$\left(\frac{3}{2}\,i\,C\,e^{-\frac{3}{2}\,i\,d\,x}\,\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\,\right]\right.$$

$$\mathrm{Cos}\left[\frac{c}{2}\right]^2\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)^2-\frac{3}{2}\,i\,C\,e^{-\frac{3}{2}\,i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]^2$$

$$\mathrm{Log}\left[2\,\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\,\right)\right]$$

$$\left(\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)^2+$$

$$\frac{3}{2}\,i\,C\,e^{-\frac{3}{2}\,i\,d\,x}\,\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\,\right]$$

$$\mathrm{Sin}\left[\frac{c}{2}\right]^2\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)^2-\frac{3}{2}\,i\,C\,e^{-\frac{3}{2}\,i\,d\,x}$$

$$\mathrm{Log}\left[2\,\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\,\right)\right]$$

$$\mathrm{Sin}\left[\frac{c}{2}\right]^2\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)^2+$$

$$4\,A\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\;\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+$$

$$8\,A\,\mathrm{Cos}[c+d\,x]\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\;\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+$$

$$\left.12\,B\,\mathrm{Cos}[c+d\,x]\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\;\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)$$

Problem 484: Result unnecessarily involves imaginary or complex numbers.

$$\int \mathrm{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 283 leaves, 7 steps):

$$\frac{a^{3/2}\,(176\,A+150\,B+133\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{128\,d}+\frac{a^2\,(176\,A+150\,B+133\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{128\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a^2\,(176\,A+150\,B+133\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{192\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a^2\,(80\,A+90\,B+67\,C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{240\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a\,(10\,B+3\,C)\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{40\,d}+\frac{C\,\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 3, 390 leaves):

$$-\frac{1}{7680\,d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\Bigg(-15\,i\,(176\,A+150\,B+133\,C)\,e^{\frac{i\,d\,x}{2}}\,\Bigg(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right]-\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]\Bigg)\,\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}-4\,\sqrt{\text{Cos}[c+d\,x]}\,\big(2960\,A+2850\,B+2671\,C+2\,(880\,A+930\,B+1007\,C)\,\text{Cos}[c+d\,x]+4\,(80\,A+150\,B+181\,C)\,\text{Cos}[2\,(c+d\,x)]+120\,B\,\text{Cos}[3\,(c+d\,x)]+228\,C\,\text{Cos}[3\,(c+d\,x)]+48\,C\,\text{Cos}[4\,(c+d\,x)]\big)\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg)$$

Problem 485: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 233 leaves, 6 steps):

$$\frac{a^{3/2}\,(112\,A+88\,B+75\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{64\,d}+\frac{a^2\,(112\,A+88\,B+75\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{64\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a^2\,(48\,A+56\,B+39\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{96\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a\,(8\,B+3\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d}+$$
$$\frac{C\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 3, 365 leaves):

$$-\frac{1}{768\,d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}$$
$$\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\Bigg(-3\,i\,(112\,A+88\,B+75\,C)\,e^{\frac{i\,d\,x}{2}}$$
$$\Bigg(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]-$$
$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]\Bigg)$$
$$\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\,-4\,\sqrt{\text{Cos}[c+d\,x]}$$
$$\big(336\,A+296\,B+285\,C+2\,(48\,A+88\,B+93\,C)\,\text{Cos}[c+d\,x]+4\,(8\,B+15\,C)\,\text{Cos}[2\,(c+d\,x)]+$$
$$12\,C\,\text{Cos}[3\,(c+d\,x)]\big)\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg)$$

Problem 486: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 181 leaves, 5 steps):

$$\frac{a^{3/2}\,(24\,A+14\,B+11\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{8\,d}+\frac{a^2\,(24\,A+30\,B+19\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a\,(2\,B+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}+$$
$$\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 3, 345 leaves):

$$-\frac{1}{96\,d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\,\text{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3\,\left(-3\,i\,\left(24\,A+14\,B+11\,C\right)\,e^{\frac{i\,d\,x}{2}}\left(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]-\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]\right)\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}-4\,\sqrt{\text{Cos}[c+d\,x]}\,\left(24\,A+42\,B+37\,C+2\,\left(6\,B+11\,C\right)\,\text{Cos}[c+d\,x]+4\,C\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\right)\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)$$

Problem 487: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 181 leaves, 5 steps):

$$\frac{a^{3/2}\,\left(8\,A+12\,B+7\,C\right)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,d}-\frac{a^2\,\left(8\,A-4\,B-5\,C\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{a\,\left(4\,A-C\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}+\frac{2\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 3, 338 leaves):

$$-\frac{1}{16\,d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\,\text{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3\,\left(-i\,\left(8\,A+12\,B+7\,C\right)\,e^{\frac{i\,d\,x}{2}}\left(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]-\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]\right)\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}-\frac{1}{\sqrt{\text{Cos}[c+d\,x]}}4\,\left(8\,A+C+\left(4\,B+7\,C\right)\,\text{Cos}[c+d\,x]+C\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\right)\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)$$

Problem 488: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a + a \operatorname{Cos}[c + d x])^{3/2} \left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right)}{\operatorname{Cos}[c + d x]^{5/2}} \, dx$$

Optimal (type 3, 171 leaves, 5 steps):

$$\frac{a^{3/2} (2 B + 3 C) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{d} - \frac{a^2 (8 A + 6 B - 3 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{3 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{2 a (A + B) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{d \sqrt{\operatorname{Cos}[c + d x]}} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{3 d \operatorname{Cos}[c + d x]^{3/2}}$$

Result (type 3, 920 leaves):

$$\frac{1}{4}\left(2B+3C\right)\left(a\left(1+\text{Cos}[c+dx]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3$$
$$\left(\frac{1}{2}\,i\,\text{Sin}\left[\frac{c}{2}\right]\left(-\left(\left(2\,i\,e^{\frac{idx}{2}}\,\text{Log}\left[2\left(e^{idx}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{idx}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right]\right.\right.\right.\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-idx}\left(\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left(d\sqrt{2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right)-$$
$$\left(2\,i\,e^{\frac{idx}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right]\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-idx}\left(\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left(d\sqrt{2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right)+$$
$$\frac{1}{2}\text{Cos}\left[\frac{c}{2}\right]\left(-\left(\left(2\,i\,e^{\frac{idx}{2}}\,\text{Log}\left[2\left(e^{idx}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{idx}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right]\right.\right.\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-idx}\left(\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left(d\sqrt{2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right)+$$
$$\left(2\,i\,e^{\frac{idx}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right]\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-idx}\left(\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left.\left(d\sqrt{2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right)\right)+$$
$$\sqrt{\text{Cos}[c+dx]}\left(a\left(1+\text{Cos}[c+dx]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3$$
$$\left(\frac{C\,\text{Cos}\left[\frac{dx}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{2d}+\frac{C\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]}{2d}+\frac{A\,\text{Sec}[c+dx]^2\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]}{3d}+\frac{\text{Sec}[c+dx]\left(5A\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]+3B\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}{3d}\right)$$

Problem 489: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a + a \operatorname{Cos}[c + d x])^{3/2} \left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right)}{\operatorname{Cos}[c + d x]^{7/2}} \, dx$$

Optimal (type 3, 172 leaves, 5 steps):

$$\frac{2 a^{3/2} C \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{d} + \frac{2 a^2 (12 A + 20 B + 15 C) \operatorname{Sin}[c + d x]}{15 d \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{2 a (3 A + 5 B) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{15 d \operatorname{Cos}[c + d x]^{3/2}} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{5 d \operatorname{Cos}[c + d x]^{5/2}}$$

Result (type 3, 850 leaves):

$$\frac{1}{60\sqrt{2}\,d\,\text{Cos}[c+d\,x]^{5/2}\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}}$$
$$\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\left(\frac{15}{4}C\,e^{-\frac{5}{2}i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]^2\right.$$
$$\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\right)\right]$$
$$\left(i\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]-(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)^3+\frac{15}{4}C\,e^{-\frac{5}{2}i\,d\,x}$$
$$\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\right)\right]$$
$$\text{Sin}\left[\frac{c}{2}\right]^2\left(i\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]-(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)^3+$$
$$\frac{15}{4}i\,C\,e^{-\frac{5}{2}i\,d\,x}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\right]$$
$$\text{Cos}\left[\frac{c}{2}\right]^2\left((1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)^3+$$
$$\frac{15}{4}i\,C\,e^{-\frac{5}{2}i\,d\,x}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\right]$$
$$\text{Sin}\left[\frac{c}{2}\right]^2\left((1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)^3+$$
$$12\,A\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$36\,A\,\text{Cos}[c+d\,x]\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$20\,B\,\text{Cos}[c+d\,x]\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$72\sqrt{2}\,A\,\text{Cos}[c+d\,x]^2\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$100\sqrt{2}\,B\,\text{Cos}[c+d\,x]^2\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$\left.60\sqrt{2}\,C\,\text{Cos}[c+d\,x]^2\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

Problem 493: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 3, 333 leaves, 8 steps):

$$\frac{a^{5/2}\,(1304 A+1132 B+1015 C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{512 d}+\frac{a^3\,(1304 A+1132 B+1015 C)\,\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{512 d\,\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{a^3\,(1304 A+1132 B+1015 C)\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{768 d\,\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{a^3\,(680 A+628 B+545 C)\,\text{Cos}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{960 d\,\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{1}{480 d}a^2\,(120 A+156 B+115 C)\,\text{Cos}[c+d x]^{5/2}\,\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]+\frac{a\,(12 B+5 C)\,\text{Cos}[c+d x]^{5/2}\,(a+a\,\text{Cos}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{60 d}+\frac{C\,\text{Cos}[c+d x]^{5/2}\,(a+a\,\text{Cos}[c+d x])^{5/2}\,\text{Sin}[c+d x]}{6 d}$$

Result (type 3, 1142 leaves):

$$\frac{1}{4096}(1304 A+1132 B+1015 C)\,\left(a\,(1+\text{Cos}[c+d x])\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\,\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{(1+e^{2 i d x})\,\text{Cos}[c]+i\,(-1+e^{2 i d x})\,\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((1+e^{2 i d x})\,\text{Cos}[c]+i\,(-1+e^{2 i d x})\,\text{Sin}[c]\right)}\right)\Big/\left(d\,\sqrt{2\,(1+e^{2 i d x})\,\text{Cos}[c]+2\,i\,(-1+e^{2 i d x})\,\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{(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{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left((1+e^{2 i d x})\,\text{Cos}[c]+i\,(-1+e^{2 i d x})\,\text{Sin}[c]\right)}\right)\Big/\left(d\,\sqrt{2\,(1+e^{2 i d x})\,\text{Cos}[c]+2\,i\,(-1+e^{2 i d x})\,\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{(1+e^{2 i d x})\,\text{Cos}[c]+i\,(-1+e^{2 i d x})\,\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((1+e^{2 i d x})\,\text{Cos}[c]+i\,(-1+e^{2 i d x})\,\text{Sin}[c]\right)}\right)\Big/\left(d\,\sqrt{2\,(1+e^{2 i d x})\,\text{Cos}[c]+2\,i\,(-1+e^{2 i d x})\,\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{(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{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left((1+e^{2 i d x})\,\text{Cos}[c]+i\,(-1+e^{2 i d x})\,\text{Sin}[c]\right)}\right)\Big/\left(d\,\sqrt{2\,(1+e^{2 i d x})\,\text{Cos}[c]+2\,i\,(-1+e^{2 i d x})\,\text{Sin}[c]}\right)\right)+$$

$$\sqrt{\text{Cos}[c+d x]}\ (a\ (1+\text{Cos}[c+d x]))^{5/2}\ \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \left(\frac{(1000 A+896 B+805 C)\ \text{Cos}\left[\frac{d x}{2}\right]\ \text{Sin}\left[\frac{c}{2}\right]}{1920 d}+\frac{(360 A+340 B+329 C)\ \text{Cos}\left[\frac{3 d x}{2}\right]\ \text{Sin}\left[\frac{3 c}{2}\right]}{2048 d}+\frac{(50 A+61 B+65 C)\ \text{Cos}\left[\frac{5 d x}{2}\right]\ \text{Sin}\left[\frac{5 c}{2}\right]}{960 d}+\frac{(24 A+60 B+79 C)\ \text{Cos}\left[\frac{7 d x}{2}\right]\ \text{Sin}\left[\frac{7 c}{2}\right]}{3072 d}+\frac{(2 B+5 C)\ \text{Cos}\left[\frac{9 d x}{2}\right]\ \text{Sin}\left[\frac{9 c}{2}\right]}{640 d}+\frac{C\ \text{Cos}\left[\frac{11 d x}{2}\right]\ \text{Sin}\left[\frac{11 c}{2}\right]}{768 d}+\frac{(1000 A+896 B+805 C)\ \text{Cos}\left[\frac{c}{2}\right]\ \text{Sin}\left[\frac{d x}{2}\right]}{1920 d}+\frac{(360 A+340 B+329 C)\ \text{Cos}\left[\frac{3 c}{2}\right]\ \text{Sin}\left[\frac{3 d x}{2}\right]}{2048 d}+\frac{(50 A+61 B+65 C)\ \text{Cos}\left[\frac{5 c}{2}\right]\ \text{Sin}\left[\frac{5 d x}{2}\right]}{960 d}+\frac{(24 A+60 B+79 C)\ \text{Cos}\left[\frac{7 c}{2}\right]\ \text{Sin}\left[\frac{7 d x}{2}\right]}{3072 d}+\frac{(2 B+5 C)\ \text{Cos}\left[\frac{9 c}{2}\right]\ \text{Sin}\left[\frac{9 d x}{2}\right]}{640 d}+\frac{C\ \text{Cos}\left[\frac{11 c}{2}\right]\ \text{Sin}\left[\frac{11 d x}{2}\right]}{768 d}\right)$$

Problem 494: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \sqrt{\text{Cos}[c+d x]}\ (a+a\ \text{Cos}[c+d x])^{5/2}\ \left(A+B\ \text{Cos}[c+d x]+C\ \text{Cos}[c+d x]^2\right)\, dx$$

Optimal (type 3, 281 leaves, 7 steps):

$$\frac{a^{5/2}\left(400 A+326 B+283 C\right) \text{ArcSin}\left[\frac{\sqrt{a}\ \text{Sin}[c+d x]}{\sqrt{a+a \text{Cos}[c+d x]}}\right]}{128 d}+$$
$$\frac{a^3\left(400 A+326 B+283 C\right)\sqrt{\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{128 d\sqrt{a+a \text{Cos}[c+d x]}}+$$
$$\frac{a^3\left(1040 A+950 B+787 C\right)\text{Cos}[c+d x]^{3/2}\text{Sin}[c+d x]}{960 d\sqrt{a+a \text{Cos}[c+d x]}}+\frac{1}{240 d}$$
$$a^2\left(80 A+110 B+79 C\right)\text{Cos}[c+d x]^{3/2}\sqrt{a+a \text{Cos}[c+d x]}\ \text{Sin}[c+d x]+$$
$$\frac{a\left(2 B+C\right)\text{Cos}[c+d x]^{3/2}\left(a+a \text{Cos}[c+d x]\right)^{3/2}\text{Sin}[c+d x]}{8 d}+$$
$$\frac{C \text{Cos}[c+d x]^{3/2}\left(a+a \text{Cos}[c+d x]\right)^{5/2}\text{Sin}[c+d x]}{5 d}$$

Result (type 3, 1082 leaves):

$$\frac{1}{1024}\left(400 A+326 B+283 C\right)\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(\frac{1}{2} i \text{Sin}\left[\frac{c}{2}\right]\left(-\left(\left(2 i e^{\frac{i d x}{2}} \text{Log}\left[2\left(e^{i d x}\text{Cos}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.\right.$$
$$\left.\left.i e^{i d x}\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right]$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]-i \text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\Bigg)\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\Bigg)-$$
$$\left(2 i e^{\frac{i d x}{2}}\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i \text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right]\right.$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]+i \text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\Bigg)\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\Bigg)+$$
$$\frac{1}{2}\text{Cos}\left[\frac{c}{2}\right]\left(-\left(\left(2 i e^{\frac{i d x}{2}}\text{Log}\left[2\left(e^{i d x}\text{Cos}\left[\frac{c}{2}\right]+i e^{i d x}\text{Sin}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.$$
$$\left.\left.\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right]$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]-i \text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\Bigg)\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\Bigg)+$$
$$\left(2 i e^{\frac{i d x}{2}}\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i \text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right]\right.$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]+i \text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\Bigg)\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\Bigg)\Bigg)+$$
$$\sqrt{\text{Cos}[c+d x]}\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}$$
$$\text{Sec}\Big[$$

$$\left.\frac{c}{2}+\frac{d\,x}{2}\right]^5$$

$$\left(\frac{(155\,A+125\,B+112\,C)\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\,\mathrm{Sin}\left[\frac{c}{2}\right]}{240\,d}+\frac{5\,(16\,A+18\,B+17\,C)\,\mathrm{Cos}\left[\frac{3\,d\,x}{2}\right]\,\mathrm{Sin}\left[\frac{3\,c}{2}\right]}{512\,d}+\frac{(20\,A+50\,B+61\,C)\,\mathrm{Cos}\left[\frac{5\,d\,x}{2}\right]\,\mathrm{Sin}\left[\frac{5\,c}{2}\right]}{960\,d}+\frac{(2\,B+5\,C)\,\mathrm{Cos}\left[\frac{7\,d\,x}{2}\right]\,\mathrm{Sin}\left[\frac{7\,c}{2}\right]}{256\,d}+\frac{C\,\mathrm{Cos}\left[\frac{9\,d\,x}{2}\right]\,\mathrm{Sin}\left[\frac{9\,c}{2}\right]}{320\,d}+\frac{(155\,A+125\,B+112\,C)\,\mathrm{Cos}\left[\frac{c}{2}\right]\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{240\,d}+\frac{5\,(16\,A+18\,B+17\,C)\,\mathrm{Cos}\left[\frac{3\,c}{2}\right]\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]}{512\,d}+\frac{(20\,A+50\,B+61\,C)\,\mathrm{Cos}\left[\frac{5\,c}{2}\right]\,\mathrm{Sin}\left[\frac{5\,d\,x}{2}\right]}{960\,d}+\frac{(2\,B+5\,C)\,\mathrm{Cos}\left[\frac{7\,c}{2}\right]\,\mathrm{Sin}\left[\frac{7\,d\,x}{2}\right]}{256\,d}+\frac{C\,\mathrm{Cos}\left[\frac{9\,c}{2}\right]\,\mathrm{Sin}\left[\frac{9\,d\,x}{2}\right]}{320\,d}\right)$$

Problem 495: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a+a\,\mathrm{Cos}[c+d\,x])^{5/2}\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{\sqrt{\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 233 leaves, 6 steps):

$$\frac{a^{5/2}\,(304\,A+200\,B+163\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{64\,d}+\frac{a^3\,(432\,A+392\,B+299\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{192\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a^2\,(16\,A+24\,B+17\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{32\,d}+\frac{a\,(8\,B+5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{24\,d}+\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 3, 364 leaves):

$$-\frac{1}{1536\,d\,\sqrt{2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}}\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\left(-3\,i\,(304\,A+200\,B+163\,C)\,e^{\frac{i\,d\,x}{2}}\left(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\right]-\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\right)\right]\right)\sqrt{e^{-i\,d\,x}\left((1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}-4\,\sqrt{\text{Cos}[c+d\,x]}\,(528\,A+632\,B+581\,C+(96\,A+272\,B+362\,C)\,\text{Cos}[c+d\,x]+4\,(8\,B+23\,C)\,\text{Cos}[2\,(c+d\,x)]+12\,C\,\text{Cos}[3\,(c+d\,x)])\,\sqrt{\text{Cos}[c+d\,x]}\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 496: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^{5/2}\,(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 231 leaves, 6 steps):

$$\frac{a^{5/2}\,(40\,A+38\,B+25\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{8\,d}-\frac{a^3\,(24\,A-54\,B-49\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{a^2\,(8\,A-2\,B-3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}-\frac{a\,(6\,A-C)\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 3, 364 leaves):

$$-\frac{1}{192\,d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5\,\left(-3\,i\,\left(40\,A+38\,B+25\,C\right)\,e^{\frac{i\,d\,x}{2}}\left(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]-\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]\right)\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}-\frac{1}{\sqrt{\text{Cos}[c+d\,x]}}4\,\left(48\,A+6\,B+17\,C+3\,\left(8\,A+22\,B+27\,C\right)\,\text{Cos}[c+d\,x]+\left(6\,B+17\,C\right)\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]+2\,C\,\text{Cos}\left[3\,\left(c+d\,x\right)\right]\right)\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)$$

Problem 497: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 233 leaves, 6 steps):

$$\frac{a^{5/2}\,\left(8\,A+20\,B+19\,C\right)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,d}-\frac{a^3\,\left(56\,A+12\,B-27\,C\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{a^2\,\left(8\,A+4\,B-C\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}+\frac{2\,a\,\left(5\,A+3\,B\right)\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 3, 364 leaves):

$$-\frac{1}{96\,d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5\,\left(-3\,i\,\left(8\,A+20\,B+19\,C\right)\,e^{\frac{i\,d\,x}{2}}\left(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]-\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]\right)\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}-\frac{1}{\text{Cos}[c+d\,x]^{3/2}}2\,\left(16\,A+12\,B+33\,C+\left(128\,A+48\,B+9\,C\right)\,\text{Cos}[c+d\,x]+3\,\left(4\,B+11\,C\right)\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]+3\,C\,\text{Cos}\left[3\,\left(c+d\,x\right)\right]\right)\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)$$

Problem 498: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a + a \operatorname{Cos}[c + d x])^{5/2} \left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right)}{\operatorname{Cos}[c + d x]^{7/2}} \, dx$$

Optimal (type 3, 223 leaves, 6 steps):

$$\frac{a^{5/2} (2 B + 5 C) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{d} - \frac{a^3 (64 A + 70 B + 15 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{15 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{2 a^2 (8 A + 10 B + 5 C) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{5 d \sqrt{\operatorname{Cos}[c + d x]}} + \frac{2 a (A + B) (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{3 d \operatorname{Cos}[c + d x]^{3/2}} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^{5/2} \operatorname{Sin}[c + d x]}{5 d \operatorname{Cos}[c + d x]^{5/2}}$$

Result (type 3, 984 leaves):

$$\frac{1}{8}\,(2 B+5 C)\,\left(a\,(1+\text{Cos}[c+d x])\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5$$

$$\left(\frac{1}{2}\,i\,\text{Sin}\left[\frac{c}{2}\right]\left(-\left(\left(2\,i\,e^{\frac{i d x}{2}}\,\text{Log}\left[2\left(e^{i d x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i d x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right]\right.\right.\right.\right.$$

$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right)\Big/$$

$$\left.\left(d\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right)-$$

$$\left(2\,i\,e^{\frac{i d x}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right]\right.$$

$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right)\Big/$$

$$\left.\left(d\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right)+$$

$$\frac{1}{2}\,\text{Cos}\left[\frac{c}{2}\right]\left(-\left(\left(2\,i\,e^{\frac{i d x}{2}}\,\text{Log}\left[2\left(e^{i d x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i d x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right]\right.\right.\right.$$

$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right)\Big/$$

$$\left.\left(d\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right)+$$

$$\left(2\,i\,e^{\frac{i d x}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right]\right.$$

$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}\right)\Big/$$

$$\left.\left.\left(d\sqrt{2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\right)\right)\right)+$$

$$\sqrt{\text{Cos}[c+d x]}\,\left(a\,(1+\text{Cos}[c+d x])\right)^{5/2}$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5$$

$$\left(\frac{C\,\text{Cos}\left[\frac{d x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{4 d}+\frac{C\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]}{4 d}+\right.$$

$$\frac{A\,\text{Sec}[c+d x]^3\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]}{10 d}+$$

$$\frac{\text{Sec}[c+d x]^2\left(14 A\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+5 B\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}{30 d}+$$

$$\frac{1}{30 d}\,\text{Sec}[c+d x]$$

$$\left.\left(43 A\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+40 B\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+15 C\,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)$$

Problem 499: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a + a \operatorname{Cos}[c + d x])^{5/2} \left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right)}{\operatorname{Cos}[c + d x]^{9/2}} \, dx$$

Optimal (type 3, 222 leaves, 6 steps):

$$\frac{2 a^{5/2} C \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{d} + \frac{2 a^3 (160 A + 224 B + 245 C) \operatorname{Sin}[c + d x]}{105 d \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{2 a^2 (40 A + 56 B + 35 C) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{105 d \operatorname{Cos}[c + d x]^{3/2}} + \frac{2 a (5 A + 7 B) (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{35 d \operatorname{Cos}[c + d x]^{5/2}} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^{5/2} \operatorname{Sin}[c + d x]}{7 d \operatorname{Cos}[c + d x]^{7/2}}$$

Result (type 3, 1000 leaves):

$$\frac{1}{4} C \left(a \left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5$$
$$\left(\frac{1}{2} \mathrm{i} \,\text{Sin}\left[\frac{c}{2}\right] \left(-\left(\left(2 \mathrm{i} \,e^{\frac{\mathrm{i} d x}{2}} \text{Log}\left[2 \left(e^{\mathrm{i} d x} \text{Cos}\left[\frac{c}{2}\right]+\mathrm{i} \,e^{\mathrm{i} d x} \text{Sin}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.$$
$$\left.\left.\sqrt{\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right)\right]$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-\mathrm{i} \,\text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-\mathrm{i} d x} \left(\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]\right)}\right) \Bigg/$$
$$\left.\left(d \sqrt{2 \left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+2 \mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right)\right)-$$
$$\left(2 \mathrm{i} \,e^{\frac{\mathrm{i} d x}{2}} \text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+\mathrm{i} \,\text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right]\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+\mathrm{i} \,\text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-\mathrm{i} d x} \left(\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]\right)}\right) \Bigg/$$
$$\left.\left(d \sqrt{2 \left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+2 \mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right)\right)+$$
$$\frac{1}{2} \text{Cos}\left[\frac{c}{2}\right] \left(-\left(\left(2 \mathrm{i} \,e^{\frac{\mathrm{i} d x}{2}} \text{Log}\left[2 \left(e^{\mathrm{i} d x} \text{Cos}\left[\frac{c}{2}\right]+\mathrm{i} \,e^{\mathrm{i} d x} \text{Sin}\left[\frac{c}{2}\right]+\right.\right.\right.\right.$$
$$\left.\left.\sqrt{\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right)\right]$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-\mathrm{i} \,\text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-\mathrm{i} d x} \left(\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]\right)}\right) \Bigg/$$
$$\left.\left(d \sqrt{2 \left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+2 \mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right)\right)+$$
$$\left(2 \mathrm{i} \,e^{\frac{\mathrm{i} d x}{2}} \text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+\mathrm{i} \,\text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right]\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+\mathrm{i} \,\text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-\mathrm{i} d x} \left(\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]\right)}\right) \Bigg/$$
$$\left.\left.\left.\left(d \sqrt{2 \left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+2 \mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right)\right)\right)\right)+$$
$$\sqrt{\text{Cos}[c+d x]} \left(a \left(1+\text{Cos}[c+d x]\right)\right)^{5/2}$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5$$
$$\left(\frac{A \,\text{Sec}[c+d x]^4 \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]}{14 d}+\frac{\text{Sec}[c+d x]^3 \left(20 A \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+7 B \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}{70 d}+\right.$$
$$\frac{1}{210 d}$$
$$\text{Sec}[c+d x]^2$$
$$\left(115 A \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+98 B \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+35 C \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)+\frac{1}{210 d}$$
$$\left.\text{Sec}[c+d x] \left(230 A \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+301 B \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+280 C \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)$$

Problem 503: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Cos}[c+d x]^{3/2} \left(A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right)}{\sqrt{a+a \text{Cos}[c+d x]}} \, dx$$

Optimal (type 3, 241 leaves, 8 steps):

$$-\frac{(8 A-14 B+9 C) \text{ArcSin}\left[\frac{\sqrt{a} \text{Sin}[c+d x]}{\sqrt{a+a \text{Cos}[c+d x]}}\right]}{8 \sqrt{a} d}+\frac{\sqrt{2} (A-B+C) \text{ArcTan}\left[\frac{\sqrt{a} \text{Sin}[c+d x]}{\sqrt{2} \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}\right]}{\sqrt{a} d}+\frac{(8 A-2 B+7 C) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{8 d \sqrt{a+a \text{Cos}[c+d x]}}+\frac{(6 B-C) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{12 d \sqrt{a+a \text{Cos}[c+d x]}}+\frac{C \text{Cos}[c+d x]^{5/2} \text{Sin}[c+d x]}{3 d \sqrt{a+a \text{Cos}[c+d x]}}$$

Result (type 3, 449 leaves):

$$\frac{1}{48 d \sqrt{a (1+\text{Cos}[c+d x])}} \text{Cos}\left[\frac{1}{2} (c+d x)\right] \left(\frac{1}{\sqrt{1+e^{2 i (c+d x)}}} 3 \sqrt{2} e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)} \left(1+e^{2 i (c+d x)}\right)} \left(-8 A d x+14 B d x-9 C d x+i (8 A-14 B+9 C) \text{ArcSinh}\left[e^{i (c+d x)}\right]-16 i \sqrt{2} (A-B+C) \text{Log}\left[1+e^{i (c+d x)}\right]-8 i A \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]+14 i B \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-9 i C \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]+16 i \sqrt{2} A \text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]-16 i \sqrt{2} B \text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]+16 i \sqrt{2} C \text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)+4 \sqrt{\text{Cos}[c+d x]} (24 A-6 B+25 C+2 (6 B-C) \text{Cos}[c+d x]+4 C \text{Cos}[2 (c+d x)]) \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)$$

Problem 504: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\text{Cos}[c+d x]} \left(A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right)}{\sqrt{a+a \text{Cos}[c+d x]}} \, dx$$

Optimal (type 3, 195 leaves, 7 steps):

$$\frac{(8A-4B+7C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{4\sqrt{a}\,d}-\frac{\sqrt{2}\,(A-B+C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{\sqrt{a}\,d}+$$
$$\frac{(4B-C)\,\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{4d\sqrt{a+a\,\text{Cos}[c+dx]}}+\frac{C\,\text{Cos}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{2d\sqrt{a+a\,\text{Cos}[c+dx]}}$$

Result (type 3, 431 leaves):

$$\frac{1}{8\sqrt{a\,(1+\text{Cos}[c+dx])}}$$
$$\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left(\frac{1}{d\sqrt{1+e^{2i(c+dx)}}}\sqrt{2}\,e^{\frac{1}{2}i(c+dx)}\sqrt{e^{-i(c+dx)}\left(1+e^{2i(c+dx)}\right)}\right.$$
$$\Big(8Adx-4Bdx+7Cdx-i\,(8A-4B+7C)\,\text{ArcSinh}\left[e^{i(c+dx)}\right]+$$
$$8i\sqrt{2}\,(A-B+C)\,\text{Log}\left[1+e^{i(c+dx)}\right]+8iA\,\text{Log}\left[1+\sqrt{1+e^{2i(c+dx)}}\right]-$$
$$4iB\,\text{Log}\left[1+\sqrt{1+e^{2i(c+dx)}}\right]+7iC\,\text{Log}\left[1+\sqrt{1+e^{2i(c+dx)}}\right]-8i\sqrt{2}\,A$$
$$\text{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]+8i\sqrt{2}\,B\,\text{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]-$$
$$8i\sqrt{2}\,C\,\text{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]\Big)+$$
$$\left.\frac{4\sqrt{\text{Cos}[c+dx]}\,(4B-C+2C\,\text{Cos}[c+dx])\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{d}\right)$$

Problem 505: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+dx]+C\,\text{Cos}[c+dx]^2}{\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\,dx$$

Optimal (type 3, 141 leaves, 6 steps):

$$\frac{(2B-C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{\sqrt{a}\,d}+$$
$$\frac{\sqrt{2}\,(A-B+C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{\sqrt{a}\,d}+\frac{C\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{d\sqrt{a+a\,\text{Cos}[c+dx]}}$$

Result (type 3, 383 leaves):

$$\frac{1}{2\sqrt{a\left(1+\text{Cos}[c+d x]\right)}}\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]\left(\frac{1}{d\sqrt{1+e^{2 i (c+d x)}}}\sqrt{2}\,e^{\frac{1}{2} i (c+d x)}\sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\right.$$
$$\left(2 B d x-C d x-i\left(2 B-C\right)\text{ArcSinh}\left[e^{i (c+d x)}\right]-2 i\sqrt{2}\left(A-B+C\right)\text{Log}\left[1+e^{i (c+d x)}\right]+\right.$$
$$2 i B\,\text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-i C\,\text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]+2 i\sqrt{2}\,A$$
$$\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]-2 i\sqrt{2}\,B\,\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]+$$
$$\left.\left.2 i\sqrt{2}\,C\,\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]\right)+\frac{4 C\sqrt{\text{Cos}[c+d x]}\,\text{Sin}\left[\frac{1}{2}\left(c+d x\right)\right]}{d}\right)$$

Problem 506: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2}{\text{Cos}[c+d x]^{3/2}\sqrt{a+a\,\text{Cos}[c+d x]}}\,dx$$

Optimal (type 3, 138 leaves, 6 steps):

$$\frac{2 C\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{\sqrt{a}\,d}-$$
$$\frac{\sqrt{2}\left(A-B+C\right)\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{2}\sqrt{\text{Cos}[c+d x]}\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{\sqrt{a}\,d}+\frac{2 A\,\text{Sin}[c+d x]}{d\sqrt{\text{Cos}[c+d x]}\sqrt{a+a\,\text{Cos}[c+d x]}}$$

Result (type 3, 340 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]\left(\frac{1}{\sqrt{1+e^{2 i (c+d x)}}}\sqrt{2}\,e^{\frac{1}{2} i (c+d x)}\sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\right.\right.$$
$$\left(C d x-i C\,\text{ArcSinh}\left[e^{i (c+d x)}\right]+i\sqrt{2}\left(A-B+C\right)\text{Log}\left[1+e^{i (c+d x)}\right]+\right.$$
$$i C\,\text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-i\sqrt{2}\,A\,\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]+i\sqrt{2}\,B$$
$$\left.\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]-i\sqrt{2}\,C\,\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]\right)+$$
$$\left.\left.\frac{4 A\,\text{Sin}\left[\frac{1}{2}\left(c+d x\right)\right]}{\sqrt{\text{Cos}[c+d x]}}\right)\right)\Big/\left(d\sqrt{a\left(1+\text{Cos}[c+d x]\right)}\right)$$

Problem 507: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2}{\text{Cos}[c+d x]^{5/2}\sqrt{a+a\,\text{Cos}[c+d x]}}\,dx$$

Optimal (type 3, 143 leaves, 5 steps):

$$\frac{\sqrt{2}\,(A-B+C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{2\,A\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{2\,(A-3\,B)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 207 leaves):

$$\left(2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(-\frac{1}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}3\,i\,(A-B+C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\sqrt{e^{-i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\frac{2\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}[c+d\,x]^{3/2}}-\frac{2\,(A-3\,B)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right)\right)\Big/\left(3\,d\,\sqrt{a\,(1+\text{Cos}[c+d\,x])}\right)$$

Problem 508: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{7/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 191 leaves, 6 steps):

$$-\frac{\sqrt{2}\,(A-B+C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{2\,A\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{2\,(A-5\,B)\,\text{Sin}[c+d\,x]}{15\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{2\,(13\,A-5\,B+15\,C)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 239 leaves):

$$\left(2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(\frac{1}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}15\,i\,(A-B+C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\sqrt{e^{-i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\frac{6\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}[c+d\,x]^{5/2}}-\frac{2\,(A-5\,B)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,(13\,A-5\,B+15\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right)\right)\Big/\left(15\,d\,\sqrt{a\,(1+\text{Cos}[c+d\,x])}\right)$$

Problem 509: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2}{\operatorname{Cos}[c + d x]^{9/2} \sqrt{a + a \operatorname{Cos}[c + d x]}} \, dx$$

Optimal (type 3, 237 leaves, 7 steps):

$$\frac{\sqrt{2} (A - B + C) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{\sqrt{a} d} + \frac{2 A \operatorname{Sin}[c + d x]}{7 d \operatorname{Cos}[c + d x]^{7/2} \sqrt{a + a \operatorname{Cos}[c + d x]}} - \frac{2 (A - 7 B) \operatorname{Sin}[c + d x]}{35 d \operatorname{Cos}[c + d x]^{5/2} \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{2 (31 A - 7 B + 35 C) \operatorname{Sin}[c + d x]}{105 d \operatorname{Cos}[c + d x]^{3/2} \sqrt{a + a \operatorname{Cos}[c + d x]}} - \frac{2 (43 A - 91 B + 35 C) \operatorname{Sin}[c + d x]}{105 d \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + a \operatorname{Cos}[c + d x]}}$$

Result (type 3, 262 leaves):

$$\left(\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] \left(-\left(\left(2 i (A - B + C) e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)} \left(1 + e^{2 i (c+d x)}\right)} \left(\operatorname{Log}\left[1 + e^{i (c+d x)}\right] - \operatorname{Log}\left[1 - e^{i (c+d x)} + \sqrt{2} \sqrt{1 + e^{2 i (c+d x)}}\right]\right)\right) \Big/ \left(d \sqrt{1 + e^{2 i (c+d x)}}\right)\right) - \left(\left(-122 A + 14 B - 70 C + 3 (47 A - 119 B + 35 C) \operatorname{Cos}[c + d x] - 2 (31 A - 7 B + 35 C) \operatorname{Cos}[2 (c + d x)] + 43 A \operatorname{Cos}[3 (c + d x)] - 91 B \operatorname{Cos}[3 (c + d x)] + 35 C \operatorname{Cos}[3 (c + d x)]\right) \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right) \Big/ \left(105 d \operatorname{Cos}[c + d x]^{7/2}\right)\right)\right) \Big/ \left(\sqrt{a (1 + \operatorname{Cos}[c + d x])}\right)$$

Problem 510: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\operatorname{Cos}[c + d x]} \left(a A + (A b + a B) \operatorname{Cos}[c + d x] + b B \operatorname{Cos}[c + d x]^2\right)}{\sqrt{a + a \operatorname{Cos}[c + d x]}} \, dx$$

Optimal (type 3, 213 leaves, 7 steps):

$$\frac{(8 a A - 4 A b - 4 a B + 7 b B) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{4 \sqrt{a} d} - \frac{\sqrt{2} (a - b) (A - B) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{\sqrt{a} d} + \frac{(4 A b + 4 a B - b B) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{4 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{b B \operatorname{Cos}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{2 d \sqrt{a + a \operatorname{Cos}[c + d x]}}$$

Result (type 3, 540 leaves):

$$\frac{1}{8\sqrt{a\left(1+\text{Cos}[c+d\,x]\right)}}\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\left(\frac{1}{d\sqrt{1+e^{2\,i\,(c+d\,x)}}}\sqrt{2}\;e^{\frac{1}{2}\,i\,(c+d\,x)}\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\right.$$
$$\left(8\,a\,A\,d\,x-4\,A\,b\,d\,x-4\,a\,B\,d\,x+7\,b\,B\,d\,x-i\left(8\,a\,A-4\,A\,b-4\,a\,B+7\,b\,B\right)\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]+\right.$$
$$8\,i\,\sqrt{2}\left(a-b\right)\left(A-B\right)\text{Log}\left[1+e^{i\,(c+d\,x)}\right]+8\,i\,a\,A\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-$$
$$4\,i\,A\,b\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-4\,i\,a\,B\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+$$
$$7\,i\,b\,B\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-8\,i\,\sqrt{2}\,a\,A\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+$$
$$8\,i\,\sqrt{2}\,A\,b\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+8\,i\,\sqrt{2}\,a\,B\,\text{Log}\left[\right.$$
$$\left.\left.1-e^{i\,(c+d\,x)}+\sqrt{2}\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-8\,i\,\sqrt{2}\,b\,B\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+$$
$$\left.\frac{1}{d}4\sqrt{\text{Cos}[c+d\,x]}\left(4\,A\,b+4\,a\,B-b\,B+2\,b\,B\,\text{Cos}[c+d\,x]\right)\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)$$

Problem 511: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 3, 260 leaves, 8 steps):

$$\frac{\left(8\,A-12\,B+19\,C\right)\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,a^{3/2}\,d}-$$
$$\frac{\left(5\,A-9\,B+13\,C\right)\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{2\sqrt{2}\,a^{3/2}\,d}-\frac{\left(A-B+C\right)\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{2\,d\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}}-$$
$$\frac{\left(2\,A-6\,B+7\,C\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,a\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{\left(A-B+2\,C\right)\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{2\,a\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 462 leaves):

$$\frac{1}{4\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}}\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\left(\frac{1}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}\sqrt{2}\,e^{\frac{1}{2}\,i\,(c+d\,x)}\sqrt{e^{-i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\right.$$
$$\left(8\,A\,d\,x-12\,B\,d\,x+19\,C\,d\,x-i\,(8\,A-12\,B+19\,C)\,\mathrm{ArcSinh}\left[e^{i\,(c+d\,x)}\right]+2\,i\,\sqrt{2}\,(5\,A-9\,B+13\,C)\right.$$
$$\mathrm{Log}\left[1+e^{i\,(c+d\,x)}\right]+8\,i\,A\,\mathrm{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-12\,i\,B\,\mathrm{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+$$
$$19\,i\,C\,\mathrm{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-10\,i\,\sqrt{2}\,A\,\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+$$
$$18\,i\,\sqrt{2}\,B\,\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-$$
$$\left.26\,i\,\sqrt{2}\,C\,\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+$$
$$2\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(-2\,A+6\,B-6\,C+(4\,B-3\,C)\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[2\,(c+d\,x)]\right)$$
$$\left.\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 512: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{(a+a\,\mathrm{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 202 leaves, 7 steps):

$$\frac{(2\,B-3\,C)\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{a^{3/2}\,d}+\frac{(A-5\,B+9\,C)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-$$
$$\frac{(A-B+C)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{2\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^{3/2}}+\frac{(A-B+3\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{2\,a\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 3, 413 leaves):

$$\frac{1}{2\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}}\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\left(\frac{1}{d\,\sqrt{1+e^{2\,i\,(c+d\,x)}}}\sqrt{2}\,e^{\frac{1}{2}\,i\,(c+d\,x)}\sqrt{e^{-i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\right.$$
$$\left(4\,B\,d\,x-6\,C\,d\,x-2\,i\,(2\,B-3\,C)\,\mathrm{ArcSinh}\left[e^{i\,(c+d\,x)}\right]-i\,\sqrt{2}\,(A-5\,B+9\,C)\,\mathrm{Log}\left[1+e^{i\,(c+d\,x)}\right]+\right.$$
$$4\,i\,B\,\mathrm{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-6\,i\,C\,\mathrm{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+i\,\sqrt{2}\,A$$
$$\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-5\,i\,\sqrt{2}\,B\,\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+$$
$$\left.9\,i\,\sqrt{2}\,C\,\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\frac{1}{d}$$
$$\left.2\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(A-B+3\,C+2\,C\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 513: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2}{\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 3, 149 leaves, 6 steps):

$$\frac{2\,C\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{a^{3/2}\,d}+\frac{(3\,A+B-5\,C)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{(A-B+C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{2\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}$$

Result (type 3, 366 leaves):

$$\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\left(\left(\sqrt{2}\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{e^{-i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\,\left(4\,C\,d\,x-4\,i\,C\,\mathrm{ArcSinh}\left[e^{i\,(c+d\,x)}\right]-i\,\sqrt{2}\right.\right.\right.\right.$$
$$(3\,A+B-5\,C)\,\mathrm{Log}\left[1+e^{i\,(c+d\,x)}\right]+4\,i\,C\,\mathrm{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+3\,i\,\sqrt{2}\,A\,\mathrm{Log}\Big[$$
$$1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\Big]+i\,\sqrt{2}\,B\,\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-$$
$$\left.\left.5\,i\,\sqrt{2}\,C\,\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/\left(d\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right)-$$
$$\left.\left.\frac{2\,(A-B+C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{d}\right)\right)\Big/$$
$$\left(2\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\right)$$

Problem 514: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2}{\mathrm{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 3, 161 leaves, 5 steps):

$$-\frac{(7\,A-3\,B-C)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{(A-B+C)\,\mathrm{Sin}[c+d\,x]}{2\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}+\frac{(5\,A-B+C)\,\mathrm{Sin}[c+d\,x]}{2\,a\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 3, 213 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left(\left(i\,(7A-3B-C)\,e^{\frac{1}{2}i(c+dx)}\sqrt{e^{-i(c+dx)}\left(1+e^{2i(c+dx)}\right)}\left(\text{Log}\left[1+e^{i(c+dx)}\right]-\text{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]\right)\right)\Big/\left(d\sqrt{1+e^{2i(c+dx)}}\right)+\left((4A+(5A-B+C)\,\text{Cos}[c+dx])\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right)\Big/\left(d\sqrt{\text{Cos}[c+dx]}\right)\right)\right)\Big/\left(a\,(1+\text{Cos}[c+dx])\right)^{3/2}$$

Problem 515: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+dx]+C\,\text{Cos}[c+dx]^2}{\text{Cos}[c+dx]^{5/2}\,(a+a\,\text{Cos}[c+dx])^{3/2}}\,dx$$

Optimal (type 3, 213 leaves, 6 steps):

$$\frac{(11A-7B+3C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{2\sqrt{2}\,a^{3/2}\,d}-\frac{(A-B+C)\,\text{Sin}[c+dx]}{2\,d\,\text{Cos}[c+dx]^{3/2}\,(a+a\,\text{Cos}[c+dx])^{3/2}}+\frac{(7A-3B+3C)\,\text{Sin}[c+dx]}{6\,a\,d\,\text{Cos}[c+dx]^{3/2}\sqrt{a+a\,\text{Cos}[c+dx]}}-\frac{(19A-15B+3C)\,\text{Sin}[c+dx]}{6\,a\,d\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}$$

Result (type 3, 239 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left(-\left(\left(i\,(11A-7B+3C)\,e^{\frac{1}{2}i(c+dx)}\sqrt{e^{-i(c+dx)}\left(1+e^{2i(c+dx)}\right)}\left(\text{Log}\left[1+e^{i(c+dx)}\right]-\text{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]\right)\right)\Big/\left(d\sqrt{1+e^{2i(c+dx)}}\right)\right)-\left((11A-15B+3C+24(A-B)\,\text{Cos}[c+dx]+(19A-15B+3C)\,\text{Cos}[2(c+dx)])\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right)\Big/\left(6\,d\,\text{Cos}[c+dx]^{3/2}\right)\right)\right)\Big/\left(a\,(1+\text{Cos}[c+dx])\right)^{3/2}$$

Problem 516: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+dx]+C\,\text{Cos}[c+dx]^2}{\text{Cos}[c+dx]^{7/2}\,(a+a\,\text{Cos}[c+dx])^{3/2}}\,dx$$

Optimal (type 3, 263 leaves, 7 steps):

$$-\frac{(15A-11B+7C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{2\sqrt{2}\,a^{3/2}\,d}-\frac{(A-B+C)\,\text{Sin}[c+dx]}{2\,d\,\text{Cos}[c+dx]^{5/2}\,(a+a\,\text{Cos}[c+dx])^{3/2}}+\frac{(9A-5B+5C)\,\text{Sin}[c+dx]}{10\,a\,d\,\text{Cos}[c+dx]^{5/2}\sqrt{a+a\,\text{Cos}[c+dx]}}-\frac{(39A-35B+15C)\,\text{Sin}[c+dx]}{30\,a\,d\,\text{Cos}[c+dx]^{3/2}\sqrt{a+a\,\text{Cos}[c+dx]}}+\frac{(147A-95B+75C)\,\text{Sin}[c+dx]}{30\,a\,d\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}$$

Result (type 3, 277 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^3\left(\left(i\,(15\,A-11\,B+7\,C)\,e^{\frac{1}{2}i\,(c+d\,x)}\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/\left(d\sqrt{1+e^{2\,i\,(c+d\,x)}}\right)+\left(\left(264\,A-120\,B+120\,C+(393\,A-205\,B+225\,C)\,\text{Cos}[c+d\,x]+24\,(9\,A-5\,B+5\,C)\,\text{Cos}[2\,(c+d\,x)]+147\,A\,\text{Cos}[3\,(c+d\,x)]-95\,B\,\text{Cos}[3\,(c+d\,x)]+75\,C\,\text{Cos}[3\,(c+d\,x)]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big/\left(60\,d\,\text{Cos}[c+d\,x]^{5/2}\right)\right)\right)\Big/\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}$$

Problem 517: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{(a+a\,\text{Cos}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 254 leaves, 8 steps):

$$\frac{(2\,B-5\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{a^{5/2}\,d}+\frac{(3\,A-43\,B+115\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{16\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B+C)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{4\,d\,(a+a\,\text{Cos}[c+d\,x])^{5/2}}+\frac{(A+7\,B-15\,C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(3\,A-11\,B+35\,C)\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{16\,a^2\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 434 leaves):

$$\frac{1}{8\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\left(\frac{1}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}\sqrt{2}\,e^{\frac{1}{2}i\,(c+d\,x)}\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\left(32\,B\,d\,x-80\,C\,d\,x-16\,i\,(2\,B-5\,C)\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]-i\sqrt{2}\,(3\,A-43\,B+115\,C)\,\text{Log}\left[1+e^{i\,(c+d\,x)}\right]+32\,i\,B\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-80\,i\,C\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+3\,i\sqrt{2}\,A\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-43\,i\sqrt{2}\,B\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+115\,i\sqrt{2}\,C\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\sqrt{\text{Cos}[c+d\,x]}\left(3\,A-11\,B+43\,C+(7\,A-15\,B+55\,C)\,\text{Cos}[c+d\,x]+8\,C\,\text{Cos}[2\,(c+d\,x)]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

Problem 518: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\sqrt{\text{Cos}[c+d x]}\,\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)}{\left(a+a\,\text{Cos}[c+d x]\right)^{5/2}}\,dx$$

Optimal (type 3, 201 leaves, 7 steps):

$$\frac{2\,C\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{a^{5/2}\,d}+\frac{(5\,A+3\,B-43\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B+C)\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{4\,d\,\left(a+a\,\text{Cos}[c+d x]\right)^{5/2}}+\frac{(5\,A+3\,B-11\,C)\,\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{16\,a\,d\,\left(a+a\,\text{Cos}[c+d x]\right)^{3/2}}$$

Result (type 3, 385 leaves):

$$\frac{1}{8\,d\,\left(a\,\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}}\text{Cos}\left[\frac{1}{2}\,(c+d x)\right]^5\left(\frac{1}{\sqrt{1+e^{2\,i\,(c+d x)}}}\sqrt{2}\,e^{\frac{1}{2}\,i\,(c+d x)}\,\sqrt{e^{-i\,(c+d x)}\,\left(1+e^{2\,i\,(c+d x)}\right)}\right.$$
$$\left(32\,C\,d\,x-32\,i\,C\,\text{ArcSinh}\left[e^{i\,(c+d x)}\right]-i\,\sqrt{2}\,(5\,A+3\,B-43\,C)\,\text{Log}\left[1+e^{i\,(c+d x)}\right]+\right.$$
$$32\,i\,C\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d x)}}\right]+5\,i\,\sqrt{2}\,A\,\text{Log}\left[1-e^{i\,(c+d x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d x)}}\right]+$$
$$3\,i\,\sqrt{2}\,B\,\text{Log}\left[1-e^{i\,(c+d x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d x)}}\right]-$$
$$\left.43\,i\,\sqrt{2}\,C\,\text{Log}\left[1-e^{i\,(c+d x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d x)}}\right]\right)+$$
$$\left.\sqrt{\text{Cos}[c+d x]}\,\left(5\,A+3\,B-11\,C+(A+7\,B-15\,C)\,\text{Cos}[c+d x]\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d x)\right]^3\,\text{Tan}\left[\frac{1}{2}\,(c+d x)\right]\right)$$

Problem 519: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2}{\sqrt{\text{Cos}[c+d x]}\,\left(a+a\,\text{Cos}[c+d x]\right)^{5/2}}\,dx$$

Optimal (type 3, 163 leaves, 5 steps):

$$\frac{(19\,A+5\,B+3\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B+C)\,\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{4\,d\,\left(a+a\,\text{Cos}[c+d x]\right)^{5/2}}-\frac{(9\,A-B-7\,C)\,\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{16\,a\,d\,\left(a+a\,\text{Cos}[c+d x]\right)^{3/2}}$$

Result (type 3, 226 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\left(-\frac{1}{\sqrt{1+e^{2 i (c+d x)}}} i (19 A+5 B+3 C)\, e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\left(\text{Log}\left[1+e^{i (c+d x)}\right]-\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)-\frac{1}{2} \sqrt{\text{Cos}[c+d x]}\,(13 A-5 B-3 C+(9 A-B-7 C) \text{Cos}[c+d x]) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/ \left(4 d\left(a(1+\text{Cos}[c+d x])\right)^{5/2}\right)$$

Problem 520: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2}{\text{Cos}[c+d x]^{3/2}(a+a \text{Cos}[c+d x])^{5/2}}\, dx$$

Optimal (type 3, 211 leaves, 6 steps):

$$-\frac{(75 A-19 B-5 C) \text{ArcTan}\left[\frac{\sqrt{a} \text{Sin}[c+d x]}{\sqrt{2} \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}\right]}{16 \sqrt{2}\, a^{5/2} d}-\frac{(A-B+C) \text{Sin}[c+d x]}{4 d \sqrt{\text{Cos}[c+d x]}\,(a+a \text{Cos}[c+d x])^{5/2}}-\frac{(13 A-5 B-3 C) \text{Sin}[c+d x]}{16 a d \sqrt{\text{Cos}[c+d x]}\,(a+a \text{Cos}[c+d x])^{3/2}}+\frac{(49 A-9 B+C) \text{Sin}[c+d x]}{16 a^2 d \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}$$

Result (type 3, 242 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\left(\frac{1}{\sqrt{1+e^{2 i (c+d x)}}} i (75 A-19 B-5 C)\, e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\left(\text{Log}\left[1+e^{i (c+d x)}\right]-\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)+\left((113 A-9 B+C+2 (85 A-13 B+5 C) \text{Cos}[c+d x]+(49 A-9 B+C) \text{Cos}[2 (c+d x)]) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^3 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right) \Big/ \left(4 \sqrt{\text{Cos}[c+d x]}\right)\right)\right) \Big/ \left(4 d\left(a(1+\text{Cos}[c+d x])\right)^{5/2}\right)$$

Problem 521: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2}{\text{Cos}[c+d x]^{5/2}(a+a \text{Cos}[c+d x])^{5/2}}\, dx$$

Optimal (type 3, 261 leaves, 7 steps):

$$\frac{(163\,A-75\,B+19\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B+C)\,\text{Sin}[c+d\,x]}{4\,d\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^{5/2}}-\frac{(17\,A-9\,B+C)\,\text{Sin}[c+d\,x]}{16\,a\,d\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(95\,A-39\,B+15\,C)\,\text{Sin}[c+d\,x]}{48\,a^2\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{(299\,A-147\,B+27\,C)\,\text{Sin}[c+d\,x]}{48\,a^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 279 leaves):

$$-\left(\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\left(\frac{1}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}3\,i\,(163\,A-75\,B+19\,C)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\left(\left(878\,A-510\,B+78\,C+(1537\,A-825\,B+81\,C)\,\text{Cos}[c+d\,x]+2\,(503\,A-255\,B+39\,C)\,\text{Cos}[2\,(c+d\,x)]+299\,A\,\text{Cos}[3\,(c+d\,x)]-147\,B\,\text{Cos}[3\,(c+d\,x)]+27\,C\,\text{Cos}[3\,(c+d\,x)]\right)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Big/\left(8\,\text{Cos}[c+d\,x]^{3/2}\right)\right)\right)\Big/\left(12\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\right)\right)$$

Problem 525: Result more than twice size of optimal antiderivative.

$$\int(a+b\,\text{Cos}[c+d\,x])\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]\,dx$$

Optimal (type 3, 58 leaves, 4 steps):

$$\frac{1}{2}b\,(2\,A+C)\,x+\frac{a\,A\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{a\,C\,\text{Sin}[c+d\,x]}{d}+\frac{b\,C\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 3, 131 leaves):

$$A\,b\,x+\frac{b\,C\,(c+d\,x)}{2\,d}-\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,C\,\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+\frac{a\,C\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}+\frac{b\,C\,\text{Sin}[2\,(c+d\,x)]}{4\,d}$$

Problem 526: Result more than twice size of optimal antiderivative.

$$\int(a+b\,\text{Cos}[c+d\,x])\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^2\,dx$$

Optimal (type 3, 42 leaves, 4 steps):

$$a\,C\,x+\frac{A\,b\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{b\,C\,\text{Sin}[c+d\,x]}{d}+\frac{a\,A\,\text{Tan}[c+d\,x]}{d}$$

Result (type 3, 112 leaves):

$$a\,C\,x-\frac{A\,b\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{A\,b\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{b\,C\,\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+\frac{b\,C\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}+\frac{a\,A\,\text{Tan}[c+d\,x]}{d}$$

Problem 527: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 3, 58 leaves, 4 steps):

$$b\,C\,x+\frac{a\,(A+2\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{A\,b\,\text{Tan}[c+d\,x]}{d}+\frac{a\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 218 leaves):

$$b\,C\,x-\frac{a\,C\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,C\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}-\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+\frac{a\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+\frac{a\,A}{4\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{a\,A}{4\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{A\,b\,\text{Tan}[c+d\,x]}{d}$$

Problem 529: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 3, 117 leaves, 7 steps):

$$\frac{a\,(3\,A+4\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{b\,(2\,A+3\,C)\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,(3\,A+4\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{A\,b\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,A\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 377 leaves):

$$-\frac{3\,a\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}-\frac{a\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+\frac{3\,a\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{a\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+\frac{a\,A}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{3\,a\,A}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{a\,C}{4\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{a\,A}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}-\frac{3\,a\,A}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{a\,C}{4\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{2\,A\,b\,\text{Tan}[c+d\,x]}{3\,d}+\frac{b\,C\,\text{Tan}[c+d\,x]}{d}+\frac{A\,b\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Problem 530: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^6\,dx$$

Optimal (type 3, 140 leaves, 7 steps):

$$\frac{b\,(3\,A+4\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{a\,(4\,A+5\,C)\,\text{Tan}[c+d\,x]}{5\,d}+\frac{b\,(3\,A+4\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{A\,b\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}+\frac{a\,A\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d}+\frac{a\,(4\,A+5\,C)\,\text{Tan}[c+d\,x]^3}{15\,d}$$

Result (type 3, 426 leaves):

$$-\frac{3\,A\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}-\frac{b\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+\frac{3\,A\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{b\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+\frac{A\,b}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{3\,A\,b}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{b\,C}{4\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{A\,b}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}-\frac{3\,A\,b}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{b\,C}{4\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{8\,a\,A\,\text{Tan}[c+d\,x]}{15\,d}+\frac{2\,a\,C\,\text{Tan}[c+d\,x]}{3\,d}+\frac{4\,a\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{15\,d}+\frac{a\,C\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,A\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d}$$

Problem 536: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])^2\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 3, 103 leaves, 5 steps):

$$2\,a\,b\,C\,x+\frac{\left(2\,A\,b^2+a^2\,(A+2\,C)\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}-\frac{b^2\,(A-2\,C)\,\text{Sin}[c+d\,x]}{2\,d}+\frac{a\,A\,b\,\text{Tan}[c+d\,x]}{d}+\frac{A\,(a+b\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 249 leaves):

$$\frac{1}{4\,d}\left(8\,a\,b\,C\,(c+d\,x)-2\,\left(2\,A\,b^2+a^2\,(A+2\,C)\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+2\,\left(2\,A\,b^2+a^2\,(A+2\,C)\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\frac{a^2\,A}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{8\,a\,A\,b\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}-\frac{a^2\,A}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{8\,a\,A\,b\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}+4\,b^2\,C\,\text{Sin}[c+d\,x]\right)$$

Problem 537: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])^2\,(A+C\,\text{Cos}[c+d\,x]^2)\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 3, 112 leaves, 5 steps):

$$b^2\,C\,x+\frac{a\,b\,(A+2\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{(2\,A\,b^2+a^2\,(2\,A+3\,C))\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,A\,b\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{3\,d}+\frac{A\,(a+b\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 424 leaves):

$$\frac{b^2\,C\,(c+d\,x)}{d}+\frac{(-a\,A\,b-2\,a\,b\,C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{(a\,A\,b+2\,a\,b\,C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{d}+\frac{a^2\,A+6\,a\,A\,b}{12\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{a^2\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{6\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+\frac{a^2\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{6\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+\frac{-a^2\,A-6\,a\,A\,b}{12\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\left(2\,a^2\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,A\,b^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a^2\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Big/\left(3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+\left(2\,a^2\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,A\,b^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a^2\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Big/\left(3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)$$

Problem 538: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])^2\,(A+C\,\text{Cos}[c+d\,x]^2)\,\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 3, 154 leaves, 7 steps):

$$\frac{(4\,b^2\,(A+2\,C)+a^2\,(3\,A+4\,C))\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{2\,a\,b\,(2\,A+3\,C)\,\text{Tan}[c+d\,x]}{3\,d}+\frac{(2\,A\,b^2+a^2\,(3\,A+4\,C))\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{a\,A\,b\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{6\,d}+\frac{A\,(a+b\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 503 leaves):

$$\frac{1}{8\,d}\left(-3\,a^2\,A-4\,A\,b^2-4\,a^2\,C-8\,b^2\,C\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+$$
$$\frac{1}{8\,d}\left(3\,a^2\,A+4\,A\,b^2+4\,a^2\,C+8\,b^2\,C\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+$$
$$\frac{a^2\,A}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{9\,a^2\,A+8\,a\,A\,b+12\,A\,b^2+12\,a^2\,C}{48\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{a\,A\,b\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}-\frac{a^2\,A}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+$$
$$\frac{a\,A\,b\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+\frac{-9\,a^2\,A-8\,a\,A\,b-12\,A\,b^2-12\,a^2\,C}{48\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{2\,\left(2\,a\,A\,b\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a\,b\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}{3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$
$$\frac{2\,\left(2\,a\,A\,b\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a\,b\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}{3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}$$

Problem 545: Result more than twice size of optimal antiderivative.

$$\int(a+b\,\text{Cos}[c+d\,x])^3\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 3, 163 leaves, 6 steps):

$$3\,a\,b^2\,C\,x+\frac{b\,\left(2\,A\,b^2+3\,a^2\,(A+2\,C)\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}-$$
$$\frac{b^3\,(5\,A-6\,C)\,\text{Sin}[c+d\,x]}{6\,d}+\frac{a\,\left(3\,A\,b^2+a^2\,(2\,A+3\,C)\right)\,\text{Tan}[c+d\,x]}{3\,d}+$$
$$\frac{A\,b\,(a+b\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}+\frac{A\,(a+b\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 473 leaves):

$$\frac{3\,a\,b^2\,C\,(c+d\,x)}{d}+\frac{\left(-3\,a^2\,A\,b-2\,A\,b^3-6\,a^2\,b\,C\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+$$
$$\frac{\left(3\,a^2\,A\,b+2\,A\,b^3+6\,a^2\,b\,C\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+$$
$$\frac{a^3\,A+9\,a^2\,A\,b}{12\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{a^3\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{6\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+$$
$$\frac{a^3\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{6\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+\frac{-a^3\,A-9\,a^2\,A\,b}{12\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\left(2\,a^3\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+9\,a\,A\,b^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a^3\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Big/$$
$$\left(3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+$$
$$\left(2\,a^3\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+9\,a\,A\,b^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a^3\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Big/$$
$$\left(3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+\frac{b^3\,C\,\text{Sin}[c+d\,x]}{d}$$

Problem 546: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])^3\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 3, 182 leaves, 6 steps):

$$b^3\,C\,x+\frac{a\,\left(12\,b^2\,(A+2\,C)+a^2\,(3\,A+4\,C)\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+$$
$$\frac{b\,\left(A\,b^2+a^2\,(4\,A+6\,C)\right)\,\text{Tan}[c+d\,x]}{2\,d}+\frac{a\,\left(2\,A\,b^2+a^2\,(3\,A+4\,C)\right)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+$$
$$\frac{A\,b\,(a+b\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{4\,d}+\frac{A\,(a+b\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 562 leaves):

$$\frac{b^3 C (c+d x)}{d}+\frac{1}{8 d}\left(-3 a^3 A-12 a A b^2-4 a^3 C-24 a b^2 C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$\frac{1}{8 d}\left(3 a^3 A+12 a A b^2+4 a^3 C+24 a b^2 C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$\frac{a^3 A}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{3 a^3 A+4 a^2 A b+12 a A b^2+4 a^3 C}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\frac{a^2 A b \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{2 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}-\frac{a^3 A}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+$$
$$\frac{a^2 A b \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{2 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+\frac{-3 a^3 A-4 a^2 A b-12 a A b^2-4 a^3 C}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\left(2 a^2 A b \text{Sin}\left[\frac{1}{2}(c+d x)\right]+A b^3 \text{Sin}\left[\frac{1}{2}(c+d x)\right]+3 a^2 b C \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\Big/$$
$$\left(d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+$$
$$\left(2 a^2 A b \text{Sin}\left[\frac{1}{2}(c+d x)\right]+A b^3 \text{Sin}\left[\frac{1}{2}(c+d x)\right]+3 a^2 b C \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\Big/$$
$$\left(d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)$$

Problem 554: Result more than twice size of optimal antiderivative.

$$\int (a+b \text{Cos}[c+d x])^4 \left(A+C \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]^4 \, dx$$

Optimal (type 3, 251 leaves, 7 steps):

$$\frac{1}{2} b^2 \left(2 A b^2+\left(12 a^2+b^2\right) C\right) x+\frac{2 a b \left(2 A b^2+a^2 (A+2 C)\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{d}-$$
$$\frac{2 a b \left(b^2 (11 A-6 C)+a^2 (2 A+3 C)\right) \text{Sin}[c+d x]}{3 d}-$$
$$\frac{b^2 \left(3 b^2 (6 A-C)+a^2 (4 A+6 C)\right) \text{Cos}[c+d x] \text{Sin}[c+d x]}{6 d}+$$
$$\frac{\left(6 A b^2+a^2 (2 A+3 C)\right) (a+b \text{Cos}[c+d x])^2 \text{Tan}[c+d x]}{3 d}+$$
$$\frac{2 A b (a+b \text{Cos}[c+d x])^3 \text{Sec}[c+d x] \text{Tan}[c+d x]}{3 d}+$$
$$\frac{A (a+b \text{Cos}[c+d x])^4 \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 d}$$

Result (type 3, 864 leaves):

$$\frac{b^2 \left(2 A b^2+12 a^2 C+b^2 C\right) (c+d x) \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4}{2 d (a+b \operatorname{Cos}[c+d x])^4}-$$

$$\left(2 \left(a^3 A b+2 a A b^3+2 a^3 b C\right) \operatorname{Cos}[c+d x]^4 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right] (b+a \operatorname{Sec}[c+d x])^4\right) \Big/ \left(d (a+b \operatorname{Cos}[c+d x])^4\right)+$$

$$\left(2 \left(a^3 A b+2 a A b^3+2 a^3 b C\right) \operatorname{Cos}[c+d x]^4 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right] (b+a \operatorname{Sec}[c+d x])^4\right) \Big/ \left(d (a+b \operatorname{Cos}[c+d x])^4\right)+$$

$$\frac{\left(a^4 A+12 a^3 A b\right) \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4}{12 d (a+b \operatorname{Cos}[c+d x])^4 \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$

$$\frac{a^4 A \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{6 d (a+b \operatorname{Cos}[c+d x])^4 \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$

$$\frac{a^4 A \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{6 d (a+b \operatorname{Cos}[c+d x])^4 \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$

$$\frac{\left(-a^4 A-12 a^3 A b\right) \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4}{12 d (a+b \operatorname{Cos}[c+d x])^4 \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$

$$\left(\operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4 \left(2 a^4 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+18 a^2 A b^2 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+3 a^4 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/ \left(3 d (a+b \operatorname{Cos}[c+d x])^4 \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+$$

$$\left(\operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4 \left(2 a^4 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+18 a^2 A b^2 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+3 a^4 C \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/ \left(3 d (a+b \operatorname{Cos}[c+d x])^4 \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+$$

$$\frac{4 a b^3 C \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4 \operatorname{Sin}[c+d x]}{d (a+b \operatorname{Cos}[c+d x])^4}+$$

$$\frac{b^4 C \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4 \operatorname{Sin}[2 (c+d x)]}{4 d (a+b \operatorname{Cos}[c+d x])^4}$$

Problem 555: Result more than twice size of optimal antiderivative.

$$\int (a+b \operatorname{Cos}[c+d x])^4 \left(A+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^5 \, dx$$

Optimal (type 3, 246 leaves, 7 steps):

$$4\,a\,b^3\,C\,x+\frac{\left(8\,A\,b^4+24\,a^2\,b^2\,(A+2\,C)+a^4\,(3\,A+4\,C)\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}-\frac{b^2\,\left(2\,b^2\,(13\,A-12\,C)+3\,a^2\,(3\,A+4\,C)\right)\,\text{Sin}[c+d\,x]}{24\,d}+\frac{a\,b\,\left(12\,A\,b^2+a^2\,(23\,A+36\,C)\right)\,\text{Tan}[c+d\,x]}{12\,d}+\frac{\left(4\,A\,b^2+a^2\,(3\,A+4\,C)\right)\,(a+b\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{A\,b\,(a+b\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{A\,(a+b\,\text{Cos}[c+d\,x])^4\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 612 leaves):

$$\frac{4\,a\,b^3\,C\,(c+d\,x)}{d}+\frac{1}{8\,d}\left(-3\,a^4\,A-24\,a^2\,A\,b^2-8\,A\,b^4-4\,a^4\,C-48\,a^2\,b^2\,C\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{1}{8\,d}\left(3\,a^4\,A+24\,a^2\,A\,b^2+8\,A\,b^4+4\,a^4\,C+48\,a^2\,b^2\,C\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{a^4\,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{9\,a^4\,A+16\,a^3\,A\,b+72\,a^2\,A\,b^2+12\,a^4\,C}{48\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{2\,a^3\,A\,b\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}-\frac{a^4\,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{2\,a^3\,A\,b\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+\frac{-9\,a^4\,A-16\,a^3\,A\,b-72\,a^2\,A\,b^2-12\,a^4\,C}{48\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\left(4\,\left(2\,a^3\,A\,b\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a\,A\,b^3\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a^3\,b\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/\left(3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+\left(4\,\left(2\,a^3\,A\,b\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a\,A\,b^3\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a^3\,b\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/\left(3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+\frac{b^4\,C\,\text{Sin}[c+d\,x]}{d}$$

Problem 566: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]}{a+b\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 88 leaves, 4 steps):

$$\frac{C\,x}{b}-\frac{2\,\left(A\,b^2+a^2\,C\right)\,\text{ArcTan}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]}{a\,\sqrt{a-b}\,b\,\sqrt{a+b}\,d}+\frac{A\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a\,d}$$

Result (type 3, 234 leaves):

$$\Bigg(2\left(A+C\,\text{Cos}[c+d\,x]^2\right)\Bigg(\Bigg(\bigg(a\,C\,d\,x-A\,b\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]-\text{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]\Big]+A\,b\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]+\text{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]\Big]\bigg)\sqrt{-\left(a^2-b^2\right)\left(\text{Cos}[c]-i\,\text{Sin}[c]\right)^2}+2\left(A\,b^2+a^2\,C\right)\text{ArcTan}\Big[\frac{\left(i\,\text{Cos}[c]+\text{Sin}[c]\right)\left(b\,\text{Sin}[c]+\left(-a+b\,\text{Cos}[c]\right)\text{Tan}\left[\frac{d\,x}{2}\right]\right)}{\sqrt{-\left(a^2-b^2\right)\left(\text{Cos}[c]-i\,\text{Sin}[c]\right)^2}}\Big]\left(i\,\text{Cos}[c]+\text{Sin}[c]\right)\Bigg)\Bigg)\Bigg/\left(a\,b\,d\left(2\,A+C+C\,\text{Cos}[2(c+d\,x)]\right)\sqrt{\left(-a^2+b^2\right)\left(\text{Cos}[2\,c]-i\,\text{Sin}[2\,c]\right)}\right)$$

Problem 567: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^2}{a+b\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 95 leaves, 5 steps):

$$\frac{2\left(A\,b^2+a^2\,C\right)\text{ArcTan}\Big[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{a+b}}\Big]}{a^2\sqrt{a-b}\,\sqrt{a+b}\,d}-\frac{A\,b\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a^2\,d}+\frac{A\,\text{Tan}[c+d\,x]}{a\,d}$$

Result (type 3, 306 leaves):

$$\left(2\,\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left(A\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-A\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\right.$$
$$\left(2\,i\,\left(A\,b^2+a^2\,C\right)\,\text{ArcTan}\left[\frac{(i\,\text{Cos}[c]+\text{Sin}[c])\,\left(b\,\text{Sin}[c]+(-a+b\,\text{Cos}[c])\,\text{Tan}\left[\frac{d\,x}{2}\right]\right)}{\sqrt{-\left(a^2-b^2\right)\,(\text{Cos}[c]-i\,\text{Sin}[c])^2}}\right]\right.$$
$$\left.(\text{Cos}[c]-i\,\text{Sin}[c])\right)\Big/\left(\sqrt{\left(-a^2+b^2\right)\,(\text{Cos}[c]-i\,\text{Sin}[c])^2}\right)+$$
$$\frac{a\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$
$$\left.\left.\frac{a\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}\right)\right)\Big/$$
$$\left(a^2\,d\,(2\,A+C+C\,\text{Cos}[2\,(c+d\,x)])\right)$$

Problem 568: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3}{a+b\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 137 leaves, 6 steps):

$$-\frac{2\,b\,\left(A\,b^2+a^2\,C\right)\,\text{ArcTan}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]}{a^3\,\sqrt{a-b}\,\sqrt{a+b}\,d}+$$
$$\frac{\left(2\,A\,b^2+a^2\,(A+2\,C)\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^3\,d}-\frac{A\,b\,\text{Tan}[c+d\,x]}{a^2\,d}+\frac{A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a\,d}$$

Result (type 3, 399 leaves):

$$\frac{1}{2 a^3 d \left(2 A + C + C \operatorname{Cos}[2 (c + d x)]\right)} \operatorname{Cos}[c + d x]^2 \left(C + A \operatorname{Sec}[c + d x]^2\right)$$
$$\left(-2 \left(2 A b^2 + a^2 (A + 2 C)\right) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + \right.$$
$$2 \left(2 A b^2 + a^2 (A + 2 C)\right) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right] + \left(8 b \left(A b^2 + a^2 C\right)\right.$$
$$\operatorname{ArcTan}\left[\frac{\left(\mathrm{i} \operatorname{Cos}[c] + \operatorname{Sin}[c]\right) \left(b \operatorname{Sin}[c] + (-a + b \operatorname{Cos}[c]) \operatorname{Tan}\left[\frac{d x}{2}\right]\right)}{\sqrt{-\left(a^2 - b^2\right) \left(\operatorname{Cos}[c] - \mathrm{i} \operatorname{Sin}[c]\right)^2}}\right] \left.\left(\mathrm{i} \operatorname{Cos}[c] + \operatorname{Sin}[c]\right)\right) \Big/$$
$$\left(\sqrt{\left(-a^2 + b^2\right) \left(\operatorname{Cos}[c] - \mathrm{i} \operatorname{Sin}[c]\right)^2}\right) + \frac{a^2 A}{\left(\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} -$$
$$\frac{4 a A b \operatorname{Sin}\left[\frac{d x}{2}\right]}{\left(\operatorname{Cos}\left[\frac{c}{2}\right] - \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] - \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right)} -$$
$$\frac{a^2 A}{\left(\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right)^2} -$$
$$\left.\frac{4 a A b \operatorname{Sin}\left[\frac{d x}{2}\right]}{\left(\operatorname{Cos}\left[\frac{c}{2}\right] + \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right)}\right)$$

Problem 569: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^4}{a + b \operatorname{Cos}[c + d x]} \, dx$$

Optimal (type 3, 184 leaves, 7 steps):

$$\frac{2 b^2 \left(A b^2 + a^2 C\right) \operatorname{ArcTan}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a^4 \sqrt{a - b} \sqrt{a + b} d} - \frac{b \left(2 A b^2 + a^2 (A + 2 C)\right) \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{2 a^4 d} +$$
$$\frac{\left(3 A b^2 + a^2 (2 A + 3 C)\right) \operatorname{Tan}[c + d x]}{3 a^3 d} - \frac{A b \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{2 a^2 d} + \frac{A \operatorname{Sec}[c + d x]^2 \operatorname{Tan}[c + d x]}{3 a d}$$

Result (type 3, 413 leaves):

$$\frac{1}{12 a^4 d}\left(-\frac{24 b^2 \left(A b^2+a^2 C\right) \text{ArcTanh}\left[\frac{(a-b) \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{-a^2+b^2}}\right]}{\sqrt{-a^2+b^2}}+\right.$$

$$6 b \left(2 A b^2+a^2 (A+2 C)\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-$$

$$6 b \left(2 A b^2+a^2 (A+2 C)\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+$$

$$\frac{a^2 A (a-3 b)}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{2 a^3 A \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+$$

$$\frac{4 a \left(3 A b^2+a^2 (2 A+3 C)\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]}+\frac{2 a^3 A \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}-$$

$$\left.\frac{a^2 A (a-3 b)}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{4 a \left(3 A b^2+a^2 (2 A+3 C)\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]}\right)$$

Problem 574: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+C \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]}{(a+b \text{Cos}[c+d x])^2} \, dx$$

Optimal (type 3, 134 leaves, 5 steps):

$$-\frac{2 b \left(2 a^2 A-A b^2+a^2 C\right) \text{ArcTan}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a^2 (a-b)^{3/2} (a+b)^{3/2} d}+$$

$$\frac{A \text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}+\frac{\left(A b^2+a^2 C\right) \text{Sin}[c+d x]}{a \left(a^2-b^2\right) d (a+b \text{Cos}[c+d x])}$$

Result (type 3, 306 leaves):

$$\Bigg(2\,\text{Cos}[c+d\,x]\,\left(C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)$$
$$\Bigg(-A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$
$$\Bigg(2\,b\left(-A\,b^2+a^2(2\,A+C)\right)\text{ArcTan}\left[\frac{(i\,\text{Cos}[c]+\text{Sin}[c])\left(b\,\text{Sin}[c]+(-a+b\,\text{Cos}[c])\,\text{Tan}\left[\frac{d\,x}{2}\right]\right)}{\sqrt{-(a^2-b^2)(\text{Cos}[c]-i\,\text{Sin}[c])^2}}\right]$$
$$(i\,\text{Cos}[c]+\text{Sin}[c])\Bigg)\Bigg/\left((a^2-b^2)\sqrt{(-a^2+b^2)(\text{Cos}[c]-i\,\text{Sin}[c])^2}\right)+$$
$$\left(a\left(A\,b^2+a^2\,C\right)(-a\,\text{Sin}[c]+b\,\text{Sin}[d\,x])\right)\Bigg/\Bigg((a-b)\,b\,(a+b)\,(a+b\,\text{Cos}[c+d\,x])$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\Bigg)\Bigg)\Bigg)\Bigg/\left(a^2\,d\,(2\,A+C+C\,\text{Cos}[2\,(c+d\,x)])\right)$$

Problem 576: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^3}{(a+b\,\text{Cos}[c+d\,x])^2}\,dx$$

Optimal (type 3, 265 leaves, 7 steps):

$$-\frac{2\,b\left(4\,a^2\,A\,b^2-3\,A\,b^4+2\,a^4\,C-a^2\,b^2\,C\right)\text{ArcTan}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{a+b}}\right]}{a^4\,(a-b)^{3/2}\,(a+b)^{3/2}\,d}+$$
$$\frac{\left(6\,A\,b^2+a^2\,(A+2\,C)\right)\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^4\,d}+\frac{b\left(3\,A\,b^2-a^2\,(2\,A-C)\right)\text{Tan}[c+d\,x]}{a^3\left(a^2-b^2\right)d}-$$
$$\frac{\left(3\,A\,b^2-a^2\,(A-2\,C)\right)\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a^2\left(a^2-b^2\right)d}+\frac{\left(A\,b^2+a^2\,C\right)\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{a\left(a^2-b^2\right)d\,(a+b\,\text{Cos}[c+d\,x])}$$

Result (type 3, 712 leaves):

$$\left(4 b \left(4 a^2 A b^2 - 3 A b^4 + 2 a^4 C - a^2 b^2 C\right) \text{ArcTanh}\left[\frac{(a-b) \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{-a^2+b^2}}\right] \text{Cos}[c+d x]^2 \left(C + A \text{Sec}[c+d x]^2\right)\right) \Big/ \left(a^4 \left(a^2-b^2\right) \sqrt{-a^2+b^2}\, d \left(2 A + C + C \text{Cos}[2 c + 2 d x]\right)\right) +$$

$$\left(\left(-a^2 A - 6 A b^2 - 2 a^2 C\right) \text{Cos}[c+d x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right] - \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \left(C + A \text{Sec}[c+d x]^2\right)\right) \Big/ \left(a^4 d \left(2 A + C + C \text{Cos}[2 c + 2 d x]\right)\right) + \left(\left(a^2 A + 6 A b^2 + 2 a^2 C\right) \text{Cos}[c+d x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right] + \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] \left(C + A \text{Sec}[c+d x]^2\right)\right) \Big/ \left(a^4 d \left(2 A + C + C \text{Cos}[2 c + 2 d x]\right)\right) + \left(A \text{Cos}[c+d x]^2 \left(C + A \text{Sec}[c+d x]^2\right)\right) \Big/ \left(2 a^2 d \left(2 A + C + C \text{Cos}[2 c + 2 d x]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right] - \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2\right) -$$

$$\left(4 A b \text{Cos}[c+d x]^2 \left(C + A \text{Sec}[c+d x]^2\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right) \Big/ \left(a^3 d \left(2 A + C + C \text{Cos}[2 c + 2 d x]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right] - \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) -$$

$$\left(A \text{Cos}[c+d x]^2 \left(C + A \text{Sec}[c+d x]^2\right)\right) \Big/ \left(2 a^2 d \left(2 A + C + C \text{Cos}[2 c + 2 d x]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right] + \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2\right) -$$

$$\left(4 A b \text{Cos}[c+d x]^2 \left(C + A \text{Sec}[c+d x]^2\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right) \Big/ \left(a^3 d \left(2 A + C + C \text{Cos}[2 c + 2 d x]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right] + \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)\right) +$$

$$\left(2 \text{Cos}[c+d x]^2 \left(C + A \text{Sec}[c+d x]^2\right) \left(A b^4 \text{Sin}[c+d x] + a^2 b^2 C \text{Sin}[c+d x]\right)\right) \Big/ \left(a^3 (a-b) (a+b) d \left(a + b \text{Cos}[c+d x]\right) \left(2 A + C + C \text{Cos}[2 c + 2 d x]\right)\right)$$

Problem 582: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A + C \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]}{\left(a + b \text{Cos}[c+d x]\right)^3} \, dx$$

Optimal (type 3, 211 leaves, 6 steps):

$$\frac{b \left(5 a^2 A b^2 - 2 A b^4 - 3 a^4 (2 A + C)\right) \text{ArcTan}\left[\frac{\sqrt{a-b}\, \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a^3 (a-b)^{5/2} (a+b)^{5/2} d} + \frac{A \text{ArcTanh}[\text{Sin}[c+d x]]}{a^3 d} + \frac{\left(A b^2 + a^2 C\right) \text{Sin}[c+d x]}{2 a \left(a^2-b^2\right) d \left(a + b \text{Cos}[c+d x]\right)^2} - \frac{\left(2 A b^4 - a^4 C - a^2 b^2 (5 A + 2 C)\right) \text{Sin}[c+d x]}{2 a^2 \left(a^2-b^2\right)^2 d \left(a + b \text{Cos}[c+d x]\right)}$$

Result (type 3, 409 leaves):

$$\frac{1}{2 a^3 d \left(2 A+C+C \operatorname{Cos}[2 (c+d x)]\right)} \operatorname{Cos}[c+d x] \left(C \operatorname{Cos}[c+d x]+A \operatorname{Sec}[c+d x]\right) \Bigg(-4 A \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+ 4 A \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\Bigg(4 b \left(-5 a^2 A b^2+2 A b^4+3 a^4 (2 A+C)\right) \operatorname{ArcTan}\left[\frac{(i \operatorname{Cos}[c]+\operatorname{Sin}[c]) \left(b \operatorname{Sin}[c]+(-a+b \operatorname{Cos}[c]) \operatorname{Tan}\left[\frac{d x}{2}\right]\right)}{\sqrt{-(a^2-b^2) (\operatorname{Cos}[c]-i \operatorname{Sin}[c])^2}}\right] (i \operatorname{Cos}[c]+\operatorname{Sin}[c])\Bigg) \Big/ \left((a^2-b^2)^2 \sqrt{(-a^2+b^2) (\operatorname{Cos}[c]-i \operatorname{Sin}[c])^2}\right) - \Big(a \operatorname{Sec}[c] \Big(\left(2 a^2+b^2\right) \left(-2 A b^4+a^4 C+a^2 b^2 (5 A+2 C)\right) \operatorname{Sin}[c]+ b \left(-a \left(-7 A b^4+4 a^4 C+a^2 b^2 (16 A+5 C)\right) \operatorname{Sin}[d x]+ b \left(a b \left(-A b^2+a^2 (4 A+3 C)\right) \operatorname{Sin}[2 c+d x]-\left(-2 A b^4+a^4 C+a^2 b^2 (5 A+2 C)\right) \operatorname{Sin}[c+2 d x]\right)\right)\Big)\Big) \Big/ \left(b \left(a^2-b^2\right)^2 \left(a+b \operatorname{Cos}[c+d x]\right)^2\right)\Bigg)$$

Problem 583: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(A+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^2}{(a+b \operatorname{Cos}[c+d x])^3} \, dx$$

Optimal (type 3, 275 leaves, 7 steps):

$$-\left(\left(\left(15 a^2 A b^4-6 A b^6-2 a^6 C-a^4 b^2 (12 A+C)\right) \operatorname{ArcTan}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]\right) \Big/ \left(a^4 (a-b)^{5/2} (a+b)^{5/2} d\right)\right)-\frac{3 A b \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{a^4 d}-\frac{\left(11 a^2 A b^2-6 A b^4-a^4 (2 A-3 C)\right) \operatorname{Tan}[c+d x]}{2 a^3 \left(a^2-b^2\right)^2 d}+\frac{\left(A b^2+a^2 C\right) \operatorname{Tan}[c+d x]}{2 a \left(a^2-b^2\right) d (a+b \operatorname{Cos}[c+d x])^2}-\frac{\left(3 A b^4-2 a^4 C-a^2 b^2 (6 A+C)\right) \operatorname{Tan}[c+d x]}{2 a^2 \left(a^2-b^2\right)^2 d (a+b \operatorname{Cos}[c+d x])}$$

Result (type 3, 649 leaves):

$$-\left(\left(2\left(12 a^4 A b^2-15 a^2 A b^4+6 A b^6+2 a^6 C+a^4 b^2 C\right) \operatorname{ArcTanh}\left[\frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{-a^2+b^2}}\right] \operatorname{Cos}[c+d x]^2\right.\right.$$

$$\left.\left.\left(C+A \operatorname{Sec}[c+d x]^2\right)\right) \Big/ \left(a^4\left(a^2-b^2\right)^2 \sqrt{-a^2+b^2}\, d\left(2 A+C+C \operatorname{Cos}[2 c+2 d x]\right)\right)\right)+$$

$$\left(6 A b \operatorname{Cos}[c+d x]^2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\left(C+A \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(a^4 d\left(2 A+C+C \operatorname{Cos}[2 c+2 d x]\right)\right)-$$
$$\left(6 A b \operatorname{Cos}[c+d x]^2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\left(C+A \operatorname{Sec}[c+d x]^2\right)\right) \Big/$$
$$\left(a^4 d\left(2 A+C+C \operatorname{Cos}[2 c+2 d x]\right)\right)+$$
$$\left(2 A \operatorname{Cos}[c+d x]^2\left(C+A \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right) \Big/$$
$$\left(a^3 d\left(2 A+C+C \operatorname{Cos}[2 c+2 d x]\right)\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+$$
$$\left(2 A \operatorname{Cos}[c+d x]^2\left(C+A \operatorname{Sec}[c+d x]^2\right) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right) \Big/$$
$$\left(a^3 d\left(2 A+C+C \operatorname{Cos}[2 c+2 d x]\right)\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+$$
$$\left(\operatorname{Cos}[c+d x]^2\left(C+A \operatorname{Sec}[c+d x]^2\right)\left(-A b^3 \operatorname{Sin}[c+d x]-a^2 b C \operatorname{Sin}[c+d x]\right)\right) \Big/$$
$$\left(a^2(a-b)(a+b) d\left(a+b \operatorname{Cos}[c+d x]\right)^2\left(2 A+C+C \operatorname{Cos}[2 c+2 d x]\right)\right)+\left(\operatorname{Cos}[c+d x]^2\right.$$
$$\left.\left(C+A \operatorname{Sec}[c+d x]^2\right)\left(-7 a^2 A b^3 \operatorname{Sin}[c+d x]+4 A b^5 \operatorname{Sin}[c+d x]-3 a^4 b C \operatorname{Sin}[c+d x]\right)\right) \Big/$$
$$\left(a^3(a-b)^2(a+b)^2 d\left(a+b \operatorname{Cos}[c+d x]\right)\left(2 A+C+C \operatorname{Cos}[2 c+2 d x]\right)\right)$$

Problem 584: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(A+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^3}{\left(a+b \operatorname{Cos}[c+d x]\right)^3}\, dx$$

Optimal (type 3, 378 leaves, 8 steps):

$$-\left(\left(b\left(12 A b^6-a^2 b^4(29 A-2 C)+5 a^4 b^2(4 A-C)+6 a^6 C\right) \operatorname{ArcTan}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]\right) \Big/\right.$$
$$\left.\left(a^5(a-b)^{5/2}(a+b)^{5/2} d\right)\right)+\frac{\left(12 A b^2+a^2(A+2 C)\right) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{2 a^5 d}-$$
$$\frac{b\left(12 A b^4+a^4(6 A-5 C)-a^2 b^2(21 A-2 C)\right) \operatorname{Tan}[c+d x]}{2 a^4\left(a^2-b^2\right)^2 d}+$$
$$\frac{\left(6 A b^4+a^4(A-4 C)-a^2 b^2(10 A-C)\right) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 a^3\left(a^2-b^2\right)^2 d}+$$
$$\frac{\left(A b^2+a^2 C\right) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 a\left(a^2-b^2\right) d\left(a+b \operatorname{Cos}[c+d x]\right)^2}+\frac{\left(7 a^2 A b^2-4 A b^4+3 a^4 C\right) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 a^2\left(a^2-b^2\right)^2 d\left(a+b \operatorname{Cos}[c+d x]\right)}$$

Result (type 3, 856 leaves):

$$\left(2\,b\,\left(20\,a^4\,A\,b^2-29\,a^2\,A\,b^4+12\,A\,b^6+6\,a^6\,C-5\,a^4\,b^2\,C+2\,a^2\,b^4\,C\right)\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{-a^2+b^2}}\right]\right.$$
$$\left.\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(a^5\,\left(a^2-b^2\right)^2\,\sqrt{-a^2+b^2}\,d\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\left(\left(-a^2\,A-12\,A\,b^2-2\,a^2\,C\right)\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right.$$
$$\left.\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(a^5\,d\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+\left(\left(a^2\,A+12\,A\,b^2+2\,a^2\,C\right)\right.$$
$$\left.\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(a^5\,d\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+\left(A\,\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(2\,a^3\,d\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\right)-$$
$$\left(6\,A\,b\,\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Big/$$
$$\left(a^4\,d\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)-$$
$$\left(A\,\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(2\,a^3\,d\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\right)-$$
$$\left(6\,A\,b\,\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Big/$$
$$\left(a^4\,d\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+$$
$$\left(\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\,\left(A\,b^4\,\text{Sin}[c+d\,x]+a^2\,b^2\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/$$
$$\left(a^3\,(a-b)\,(a+b)\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)^2\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\left(\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left.\left(9\,a^2\,A\,b^4\,\text{Sin}[c+d\,x]-6\,A\,b^6\,\text{Sin}[c+d\,x]+5\,a^4\,b^2\,C\,\text{Sin}[c+d\,x]-2\,a^2\,b^4\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/$$
$$\left(a^4\,(a-b)^2\,(a+b)^2\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)$$

Problem 585: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^4\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\left(a+b\,\text{Cos}[c+d\,x]\right)^4}\,dx$$

Optimal (type 3, 514 leaves, 8 steps):

$$\frac{\left(2\,A\,b^2+\left(20\,a^2+b^2\right)\,C\right)\,x}{2\,b^6}+\left(\left(8\,a\,A\,b^8-a^7\,b^2\,\left(2\,A-69\,C\right)+7\,a^5\,b^4\,\left(A-12\,C\right)-8\,a^3\,b^6\,\left(A-5\,C\right)-20\,a^9\,C\right)\right.$$
$$\left.\text{ArcTan}\left[\frac{\sqrt{a-b}\;\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}{\sqrt{a+b}}\right]\right)\Big/\left(\sqrt{a-b}\;b^6\,\sqrt{a+b}\;\left(a^2-b^2\right)^3\,d\right)-\frac{1}{6\,b^5\,\left(a^2-b^2\right)^3\,d}$$
$$a\,\left(a^4\,b^2\,\left(6\,A-167\,C\right)-a^2\,b^4\,\left(17\,A-146\,C\right)+2\,b^6\,\left(13\,A-12\,C\right)+60\,a^6\,C\right)\,\text{Sin}[c+d\,x]+$$
$$\frac{1}{2\,b^4\,\left(a^2-b^2\right)^3\,d}\left(a^4\,b^2\,\left(A-27\,C\right)-a^2\,b^4\,\left(2\,A-23\,C\right)+b^6\,\left(6\,A-C\right)+10\,a^6\,C\right)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]-$$
$$\frac{\left(A\,b^2+a^2\,C\right)\,\text{Cos}[c+d\,x]^4\,\text{Sin}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)^3}+\frac{\left(4\,A\,b^4-5\,a^4\,C+a^2\,b^2\,\left(A+10\,C\right)\right)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{6\,b^2\,\left(a^2-b^2\right)^2\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)^2}-$$
$$\left(\left(12\,A\,b^6+a^4\,b^2\,\left(2\,A-53\,C\right)+20\,a^6\,C+a^2\,b^4\,\left(A+48\,C\right)\right)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(6\,b^3\,\left(a^2-b^2\right)^3\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)\right)$$

Result (type 3, 1452 leaves):

$$\left(a\left(2 a^6 A b^2-7 a^4 A b^4+8 a^2 A b^6-8 A b^8+20 a^8 C-69 a^6 b^2 C+84 a^4 b^4 C-40 a^2 b^6 C\right)\right.$$

$$\left.\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{-a^2+b^2}}\right]\right)\Big/\left(b^6\left(a^2-b^2\right)^3\sqrt{-a^2+b^2}\;d\right)-$$

$$\frac{1}{96 b^6\left(-a^2+b^2\right)^3 d\,(a+b\,\text{Cos}[c+d x])^3}\left(96 a^9 A b^2 (c+d x)-144 a^7 A b^4 (c+d x)-\right.$$
$$144 a^5 A b^6 (c+d x)+336 a^3 A b^8 (c+d x)-144 a A b^{10} (c+d x)+960 a^{11} C (c+d x)-$$
$$1392 a^9 b^2 C (c+d x)-1512 a^7 b^4 C (c+d x)+3288 a^5 b^6 C (c+d x)-1272 a^3 b^8 C (c+d x)-$$
$$72 a b^{10} C (c+d x)+288 a^8 A b^3 (c+d x)\,\text{Cos}[c+d x]-792 a^6 A b^5 (c+d x)\,\text{Cos}[c+d x]+$$
$$648 a^4 A b^7 (c+d x)\,\text{Cos}[c+d x]-72 a^2 A b^9 (c+d x)\,\text{Cos}[c+d x]-72 A b^{11} (c+d x)\,\text{Cos}[c+d x]+$$
$$2880 a^{10} b C (c+d x)\,\text{Cos}[c+d x]-7776 a^8 b^3 C (c+d x)\,\text{Cos}[c+d x]+$$
$$6084 a^6 b^5 C (c+d x)\,\text{Cos}[c+d x]-396 a^4 b^7 C (c+d x)\,\text{Cos}[c+d x]-$$
$$756 a^2 b^9 C (c+d x)\,\text{Cos}[c+d x]-36 b^{11} C (c+d x)\,\text{Cos}[c+d x]+$$
$$144 a^7 A b^4 (c+d x)\,\text{Cos}[2(c+d x)]-432 a^5 A b^6 (c+d x)\,\text{Cos}[2(c+d x)]+$$
$$432 a^3 A b^8 (c+d x)\,\text{Cos}[2(c+d x)]-144 a A b^{10} (c+d x)\,\text{Cos}[2(c+d x)]+$$
$$1440 a^9 b^2 C (c+d x)\,\text{Cos}[2(c+d x)]-4248 a^7 b^4 C (c+d x)\,\text{Cos}[2(c+d x)]+$$
$$4104 a^5 b^6 C (c+d x)\,\text{Cos}[2(c+d x)]-1224 a^3 b^8 C (c+d x)\,\text{Cos}[2(c+d x)]-$$
$$72 a b^{10} C (c+d x)\,\text{Cos}[2(c+d x)]+24 a^6 A b^5 (c+d x)\,\text{Cos}[3(c+d x)]-$$
$$72 a^4 A b^7 (c+d x)\,\text{Cos}[3(c+d x)]+72 a^2 A b^9 (c+d x)\,\text{Cos}[3(c+d x)]-$$
$$24 A b^{11} (c+d x)\,\text{Cos}[3(c+d x)]+240 a^8 b^3 C (c+d x)\,\text{Cos}[3(c+d x)]-$$
$$708 a^6 b^5 C (c+d x)\,\text{Cos}[3(c+d x)]+684 a^4 b^7 C (c+d x)\,\text{Cos}[3(c+d x)]-$$
$$204 a^2 b^9 C (c+d x)\,\text{Cos}[3(c+d x)]-12 b^{11} C (c+d x)\,\text{Cos}[3(c+d x)]-$$
$$96 a^8 A b^3\,\text{Sin}[c+d x]+228 a^6 A b^5\,\text{Sin}[c+d x]-288 a^4 A b^7\,\text{Sin}[c+d x]-$$
$$144 a^2 A b^9\,\text{Sin}[c+d x]-960 a^{10} b C\,\text{Sin}[c+d x]+2232 a^8 b^3 C\,\text{Sin}[c+d x]-$$
$$1086 a^6 b^5 C\,\text{Sin}[c+d x]-750 a^4 b^7 C\,\text{Sin}[c+d x]+270 a^2 b^9 C\,\text{Sin}[c+d x]-6 b^{11} C\,\text{Sin}[c+d x]-$$
$$120 a^7 A b^4\,\text{Sin}[2(c+d x)]+360 a^5 A b^6\,\text{Sin}[2(c+d x)]-480 a^3 A b^8\,\text{Sin}[2(c+d x)]-$$
$$1200 a^9 b^2 C\,\text{Sin}[2(c+d x)]+3300 a^7 b^4 C\,\text{Sin}[2(c+d x)]-2772 a^5 b^6 C\,\text{Sin}[2(c+d x)]+$$
$$372 a^3 b^8 C\,\text{Sin}[2(c+d x)]+60 a b^{10} C\,\text{Sin}[2(c+d x)]-44 a^6 A b^5\,\text{Sin}[3(c+d x)]+$$
$$128 a^4 A b^7\,\text{Sin}[3(c+d x)]-144 a^2 A b^9\,\text{Sin}[3(c+d x)]-440 a^8 b^3 C\,\text{Sin}[3(c+d x)]+$$
$$1253 a^6 b^5 C\,\text{Sin}[3(c+d x)]-1143 a^4 b^7 C\,\text{Sin}[3(c+d x)]+279 a^2 b^9 C\,\text{Sin}[3(c+d x)]-$$
$$9 b^{11} C\,\text{Sin}[3(c+d x)]-30 a^7 b^4 C\,\text{Sin}[4(c+d x)]+90 a^5 b^6 C\,\text{Sin}[4(c+d x)]-$$
$$90 a^3 b^8 C\,\text{Sin}[4(c+d x)]+30 a b^{10} C\,\text{Sin}[4(c+d x)]+3 a^6 b^5 C\,\text{Sin}[5(c+d x)]-$$
$$\left.9 a^4 b^7 C\,\text{Sin}[5(c+d x)]+9 a^2 b^9 C\,\text{Sin}[5(c+d x)]-3 b^{11} C\,\text{Sin}[5(c+d x)]\right)$$

Problem 586: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^3\left(A+C\,\text{Cos}[c+d x]^2\right)}{(a+b\,\text{Cos}[c+d x])^4}\,dx$$

Optimal (type 3, 369 leaves, 7 steps):

$$-\frac{4\,a\,C\,x}{b^5}-\left(\left(2\,A\,b^8-8\,a^8\,C+28\,a^6\,b^2\,C-35\,a^4\,b^4\,C+a^2\,b^6\,\left(3\,A+20\,C\right)\right)\,\text{ArcTan}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}{\sqrt{a+b}}\right]\right)\Big/\left(\left(a-b\right)^{7/2}\,b^5\,\left(a+b\right)^{7/2}\,d\right)-\frac{\left(5\,A\,b^4-\left(12\,a^4-23\,a^2\,b^2+6\,b^4\right)\,C\right)\,\text{Sin}[c+d\,x]}{6\,b^4\,\left(a^2-b^2\right)^2\,d}-\frac{\left(A\,b^2+a^2\,C\right)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)^3}+\frac{\left(3\,A\,b^4-4\,a^4\,C+a^2\,b^2\,\left(2\,A+9\,C\right)\right)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{6\,b^2\,\left(a^2-b^2\right)^2\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)^2}+\frac{a\,\left(2\,A\,b^6+4\,a^6\,C-11\,a^4\,b^2\,C+3\,a^2\,b^4\,\left(A+4\,C\right)\right)\,\text{Sin}[c+d\,x]}{2\,b^4\,\left(a^2-b^2\right)^3\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)}$$

Result (type 3, 893 leaves):

$$-\left(\left(\left(-3\,a^2\,A\,b^6-2\,A\,b^8+8\,a^8\,C-28\,a^6\,b^2\,C+35\,a^4\,b^4\,C-20\,a^2\,b^6\,C\right)\,\text{ArcTanh}\left[\frac{\left(a-b\right)\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\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\,\left(a+b\,\text{Cos}[c+d\,x]\right)^3}\Big(-96\,a^{10}\,C\,\left(c+d\,x\right)+144\,a^8\,b^2\,C\,\left(c+d\,x\right)+144\,a^6\,b^4\,C\,\left(c+d\,x\right)-336\,a^4\,b^6\,C\,\left(c+d\,x\right)+144\,a^2\,b^8\,C\,\left(c+d\,x\right)-288\,a^9\,b\,C\,\left(c+d\,x\right)\,\text{Cos}[c+d\,x]+792\,a^7\,b^3\,C\,\left(c+d\,x\right)\,\text{Cos}[c+d\,x]-648\,a^5\,b^5\,C\,\left(c+d\,x\right)\,\text{Cos}[c+d\,x]+72\,a^3\,b^7\,C\,\left(c+d\,x\right)\,\text{Cos}[c+d\,x]+72\,a\,b^9\,C\,\left(c+d\,x\right)\,\text{Cos}[c+d\,x]-144\,a^8\,b^2\,C\,\left(c+d\,x\right)\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]+432\,a^6\,b^4\,C\,\left(c+d\,x\right)\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]-432\,a^4\,b^6\,C\,\left(c+d\,x\right)\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]+144\,a^2\,b^8\,C\,\left(c+d\,x\right)\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]-24\,a^7\,b^3\,C\,\left(c+d\,x\right)\,\text{Cos}\left[3\,\left(c+d\,x\right)\right]+72\,a^5\,b^5\,C\,\left(c+d\,x\right)\,\text{Cos}\left[3\,\left(c+d\,x\right)\right]-72\,a^3\,b^7\,C\,\left(c+d\,x\right)\,\text{Cos}\left[3\,\left(c+d\,x\right)\right]+24\,b^9\,C\,\left(c+d\,x\right)\,\text{Cos}\left[3\,\left(c+d\,x\right)\right]+18\,a^5\,A\,b^5\,\text{Sin}[c+d\,x]+39\,a^3\,A\,b^7\,\text{Sin}[c+d\,x]+18\,a\,A\,b^9\,\text{Sin}[c+d\,x]+96\,a^9\,b\,C\,\text{Sin}[c+d\,x]-228\,a^7\,b^3\,C\,\text{Sin}[c+d\,x]+135\,a^5\,b^5\,C\,\text{Sin}[c+d\,x]+90\,a^3\,b^7\,C\,\text{Sin}[c+d\,x]-18\,a\,b^9\,C\,\text{Sin}[c+d\,x]+6\,a^4\,A\,b^6\,\text{Sin}\left[2\,\left(c+d\,x\right)\right]+54\,a^2\,A\,b^8\,\text{Sin}\left[2\,\left(c+d\,x\right)\right]+120\,a^8\,b^2\,C\,\text{Sin}\left[2\,\left(c+d\,x\right)\right]-336\,a^6\,b^4\,C\,\text{Sin}\left[2\,\left(c+d\,x\right)\right]+300\,a^4\,b^6\,C\,\text{Sin}\left[2\,\left(c+d\,x\right)\right]-18\,a^2\,b^8\,C\,\text{Sin}\left[2\,\left(c+d\,x\right)\right]-6\,b^{10}\,C\,\text{Sin}\left[2\,\left(c+d\,x\right)\right]+2\,a^5\,A\,b^5\,\text{Sin}\left[3\,\left(c+d\,x\right)\right]-5\,a^3\,A\,b^7\,\text{Sin}\left[3\,\left(c+d\,x\right)\right]+18\,a\,A\,b^9\,\text{Sin}\left[3\,\left(c+d\,x\right)\right]+44\,a^7\,b^3\,C\,\text{Sin}\left[3\,\left(c+d\,x\right)\right]-125\,a^5\,b^5\,C\,\text{Sin}\left[3\,\left(c+d\,x\right)\right]+114\,a^3\,b^7\,C\,\text{Sin}\left[3\,\left(c+d\,x\right)\right]-18\,a\,b^9\,C\,\text{Sin}\left[3\,\left(c+d\,x\right)\right]+3\,a^6\,b^4\,C\,\text{Sin}\left[4\,\left(c+d\,x\right)\right]-9\,a^4\,b^6\,C\,\text{Sin}\left[4\,\left(c+d\,x\right)\right]+9\,a^2\,b^8\,C\,\text{Sin}\left[4\,\left(c+d\,x\right)\right]-3\,b^{10}\,C\,\text{Sin}\left[4\,\left(c+d\,x\right)\right]\Big)$$

Problem 587: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^2\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\left(a+b\,\text{Cos}[c+d\,x]\right)^4}\,dx$$

Optimal (type 3, 304 leaves, 6 steps):

$$\frac{C x}{b^4}+\left(a \left(a^2 b^4 (A-8 C)-2 a^6 C+7 a^4 b^2 C+4 b^6 (A+2 C)\right) \text{ArcTan}\left[\frac{\sqrt{a-b} \text{ Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]\right)\Big/\left((a-b)^{7/2} b^4 (a+b)^{7/2} d\right)-\frac{\left(A b^2+a^2 C\right) \text{Cos}[c+d x]^2 \text{Sin}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \text{Cos}[c+d x])^3}-\frac{a \left(2 A b^4-3 a^4 C+a^2 b^2 (3 A+8 C)\right) \text{Sin}[c+d x]}{6 b^3 \left(a^2-b^2\right)^2 d (a+b \text{Cos}[c+d x])^2}-\frac{\left(4 A b^6+9 a^6 C+2 a^2 b^4 (7 A+17 C)-a^4 b^2 (3 A+28 C)\right) \text{Sin}[c+d x]}{6 b^3 \left(a^2-b^2\right)^3 d (a+b \text{Cos}[c+d x])}$$

Result (type 3, 773 leaves):

$$\left(a \left(-a^2 A b^4-4 A b^6+2 a^6 C-7 a^4 b^2 C+8 a^2 b^4 C-8 b^6 C\right) \text{ArcTanh}\left[\frac{(a-b) \text{ Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{-a^2+b^2}}\right]\right)\Big/\left(b^4 \left(a^2-b^2\right)^3 \sqrt{-a^2+b^2}\, d\right)+\frac{1}{24 b^4 \left(-a^2+b^2\right)^3 d (a+b \text{Cos}[c+d x])^3}$$
$$\Big(-24 a^9 C (c+d x)+36 a^7 b^2 C (c+d x)+36 a^5 b^4 C (c+d x)-84 a^3 b^6 C (c+d x)+36 a b^8 C (c+d x)-72 a^8 b C (c+d x) \text{Cos}[c+d x]+198 a^6 b^3 C (c+d x) \text{Cos}[c+d x]-162 a^4 b^5 C (c+d x) \text{Cos}[c+d x]+18 a^2 b^7 C (c+d x) \text{Cos}[c+d x]+18 b^9 C (c+d x) \text{Cos}[c+d x]-36 a^7 b^2 C (c+d x) \text{Cos}[2 (c+d x)]+108 a^5 b^4 C (c+d x) \text{Cos}[2 (c+d x)]-108 a^3 b^6 C (c+d x) \text{Cos}[2 (c+d x)]+36 a b^8 C (c+d x) \text{Cos}[2 (c+d x)]-6 a^6 b^3 C (c+d x) \text{Cos}[3 (c+d x)]+18 a^4 b^5 C (c+d x) \text{Cos}[3 (c+d x)]-18 a^2 b^7 C (c+d x) \text{Cos}[3 (c+d x)]+6 b^9 C (c+d x) \text{Cos}[3 (c+d x)]+51 a^4 A b^5 \text{Sin}[c+d x]+18 a^2 A b^7 \text{Sin}[c+d x]+6 A b^9 \text{Sin}[c+d x]+24 a^8 b C \text{Sin}[c+d x]-57 a^6 b^3 C \text{Sin}[c+d x]+72 a^4 b^5 C \text{Sin}[c+d x]+36 a^2 b^7 C \text{Sin}[c+d x]-6 a^5 A b^4 \text{Sin}[2 (c+d x)]+54 a^3 A b^6 \text{Sin}[2 (c+d x)]+12 a A b^8 \text{Sin}[2 (c+d x)]+30 a^7 b^2 C \text{Sin}[2 (c+d x)]-90 a^5 b^4 C \text{Sin}[2 (c+d x)]+120 a^3 b^6 C \text{Sin}[2 (c+d x)]-a^4 A b^5 \text{Sin}[3 (c+d x)]+10 a^2 A b^7 \text{Sin}[3 (c+d x)]+6 A b^9 \text{Sin}[3 (c+d x)]+11 a^6 b^3 C \text{Sin}[3 (c+d x)]-32 a^4 b^5 C \text{Sin}[3 (c+d x)]+36 a^2 b^7 C \text{Sin}[3 (c+d x)]\Big)$$

Problem 590: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+C \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]}{(a+b \text{Cos}[c+d x])^4} \, dx$$

Optimal (type 3, 301 leaves, 7 steps):

$$-\left(\left(b\left(7a^2Ab^4-2Ab^6-a^4b^2(8A-C)+4a^6(2A+C)\right)\text{ArcTan}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{a+b}}\right]\right)\Big/\left(a^4(a-b)^{7/2}(a+b)^{7/2}d\right)\right)+\frac{A\,\text{ArcTanh}[\text{Sin}[c+dx]]}{a^4d}+$$

$$\frac{(Ab^2+a^2C)\,\text{Sin}[c+dx]}{3a(a^2-b^2)d(a+b\,\text{Cos}[c+dx])^3}-\frac{(3Ab^4-2a^4C-a^2b^2(8A+3C))\,\text{Sin}[c+dx]}{6a^2(a^2-b^2)^2d(a+b\,\text{Cos}[c+dx])^2}-$$

$$\frac{(17a^2Ab^4-6Ab^6-2a^6C-13a^4b^2(2A+C))\,\text{Sin}[c+dx]}{6a^3(a^2-b^2)^3d(a+b\,\text{Cos}[c+dx])}$$

Result (type 3, 1088 leaves) :

$$-\left(\left(2\,A\,\mathrm{Cos}[c+d\,x]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,(C\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x])\right)\Big/\left(a^4\,d\,(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)\right)+$$
$$\left(2\,A\,\mathrm{Cos}[c+d\,x]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,(C\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x])\right)\Big/\left(a^4\,d\,(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)+$$
$$\frac{1}{(a^2-b^2)^3\,(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x])}\left(8\,a^6\,A-8\,a^4\,A\,b^2+7\,a^2\,A\,b^4-2\,A\,b^6+4\,a^6\,C+a^4\,b^2\,C\right)$$
$$\mathrm{Cos}[c+d\,x]\,(C\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x])\,\Bigg(\Bigg(2\,i\,b\,\mathrm{ArcTan}\Big[$$
$$\mathrm{Sec}\left[\frac{d\,x}{2}\right]\,\left(\mathrm{Cos}[c]\Big/\left(\sqrt{\left(-a^2\,\mathrm{Cos}[2\,c]+b^2\,\mathrm{Cos}[2\,c]+i\,a^2\,\mathrm{Sin}[2\,c]-i\,b^2\,\mathrm{Sin}[2\,c]\right)}\right)-\right.$$
$$\left.(i\,\mathrm{Sin}[c])\Big/\left(\sqrt{\left(-a^2\,\mathrm{Cos}[2\,c]+b^2\,\mathrm{Cos}[2\,c]+i\,a^2\,\mathrm{Sin}[2\,c]-i\,b^2\,\mathrm{Sin}[2\,c]\right)}\right)\right)$$
$$\left(-i\,a\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+i\,b\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]\right)\Big]\,\mathrm{Cos}[c]\Bigg)\Big/$$
$$\left(a^4\,d\,\sqrt{-a^2\,\mathrm{Cos}[2\,c]+b^2\,\mathrm{Cos}[2\,c]+i\,a^2\,\mathrm{Sin}[2\,c]-i\,b^2\,\mathrm{Sin}[2\,c]}\right)+\Bigg(2\,b\,\mathrm{ArcTan}\Big[$$
$$\mathrm{Sec}\left[\frac{d\,x}{2}\right]\,\left(\mathrm{Cos}[c]\Big/\left(\sqrt{\left(-a^2\,\mathrm{Cos}[2\,c]+b^2\,\mathrm{Cos}[2\,c]+i\,a^2\,\mathrm{Sin}[2\,c]-i\,b^2\,\mathrm{Sin}[2\,c]\right)}\right)-\right.$$
$$\left.(i\,\mathrm{Sin}[c])\Big/\left(\sqrt{\left(-a^2\,\mathrm{Cos}[2\,c]+b^2\,\mathrm{Cos}[2\,c]+i\,a^2\,\mathrm{Sin}[2\,c]-i\,b^2\,\mathrm{Sin}[2\,c]\right)}\right)\right)$$
$$\left(-i\,a\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+i\,b\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]\right)\Big]\,\mathrm{Sin}[c]\Bigg)\Big/$$
$$\left(a^4\,d\,\sqrt{-a^2\,\mathrm{Cos}[2\,c]+b^2\,\mathrm{Cos}[2\,c]+i\,a^2\,\mathrm{Sin}[2\,c]-i\,b^2\,\mathrm{Sin}[2\,c]}\right)\Bigg)-$$
$$\left(2\,\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}[c]\,(C\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x])\right.$$
$$\left.\left(a\,A\,b^2\,\mathrm{Sin}[c]+a^3\,C\,\mathrm{Sin}[c]-A\,b^3\,\mathrm{Sin}[d\,x]-a^2\,b\,C\,\mathrm{Sin}[d\,x]\right)\right)\Big/$$
$$\left(3\,a\,b\,(a^2-b^2)\,d\,(a+b\,\mathrm{Cos}[c+d\,x])^3\,(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)+$$
$$\left(\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}[c]\,(C\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x])\right.$$
$$\left(-6\,a^3\,A\,b\,\mathrm{Sin}[c]+a\,A\,b^3\,\mathrm{Sin}[c]-5\,a^3\,b\,C\,\mathrm{Sin}[c]+8\,a^2\,A\,b^2\,\mathrm{Sin}[d\,x]-\right.$$
$$\left.\left.3\,A\,b^4\,\mathrm{Sin}[d\,x]+2\,a^4\,C\,\mathrm{Sin}[d\,x]+3\,a^2\,b^2\,C\,\mathrm{Sin}[d\,x]\right)\right)\Big/$$
$$\left(3\,a^2\,(a^2-b^2)^2\,d\,(a+b\,\mathrm{Cos}[c+d\,x])^2\,(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)+$$
$$\left(\mathrm{Cos}[c+d\,x]\,\mathrm{Sec}[c]\,(C\,\mathrm{Cos}[c+d\,x]+A\,\mathrm{Sec}[c+d\,x])\right.$$
$$\left(-18\,a^5\,A\,b\,\mathrm{Sin}[c]+6\,a^3\,A\,b^3\,\mathrm{Sin}[c]-3\,a\,A\,b^5\,\mathrm{Sin}[c]-12\,a^5\,b\,C\,\mathrm{Sin}[c]-3\,a^3\,b^3\,C\,\mathrm{Sin}[c]+26\,a^4\,A\right.$$
$$\left.\left.b^2\,\mathrm{Sin}[d\,x]-17\,a^2\,A\,b^4\,\mathrm{Sin}[d\,x]+6\,A\,b^6\,\mathrm{Sin}[d\,x]+2\,a^6\,C\,\mathrm{Sin}[d\,x]+13\,a^4\,b^2\,C\,\mathrm{Sin}[d\,x]\right)\right)\Big/$$
$$\left(3\,a^3\,(a^2-b^2)^3\,d\,(a+b\,\mathrm{Cos}[c+d\,x])\,(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)$$

Problem 592: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^3}{(a+b\,\mathrm{Cos}[c+d\,x])^4}\,dx$$

Optimal (type 3, 522 leaves, 9 steps):

$$\left(\left(20\,A\,b^9-a^2\,b^7\,(69\,A-2\,C)-8\,a^6\,b^3\,(5\,A-C)+7\,a^4\,b^5\,(12\,A-C)-8\,a^8\,b\,C\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]\right)\Big/\left(a^6\,\sqrt{a-b}\,\sqrt{a+b}\,\left(a^2-b^2\right)^3\,d\right)+$$

$$\frac{\left(20\,A\,b^2+a^2\,(A+2\,C)\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^6\,d}+\frac{1}{6\,a^5\,\left(a^2-b^2\right)^3\,d}$$

$$b\,\left(60\,A\,b^6-a^6\,(24\,A-26\,C)+a^4\,b^2\,(146\,A-17\,C)-a^2\,b^4\,(167\,A-6\,C)\right)\,\text{Tan}[c+d\,x]-\frac{1}{2\,a^4\,\left(a^2-b^2\right)^3\,d}$$

$$\left(10\,A\,b^6-a^6\,(A-6\,C)+a^4\,b^2\,(23\,A-2\,C)-a^2\,b^4\,(27\,A-C)\right)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]+$$

$$\frac{\left(A\,b^2+a^2\,C\right)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{3\,a\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Cos}[c+d\,x])^3}-\frac{\left(5\,A\,b^4-4\,a^4\,C-a^2\,b^2\,(10\,A+C)\right)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{6\,a^2\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Cos}[c+d\,x])^2}+$$

$$\left(\left(20\,A\,b^6-a^2\,b^4\,(53\,A-2\,C)+12\,a^6\,C+a^4\,b^2\,(48\,A+C)\right)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)\Big/$$

$$\left(6\,a^3\,\left(a^2-b^2\right)^3\,d\,(a+b\,\text{Cos}[c+d\,x])\right)$$

Result (type 3, 1065 leaves) :

$$\left(2\,b\,\left(40\,a^6\,A\,b^2-84\,a^4\,A\,b^4+69\,a^2\,A\,b^6-20\,A\,b^8+8\,a^8\,C-8\,a^6\,b^2\,C+7\,a^4\,b^4\,C-2\,a^2\,b^6\,C\right)\right.$$
$$\left.\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{-a^2+b^2}}\right]\,\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/$$
$$\left(a^6\,\left(a^2-b^2\right)^3\,\sqrt{-a^2+b^2}\,d\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\left(\left(-a^2\,A-20\,A\,b^2-2\,a^2\,C\right)\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right.$$
$$\left.\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(a^6\,d\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\left(\left(a^2\,A+20\,A\,b^2+2\,a^2\,C\right)\,\text{Cos}[c+d\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right.$$
$$\left.\left(C+A\,\text{Sec}[c+d\,x]^2\right)\right)\Big/\left(a^6\,d\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\frac{1}{48\,a^5\,\left(a^2-b^2\right)^3\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)^3\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)}$$
$$\left(C+A\,\text{Sec}[c+d\,x]^2\right)\,\left(48\,a^{10}\,A\,\text{Sin}[c+d\,x]-396\,a^8\,A\,b^2\,\text{Sin}[c+d\,x]+\right.$$
$$1212\,a^6\,A\,b^4\,\text{Sin}[c+d\,x]-1000\,a^4\,A\,b^6\,\text{Sin}[c+d\,x]+106\,a^2\,A\,b^8\,\text{Sin}[c+d\,x]+$$
$$120\,A\,b^{10}\,\text{Sin}[c+d\,x]+144\,a^8\,b^2\,C\,\text{Sin}[c+d\,x]-76\,a^6\,b^4\,C\,\text{Sin}[c+d\,x]+$$
$$10\,a^4\,b^6\,C\,\text{Sin}[c+d\,x]+12\,a^2\,b^8\,C\,\text{Sin}[c+d\,x]-120\,a^9\,A\,b\,\text{Sin}[2\,(c+d\,x)]+$$
$$84\,a^7\,A\,b^3\,\text{Sin}[2\,(c+d\,x)]+1116\,a^5\,A\,b^5\,\text{Sin}[2\,(c+d\,x)]-1560\,a^3\,A\,b^7\,\text{Sin}[2\,(c+d\,x)]+$$
$$600\,a\,A\,b^9\,\text{Sin}[2\,(c+d\,x)]+240\,a^7\,b^3\,C\,\text{Sin}[2\,(c+d\,x)]-180\,a^5\,b^5\,C\,\text{Sin}[2\,(c+d\,x)]+$$
$$60\,a^3\,b^7\,C\,\text{Sin}[2\,(c+d\,x)]-252\,a^8\,A\,b^2\,\text{Sin}[3\,(c+d\,x)]+1044\,a^6\,A\,b^4\,\text{Sin}[3\,(c+d\,x)]-$$
$$806\,a^4\,A\,b^6\,\text{Sin}[3\,(c+d\,x)]-61\,a^2\,A\,b^8\,\text{Sin}[3\,(c+d\,x)]+180\,A\,b^{10}\,\text{Sin}[3\,(c+d\,x)]+$$
$$144\,a^8\,b^2\,C\,\text{Sin}[3\,(c+d\,x)]-50\,a^6\,b^4\,C\,\text{Sin}[3\,(c+d\,x)]-7\,a^4\,b^6\,C\,\text{Sin}[3\,(c+d\,x)]+$$
$$18\,a^2\,b^8\,C\,\text{Sin}[3\,(c+d\,x)]-138\,a^7\,A\,b^3\,\text{Sin}[4\,(c+d\,x)]+738\,a^5\,A\,b^5\,\text{Sin}[4\,(c+d\,x)]-$$
$$840\,a^3\,A\,b^7\,\text{Sin}[4\,(c+d\,x)]+300\,a\,A\,b^9\,\text{Sin}[4\,(c+d\,x)]+120\,a^7\,b^3\,C\,\text{Sin}[4\,(c+d\,x)]-$$
$$90\,a^5\,b^5\,C\,\text{Sin}[4\,(c+d\,x)]+30\,a^3\,b^7\,C\,\text{Sin}[4\,(c+d\,x)]-24\,a^6\,A\,b^4\,\text{Sin}[5\,(c+d\,x)]+$$
$$146\,a^4\,A\,b^6\,\text{Sin}[5\,(c+d\,x)]-167\,a^2\,A\,b^8\,\text{Sin}[5\,(c+d\,x)]+60\,A\,b^{10}\,\text{Sin}[5\,(c+d\,x)]+$$
$$\left.26\,a^6\,b^4\,C\,\text{Sin}[5\,(c+d\,x)]-17\,a^4\,b^6\,C\,\text{Sin}[5\,(c+d\,x)]+6\,a^2\,b^8\,C\,\text{Sin}[5\,(c+d\,x)]\right)$$

Problem 599: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(1-\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3}{a+b\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 117 leaves, 6 steps):

$$\frac{2\,\sqrt{a-b}\,b\,\sqrt{a+b}\,\text{ArcTan}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]}{a^3\,d}-$$
$$\frac{\left(a^2-2\,b^2\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^3\,d}-\frac{b\,\text{Tan}[c+d\,x]}{a^2\,d}+\frac{\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a\,d}$$

Result (type 3, 236 leaves):

$$\frac{1}{4 a^3 d}\left(8 b \sqrt{-a^2+b^2}\, \text{ArcTanh}\left[\frac{(a-b) \tan\left[\frac{1}{2}(c+d x)\right]}{\sqrt{-a^2+b^2}}\right]+2 a^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\right.$$
$$4 b^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-2 a^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$4 b^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\frac{a^2}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-$$
$$\left.\frac{a^2}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-4 a b \text{Tan}[c+d x]\right)$$

Problem 609: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(1-\text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]^4}{(a+b \text{Cos}[c+d x])^2}\, dx$$

Optimal (type 3, 195 leaves, 8 steps):

$$-\frac{2 b^2 \left(3 a^2-4 b^2\right) \text{ArcTan}\left[\frac{\sqrt{a-b}\, \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]}{a^5 \sqrt{a-b} \sqrt{a+b}\, d}+$$
$$\frac{b \left(a^2-4 b^2\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{a^5 d}-\frac{\left(a^2-12 b^2\right) \text{Tan}[c+d x]}{3 a^4 d}-$$
$$\frac{2 b\, \text{Sec}[c+d x] \text{Tan}[c+d x]}{a^3 d}+\frac{4 \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 a^2 d}-\frac{\text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{a d (a+b \text{Cos}[c+d x])}$$

Result (type 3, 475 leaves):

$$\frac{2 b^2 \left(3 a^2-4 b^2\right) \text{ArcTanh}\left[\frac{(a-b) \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{-a^2+b^2}}\right]}{a^5 \sqrt{-a^2+b^2}\, d}+\frac{\left(-a^2 b+4 b^3\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{a^5 d}+\frac{\left(a^2 b-4 b^3\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{a^5 d}+\frac{a-6 b}{12 a^3 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{\text{Sin}\left[\frac{1}{2} (c+d x)\right]}{6 a^2 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+\frac{\text{Sin}\left[\frac{1}{2} (c+d x)\right]}{6 a^2 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+\frac{-a+6 b}{12 a^3 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{-a^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+9 b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{3 a^4 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+\frac{-a^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]+9 b^2 \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{3 a^4 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+\frac{b^3 \text{Sin}[c+d x]}{a^4 d (a+b \text{Cos}[c+d x])}$$

Problem 626: Result unnecessarily involves imaginary or complex numbers.

$$\int \sqrt{a+b \text{Cos}[c+d x]} \left(A+C \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x] \, dx$$

Optimal (type 4, 231 leaves, 9 steps):

$$\frac{2 a C \sqrt{a+b \text{Cos}[c+d x]}\, \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]}{3 b d \sqrt{\frac{a+b \text{Cos}[c+d x]}{a+b}}}-\frac{2 \left(a^2 C-b^2 (3 A+C)\right) \sqrt{\frac{a+b \text{Cos}[c+d x]}{a+b}}\, \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]}{3 b d \sqrt{a+b \text{Cos}[c+d x]}}+\frac{2 a A \sqrt{\frac{a+b \text{Cos}[c+d x]}{a+b}}\, \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]}{d \sqrt{a+b \text{Cos}[c+d x]}}+\frac{2 C \sqrt{a+b \text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{3 d}$$

Result (type 4, 371 leaves):

$$\frac{1}{6 d}\left(\frac{4 b (3 A+C) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{\sqrt{a+b \operatorname{Cos}[c+d x]}}+\right.$$

$$\frac{2 a (6 A+C) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{\sqrt{a+b \operatorname{Cos}[c+d x]}}+\frac{1}{b^2 \sqrt{-\frac{1}{a+b}}}$$

$$2 i C \sqrt{-\frac{b(-1+\operatorname{Cos}[c+d x])}{a+b}} \sqrt{\frac{b(1+\operatorname{Cos}[c+d x])}{-a+b}} \operatorname{Csc}[c+d x]$$

$$\left(-2 a (a-b) \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]+\right.$$

$$b\left(-2 a \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]+\right.$$

$$\left.\left.b \operatorname{EllipticPi}\left[\frac{a+b}{a}, i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]\right)\right)+$$

$$\left.4 C \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]\right)$$

Problem 627: Result unnecessarily involves imaginary or complex numbers.

$$\int \sqrt{a+b \operatorname{Cos}[c+d x]} \left(A+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^2 \, dx$$

Optimal (type 4, 205 leaves, 9 steps):

$$-\frac{(A-2C)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2b}{a+b}\right]}{d\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{a\,A\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2b}{a+b}\right]}{d\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+$$

$$\frac{A\,b\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2b}{a+b}\right]}{d\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\frac{A\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Tan}[c+d\,x]}{d}$$

Result (type 4, 374 leaves):

$$\frac{1}{4d}\left(\frac{8\,a\,C\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\,b\,(A+2C)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}-\frac{1}{a\,b\sqrt{-\frac{1}{a+b}}}$$

$$2\,\mathrm{i}\,(A-2C)\sqrt{-\frac{b\,(-1+\mathrm{Cos}[c+d\,x])}{a+b}}\sqrt{\frac{b\,(1+\mathrm{Cos}[c+d\,x])}{-a+b}}\;\mathrm{Csc}[c+d\,x]$$

$$\left(-2\,a\,(a-b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$b\left(-2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$\left.\left.b\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)+$$

$$\left.4\,A\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Tan}[c+d\,x]\right)$$

Problem 628: Result unnecessarily involves imaginary or complex numbers.

$$\int \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\mathrm{Sec}[c+d\,x]^3\,dx$$

Optimal (type 4, 277 leaves, 10 steps):

$$-\frac{A\,b\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{4\,a\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}}+\frac{b\,(3\,A+8\,C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{4\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}-\frac{\left(A\,b^2-4\,a^2\,(A+2\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{4\,a\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\frac{A\,b\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Tan}[c+d\,x]}{4\,a\,d}+\frac{A\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,d}$$

Result (type 4, 535 leaves):

$$\frac{1}{16\,a\,d}\left(\frac{2\,(4\,a\,A\,b+16\,a\,b\,C)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\left(8\,a^2\,A-3\,A\,b^2+16\,a^2\,C\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\left(2\,\mathrm{i}\,A\,b^2\,\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(2\,a\,(a-b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\right[$$

$$\left.\left.\frac{a+b}{a},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\;\text{Sin}[c+d\,x]\Bigg)\Big/$$

$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\text{Cos}[c+d\,x])+(a+b\,\text{Cos}[c+d\,x])^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\text{Cos}[c+d\,x])+2\,(a+b\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{A\,b\,\text{Tan}[c+d\,x]}{4\,a}+\frac{1}{2}\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)}{d}$$

Problem 629: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 4, 365 leaves, 11 steps):

$$\left(\left(3\,A\,b^2-8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\bigg/$$

$$\left(24\,a^2\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)-$$

$$\frac{\left(A\,b^2-8\,a^2\,(2\,A+3\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{24\,a\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+$$

$$\left(b\,\left(A\,b^2+4\,a^2\,(A+2\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\bigg/$$

$$\left(8\,a^2\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\frac{\left(3\,A\,b^2-8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Tan}[c+d\,x]}{24\,a^2\,d}+$$

$$\frac{A\,b\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]\;\mathrm{Tan}[c+d\,x]}{12\,a\,d}+\frac{A\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{3\,d}$$

Result (type 4, 601 leaves) :

$$-\frac{1}{96\,a^2\,d}\,b\left(-\frac{8\,a\,A\,b\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\left(2\,\left(-8\,a^2\,A-9\,A\,b^2-24\,a^2\,C\right)\right.\right.$$

$$\left.\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(2\,\mathrm{i}\,\left(16\,a^2\,A-3\,A\,b^2+24\,a^2\,C\right)\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}[2\,(c+d\,x)]\right.$$

$$\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\left.\frac{a+b}{a},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left(a\,\sqrt{-\frac{1}{a+b}}\;\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\;\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+2\,(a+b\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}$$

$$\left(\frac{1}{24\,a^2}\mathrm{Sec}[c+d\,x]\,\left(16\,a^2\,A\,\mathrm{Sin}[c+d\,x]-3\,A\,b^2\,\mathrm{Sin}[c+d\,x]+24\,a^2\,C\,\mathrm{Sin}[c+d\,x]\right)+\right.$$
$$\frac{A\,b\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{12\,a}+$$
$$\left.\frac{1}{3}\,A\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 633: Result unnecessarily involves imaginary or complex numbers.

$$\int(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]\,dx$$

Optimal (type 4, 281 leaves, 10 steps):

$$\left(2\left(a^2 C+b^2(5A+3C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2b}{a+b}\right]\right)\Big/$$
$$\left(5\,b\,d\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)+$$
$$\frac{2a\left(5Ab^2-\left(a^2-b^2\right)C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2b}{a+b}\right]}{5\,b\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$
$$\frac{2a^2A\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2b}{a+b}\right]}{d\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$
$$\frac{2aC\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{5d}+\frac{2C\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\text{Sin}[c+d\,x]}{5d}$$

Result (type 4, 421 leaves) :

$$\frac{1}{10\,d}\left(\frac{8\,a\,b\,(5\,A+2\,C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\left(a^2\,(10\,A+C)+b^2\,(5\,A+3\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\frac{1}{a\,b^2\,\sqrt{-\frac{1}{a+b}}}$$

$$2\,i\,\left(5\,A\,b^2+\left(a^2+3\,b^2\right)C\right)\sqrt{-\frac{b\,(-1+\mathrm{Cos}[c+d\,x])}{a+b}}\;\sqrt{\frac{b\,(1+\mathrm{Cos}[c+d\,x])}{-a+b}}\;\mathrm{Csc}[c+d\,x]$$

$$\left(-2\,a\,(a-b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\,\left(-2\,a\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$\left.\left.b\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\,i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)+$$

$$\left.4\,C\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;(2\,a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sin}[c+d\,x]\right)$$

Problem 634: Result unnecessarily involves imaginary or complex numbers.

$$\int (a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^2\,dx$$

Optimal (type 4, 270 leaves, 10 steps):

$$-\frac{a\,(3\,A-8\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{3\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\left(\left(a^2\,(3\,A-2\,C)+2\,b^2\,(3\,A+C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(3\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{3\,a\,A\,b\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-$$

$$\frac{b\,(3\,A-2\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{3\,d}+\frac{A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{d}$$

Result (type 4, 528 leaves) :

$$
\begin{aligned}
&\frac{1}{12\,d}\Bigg(\left(2\left(12\,A\,b^2+12\,a^2\,C+4\,b^2\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\\
&\quad\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\\
&\quad\left(2\left(15\,a\,A\,b+8\,a\,b\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\\
&\quad\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\Bigg(2\,\mathrm{i}\left(-3\,a\,A\,b+8\,a\,b\,C\right)\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\\
&\qquad\mathrm{Cos}\left[2\left(c+d\,x\right)\right]\Bigg(2\,a\left(a-b\right)\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\\
&\qquad\quad b\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.\\
&\qquad\qquad\left.\left.\frac{a+b}{a},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\Bigg)\mathrm{Sin}[c+d\,x]\Bigg)\Big/\\
&\quad\Bigg(a\sqrt{-\frac{1}{a+b}}\;\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\;\sqrt{-\frac{a^2-b^2-2\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2}{b^2}}\\
&\qquad\left(2\,a^2-b^2-4\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+2\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2\right)\Bigg)\Bigg)+\\
&\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\left(\frac{2}{3}\,b\,C\,\mathrm{Sin}[c+d\,x]+a\,A\,\mathrm{Tan}[c+d\,x]\right)}{d}
\end{aligned}
$$

Problem 635: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\mathrm{Sec}[c+d\,x]^3\,\mathrm{d}x$$

Optimal (type 4, 276 leaves, 10 steps):

$$-\frac{b\,(5\,A-8\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{4\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{a\,b\,(7\,A+8\,C)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{4\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\left(\left(3\,A\,b^2+4\,a^2\,(A+2\,C)\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(4\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{3\,A\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Tan}[c+d\,x]}{4\,d}+$$

$$\frac{A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]\,\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 4, 544 leaves):

$$\frac{1}{16\,d}\left(\frac{2\,(4\,a\,A\,b+32\,a\,b\,C)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,(8\,a^2\,A+A\,b^2+16\,a^2\,C+8\,b^2\,C)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(2\,\text{i}\,(-5\,A\,b^2+8\,b^2\,C)\,\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\right.$$

$$\text{Cos}[2\,(c+d\,x)]\left(2\,a\,(a-b)\,\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},\,\text{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\text{Cos}[c+d\,x])+(a+b\,\text{Cos}[c+d\,x])^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\text{Cos}[c+d\,x])+2\,(a+b\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{5}{4}\,A\,b\,\text{Tan}[c+d\,x]+\frac{1}{2}\,a\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)$$

Problem 636: Result unnecessarily involves imaginary or complex numbers.

$$\int(a+b\,\text{Cos}[c+d\,x])^{3/2}\,(A+C\,\text{Cos}[c+d\,x]^2)\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 4, 365 leaves, 11 steps):

$$-\left(\left(\left(3\,A\,b^2+8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(24\,a\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)\right)+$$

$$\left(\left(8\,a^2\,(2\,A+3\,C)+b^2\,(17\,A+48\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(24\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(b\,\left(A\,b^2-12\,a^2\,(A+2\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(8\,a\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\frac{\left(3\,A\,b^2+8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Tan}[c+d\,x]}{24\,a\,d}+$$

$$\frac{A\,b\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]\;\mathrm{Tan}[c+d\,x]}{4\,d}+$$

$$\frac{A\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{3\,d}$$

Result (type 4, 607 leaves) :

$$-\frac{1}{96\,a\,d}b\left(\left(2\,(-28\,a\,A\,b-96\,a\,b\,C)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\left(2\,(-56\,a^2\,A+9\,A\,b^2-120\,a^2\,C)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,\mathrm{i}\,(16\,a^2\,A+3\,A\,b^2+24\,a^2\,C)\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\,\mathrm{Cos}[2\,(c+d\,x)]\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}\left(2\,a^2-b^2-4\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+2\,(a+b\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\left(\frac{1}{24\,a}\mathrm{Sec}[c+d\,x]\,(16\,a^2\,A\,\mathrm{Sin}[c+d\,x]+3\,A\,b^2\,\mathrm{Sin}[c+d\,x]+24\,a^2\,C\,\mathrm{Sin}[c+d\,x])+\frac{7}{12}A\,b\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]+\frac{1}{3}a\,A\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 637: Result unnecessarily involves imaginary or complex numbers.

$$\int(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+C\,\mathrm{Cos}[c+d\,x]^2)\,\mathrm{Sec}[c+d\,x]^5\,dx$$

Optimal (type 4, 436 leaves, 12 steps):

$$\left(b\left(3\,A\,b^2-4\,a^2\,(13\,A+20\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(64\,a^2\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)-$$

$$\left(b\left(A\,b^2-4\,a^2\,(19\,A+28\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(64\,a\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\left(\left(3\,A\,b^4+24\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\right)\right.$$

$$\left.\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(64\,a^2\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\frac{b\left(3\,A\,b^2-4\,a^2\,(13\,A+20\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Tan}[c+d\,x]}{64\,a^2\,d}+$$

$$\frac{\left(A\,b^2+4\,a^2\,(3\,A+4\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]\;\mathrm{Tan}[c+d\,x]}{32\,a\,d}+$$

$$\frac{A\,b\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]^2\;\mathrm{Tan}[c+d\,x]}{8\,d}+$$

$$\frac{A\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\;\mathrm{Sec}[c+d\,x]^3\;\mathrm{Tan}[c+d\,x]}{4\,d}$$

Result (type 4, 696 leaves) :

$$\frac{1}{256 a^2 d}\left(\left(\left(2\left(48 a^3 A b+4 a A b^3+64 a^3 b C\right)\sqrt{\frac{a+b \text{Cos}[c+d x]}{a+b}}\text{ EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 b}{a+b}\right]\right)\Big/\left(\sqrt{a+b \text{Cos}[c+d x]}\right)+\left(2\left(96 a^4 A-4 a^2 A b^2+9 A b^4+128 a^4 C+16 a^2 b^2 C\right)\sqrt{\frac{a+b \text{Cos}[c+d x]}{a+b}}\text{ EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2 b}{a+b}\right]\right)\Big/\left(\sqrt{a+b \text{Cos}[c+d x]}\right)-\left(2 i\left(-52 a^2 A b^2+3 A b^4-80 a^2 b^2 C\right)\sqrt{\frac{b-b \text{Cos}[c+d x]}{a+b}}\sqrt{-\frac{b+b \text{Cos}[c+d x]}{a-b}}\text{ Cos}[2(c+d x)]\left(2 a(a-b)\text{ EllipticE}\left[i \text{ ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \text{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]+b\left(2 a \text{ EllipticF}\left[i \text{ ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \text{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]-b \text{ EllipticPi}\left[\frac{a+b}{a},i \text{ ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \text{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{ Sin}[c+d x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\text{Cos}[c+d x]^2}\sqrt{-\frac{a^2-b^2-2 a(a+b \text{Cos}[c+d x])+(a+b \text{Cos}[c+d x])^2}{b^2}}\left(2 a^2-b^2-4 a(a+b \text{Cos}[c+d x])+2(a+b \text{Cos}[c+d x])^2\right)\right)\right)+\frac{1}{d}\sqrt{a+b \text{Cos}[c+d x]}$$
$$\left(\frac{1}{32 a}\text{Sec}[c+d x]^2\left(12 a^2 A \text{ Sin}[c+d x]+A b^2 \text{ Sin}[c+d x]+16 a^2 C \text{ Sin}[c+d x]\right)+\frac{1}{64 a^2}\text{Sec}[c+d x]\left(52 a^2 A b \text{ Sin}[c+d x]-3 A b^3 \text{ Sin}[c+d x]+80 a^2 b C \text{ Sin}[c+d x]\right)+\frac{3}{8}A b \text{ Sec}[c+d x]^2 \text{ Tan}[c+d x]+\frac{1}{4}a A \text{ Sec}[c+d x]^3 \text{ Tan}[c+d x]\right)$$

Problem 641: Result unnecessarily involves imaginary or complex numbers.

$$\int(a+b \text{Cos}[c+d x])^{5/2}\left(A+C \text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]\,dx$$

Optimal (type 4, 342 leaves, 11 steps):

$$\left(2\,a\,\left(49\,A\,b^2+3\,a^2\,C+29\,b^2\,C\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$
$$\left(21\,b\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)+$$
$$\left(2\,\left(2\,a^2\,b^2\,(7\,A-C)-3\,a^4\,C+b^4\,(7\,A+5\,C)\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$
$$\left(21\,b\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{2\,a^3\,A\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$
$$\frac{2\,\left(3\,a^2\,C+b^2\,(7\,A+5\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{21\,d}+$$
$$\frac{2\,a\,C\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{7\,d}+\frac{2\,C\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 4, 468 leaves) :

$$\frac{1}{42 d}\left(\left(4 b\left(9 a^2 (7 A+3 C)+b^2 (7 A+5 C)\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 b}{a+b}\right]\right)\Big/\right.$$

$$\left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)+$$

$$\left(2 a\left(3 a^2 (14 A+C)+b^2 (49 A+29 C)\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2 b}{a+b}\right]\right)\Big/$$

$$\left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\frac{1}{b^2\sqrt{-\frac{1}{a+b}}}$$

$$2 i\left(49 A b^2+3 a^2 C+29 b^2 C\right)\sqrt{-\frac{b(-1+\operatorname{Cos}[c+d x])}{a+b}}\sqrt{\frac{b(1+\operatorname{Cos}[c+d x])}{-a+b}}$$

$$\operatorname{Csc}[c+d x]\left(-2 a(a-b)\operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$b\left(-2 a \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$\left.\left.b \operatorname{EllipticPi}\left[\frac{a+b}{a},i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]\right)\right)+$$

$$2\sqrt{a+b \operatorname{Cos}[c+d x]}\left(14 A b^2+18 a^2 C+13 b^2 C+18 a b C \operatorname{Cos}[c+d x]+3 b^2 C \operatorname{Cos}[2(c+d x)]\right)$$

$$\left.\operatorname{Sin}[c+d x]\right)$$

Problem 642: Result unnecessarily involves imaginary or complex numbers.

$$\int(a+b \operatorname{Cos}[c+d x])^{5/2}\left(A+C \operatorname{Cos}[c+d x]^2\right)\operatorname{Sec}[c+d x]^2\, dx$$

Optimal (type 4, 327 leaves, 11 steps):

$$-\left(\left(\left(a^2\,(15\,A-46\,C)-6\,b^2\,(5\,A+3\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Bigg/\left(15\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)\right)+$$

$$\left(a\,\left(a^2\,(15\,A-16\,C)+4\,b^2\,(15\,A+4\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Bigg/$$

$$\left(15\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\frac{5\,a^2\,A\,b\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}-$$

$$\frac{a\,b\,(15\,A-16\,C)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{15\,d}-$$

$$\frac{b\,(5\,A-2\,C)\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{5\,d}+$$

$$\frac{A\,(a+b\,\mathrm{Cos}[c+d\,x])^{5/2}\,\mathrm{Tan}[c+d\,x]}{d}$$

Result (type 4, 581 leaves) :

$$\frac{1}{60\,d}\left(\left(\left(2\left(180\,a\,A\,b^2+60\,a^3\,C+68\,a\,b^2\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\left(2\left(135\,a^2\,A\,b+30\,A\,b^3+46\,a^2\,b\,C+18\,b^3\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,\mathrm{i}\left(-15\,a^2\,A\,b+30\,A\,b^3+46\,a^2\,b\,C+18\,b^3\,C\right)\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}\left[2\left(c+d\,x\right)\right]\left(2\,a\left(a-b\right)\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2}{b^2}}\left(2\,a^2-b^2-4\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+2\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2\right)\right)\right)+\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\left(\frac{22}{15}\,a\,b\,C\,\mathrm{Sin}[c+d\,x]+\frac{1}{5}\,b^2\,C\,\mathrm{Sin}\left[2\left(c+d\,x\right)\right]+a^2\,A\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 643: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{5/2}\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\mathrm{Sec}[c+d\,x]^3\,dx$$

Optimal (type 4, 329 leaves, 11 steps):

$$-\frac{a\,b\,(27\,A-56\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{12\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\left(b\,\left(8\,b^2\,(3\,A+C)+a^2\,(33\,A+16\,C)\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(12\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+$$

$$\left(a\,\left(15\,A\,b^2+4\,a^2\,(A+2\,C)\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(4\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\frac{b^2\,(21\,A-8\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{12\,d}+$$

$$\frac{5\,A\,b\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{4\,d}+\frac{A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 4, 582 leaves):

$$\frac{1}{48\,d}\left(\left(\left(2\left(12 a^2 A b+48 A b^3+144 a^2 b C+16 b^3 C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\left(2\left(24 a^3 A+63 a A b^2+48 a^3 C+56 a b^2 C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(2\,\text{i}\left(-27 a A b^2+56 a b^2 C\right)\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}\left[2\left(c+d\,x\right)\right]\left(2\,a\left(a-b\right)\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(2\,a\,\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\frac{a+b}{a},\text{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\text{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\left(a+b\,\text{Cos}[c+d\,x]\right)+\left(a+b\,\text{Cos}[c+d\,x]\right)^2}{b^2}}\left(2 a^2-b^2-4\,a\left(a+b\,\text{Cos}[c+d\,x]\right)+2\left(a+b\,\text{Cos}[c+d\,x]\right)^2\right)\right)\right)+\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{2}{3}b^2\,C\,\text{Sin}[c+d\,x]+\frac{9}{4}a\,A\,b\,\text{Tan}[c+d\,x]+\frac{1}{2}a^2\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)$$

Problem 644: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\left(A+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^4\,\text{d}x$$

Optimal (type 4, 363 leaves, 11 steps):

$$-\left(\left(\left(3\,b^2\,\left(11\,A-16\,C\right)+8\,a^2\,\left(2\,A+3\,C\right)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,\left(c+d\,x\right),\,\frac{2\,b}{a+b}\right]\right)\Big/\right.$$

$$\left.\left(24\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)\right)+$$

$$\left(a\,\left(8\,a^2\,\left(2\,A+3\,C\right)+b^2\,\left(59\,A+96\,C\right)\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\,\text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(24\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+$$

$$\left(5\,b\,\left(A\,b^2+4\,a^2\,\left(A+2\,C\right)\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,\left(c+d\,x\right),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(8\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\left(15\,A\,b^2+8\,a^2\,\left(2\,A+3\,C\right)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Tan}[c+d\,x]}{24\,d}+$$

$$\frac{5\,A\,b\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Sec}[c+d\,x]\,\,\text{Tan}[c+d\,x]}{12\,d}+$$

$$\frac{A\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\,\text{Sec}[c+d\,x]^2\,\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 4, 616 leaves) :

$$-\frac{1}{96\,d}b\left(\left(2\,(-52\,a\,A\,b-288\,a\,b\,C)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\left(2\,(-104\,a^2\,A+3\,A\,b^2-216\,a^2\,C-48\,b^2\,C)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(2\,\mathrm{i}\,(16\,a^2\,A+33\,A\,b^2+24\,a^2\,C-48\,b^2\,C)\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}[2\,(c+d\,x)]\left(2\,a\,(a-b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(2\,a\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\frac{a+b}{a},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\text{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\text{Cos}[c+d\,x])+(a+b\,\text{Cos}[c+d\,x])^2}{b^2}}\left(2\,a^2-b^2-4\,a\,(a+b\,\text{Cos}[c+d\,x])+2\,(a+b\,\text{Cos}[c+d\,x])^2\right)\right)\right)+\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{1}{24}\text{Sec}[c+d\,x]\,(16\,a^2\,A\,\text{Sin}[c+d\,x]+33\,A\,b^2\,\text{Sin}[c+d\,x]+24\,a^2\,C\,\text{Sin}[c+d\,x])+\frac{13}{12}a\,A\,b\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]+\frac{1}{3}a^2\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)$$

Problem 645: Result unnecessarily involves imaginary or complex numbers.

$$\int(a+b\,\text{Cos}[c+d\,x])^{5/2}\,(A+C\,\text{Cos}[c+d\,x]^2)\,\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 4, 437 leaves, 12 steps):

$$-\left(\left(b\left(15\,A\,b^2+4\,a^2\,(71\,A+108\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Bigg/\left(192\,a\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)\right)+$$

$$\left(b\left(4\,a^2\,(89\,A+132\,C)+b^2\,(133\,A+384\,C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Bigg/\left(192\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(\left(5\,A\,b^4-120\,a^2\,b^2\,(A+2\,C)-16\,a^4\,(3\,A+4\,C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Bigg/\left(64\,a\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+$$

$$\frac{b\left(15\,A\,b^2+4\,a^2\,(71\,A+108\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Tan}[c+d\,x]}{192\,a\,d}+$$

$$\frac{\left(5\,A\,b^2+4\,a^2\,(3\,A+4\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]\;\text{Tan}[c+d\,x]}{32\,d}+$$

$$\frac{5\,A\,b\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{24\,d}+$$

$$\frac{A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 4, 704 leaves) :

$$\frac{1}{768\,a\,d}\left(\left(2\left(144\,a^3\,A\,b+236\,a\,A\,b^3+192\,a^3\,b\,C+768\,a\,b^3\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\right.$$

$$\left(2\left(288\,a^4\,A+436\,a^2\,A\,b^2-45\,A\,b^4+384\,a^4\,C+1008\,a^2\,b^2\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right.$$

$$\left.\mathrm{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(2\,i\left(-284\,a^2\,A\,b^2-15\,A\,b^4-432\,a^2\,b^2\,C\right)\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\right.$$

$$\mathrm{Cos}\left[2\left(c+d\,x\right)\right]\left(2\,a\left(a-b\right)\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+2\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2\right)\right)\right)+\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}$$

$$\left(\frac{1}{96}\,\mathrm{Sec}[c+d\,x]^2\left(36\,a^2\,A\,\mathrm{Sin}[c+d\,x]+59\,A\,b^2\,\mathrm{Sin}[c+d\,x]+48\,a^2\,C\,\mathrm{Sin}[c+d\,x]\right)+\right.$$

$$\frac{1}{192\,a}\mathrm{Sec}[c+d\,x]\left(284\,a^2\,A\,b\,\mathrm{Sin}[c+d\,x]+15\,A\,b^3\,\mathrm{Sin}[c+d\,x]+432\,a^2\,b\,C\,\mathrm{Sin}[c+d\,x]\right)+$$

$$\frac{17}{24}\,a\,A\,b\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]+$$

$$\left.\frac{1}{4}\,a^2\,A\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 652: Unable to integrate problem.

$$\int \frac{\left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]}{\sqrt{a + b \operatorname{Cos}[c + d x]}} \, dx$$

Optimal (type 4, 183 leaves, 8 steps):

$$\frac{2 C \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{b d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}} - \frac{2 a C \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{b d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{2 A \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{d \sqrt{a + b \operatorname{Cos}[c + d x]}}$$

Result (type 8, 35 leaves):

$$\int \frac{\left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]}{\sqrt{a + b \operatorname{Cos}[c + d x]}} \, dx$$

Problem 653: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^2}{\sqrt{a + b \operatorname{Cos}[c + d x]}} \, dx$$

Optimal (type 4, 214 leaves, 9 steps):

$$-\frac{A \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{a d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}} + \frac{(A + 2 C) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{d \sqrt{a + b \operatorname{Cos}[c + d x]}} - \frac{A b \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{a d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{A \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Tan}[c + d x]}{a d}$$

Result (type 4, 559 leaves):

$$\frac{2\,A\,\text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}[c+d\,x]}{a\,d\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)}+$$

$$\frac{1}{2\,a\,d\,\left(2\,A+C+C\,\text{Cos}[2\,c+2\,d\,x]\right)}$$

$$\text{Cos}[c+d\,x]^2\,\left(C+A\,\text{Sec}[c+d\,x]^2\right)\,\left(\frac{8\,a\,C\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}-\right.$$

$$\frac{6\,A\,b\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\left(2\,i\,A\,b\,\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}\left[2\,(c+d\,x)\right]\right.$$

$$\left(2\,a\,(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\,\left(2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},\,i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\,\text{Sin}[c+d\,x]\Bigg)\Bigg/$$

$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,\left(a+b\,\text{Cos}[c+d\,x]\right)+\left(a+b\,\text{Cos}[c+d\,x]\right)^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\,\left(a+b\,\text{Cos}[c+d\,x]\right)+2\,\left(a+b\,\text{Cos}[c+d\,x]\right)^2\right)\right)\right)$$

Problem 654: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 278 leaves, 10 steps):

$$\frac{3\,A\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{4\,a^2\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}}-$$

$$\frac{A\,b\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{4\,a\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\left(\left(3\,A\,b^2+4\,a^2\,(A+2\,C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(4\,a^2\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\frac{3\,A\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Tan}[c+d\,x]}{4\,a^2\,d}+$$

$$\frac{A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]\;\text{Tan}[c+d\,x]}{2\,a\,d}$$

Result (type 4, 603 leaves) :

$$\frac{1}{8 a^2 d \left(2 A + C + C \operatorname{Cos}[2 c + 2 d x]\right)}$$

$$\operatorname{Cos}[c + d x]^2 \left(C + A \operatorname{Sec}[c + d x]^2\right) \left(\frac{8 a A b \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{\sqrt{a + b \operatorname{Cos}[c + d x]}} +\right.$$

$$\left(2 \left(8 a^2 A + 9 A b^2 + 16 a^2 C\right) \sqrt{\frac{a + b \operatorname{Cos}[c + d x]}{a + b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 b}{a + b}\right]\right) \Big/$$

$$\left(\sqrt{a + b \operatorname{Cos}[c + d x]}\right) - \left(6 i A b^2 \sqrt{\frac{b - b \operatorname{Cos}[c + d x]}{a + b}} \sqrt{-\frac{b + b \operatorname{Cos}[c + d x]}{a - b}} \operatorname{Cos}[2 (c + d x)]\right.$$

$$\left(2 a (a - b) \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a + b}} \sqrt{a + b \operatorname{Cos}[c + d x]}\right], \frac{a + b}{a - b}\right] +\right.$$

$$b \left(2 a \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a + b}} \sqrt{a + b \operatorname{Cos}[c + d x]}\right], \frac{a + b}{a - b}\right] - b \operatorname{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\left.\frac{a + b}{a}, i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a + b}} \sqrt{a + b \operatorname{Cos}[c + d x]}\right], \frac{a + b}{a - b}\right]\right)\right) \operatorname{Sin}[c + d x]\right) \Big/$$

$$\left(a \sqrt{-\frac{1}{a + b}} \sqrt{1 - \operatorname{Cos}[c + d x]^2} \sqrt{-\frac{a^2 - b^2 - 2 a (a + b \operatorname{Cos}[c + d x]) + (a + b \operatorname{Cos}[c + d x])^2}{b^2}}\right.$$

$$\left.\left.\left(2 a^2 - b^2 - 4 a (a + b \operatorname{Cos}[c + d x]) + 2 (a + b \operatorname{Cos}[c + d x])^2\right)\right)\right) +$$

$$\left(\operatorname{Cos}[c + d x]^2 \sqrt{a + b \operatorname{Cos}[c + d x]} \left(C + A \operatorname{Sec}[c + d x]^2\right)\right.$$

$$\left.\left(-\frac{3 A b \operatorname{Tan}[c + d x]}{2 a^2} + \frac{A \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{a}\right)\right) \Big/$$

$$\left(d \left(2 A + C + C \operatorname{Cos}[2 c + 2 d x]\right)\right)$$

Problem 655: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^4}{\sqrt{a + b \operatorname{Cos}[c + d x]}} \, dx$$

Optimal (type 4, 370 leaves, 11 steps) :

$$-\left(\left(\left(15\,A\,b^2+8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(24\,a^3\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)\right)+$$

$$\frac{\left(5\,A\,b^2+8\,a^2\,(2\,A+3\,C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{24\,a^2\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-$$

$$\left(b\,\left(5\,A\,b^2+4\,a^2\,(A+2\,C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(8\,a^3\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\left(15\,A\,b^2+8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Tan}[c+d\,x]}{24\,a^3\,d}-$$

$$\frac{5\,A\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{12\,a^2\,d}+$$

$$\frac{A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,a\,d}$$

Result (type 4, 604 leaves):

$$-\frac{1}{96\,a^3\,d}\,b\left(\frac{40\,a\,A\,b\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\left(2\,\left(40\,a^2\,A+45\,A\,b^2+72\,a^2\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,i\,\left(16\,a^2\,A+15\,A\,b^2+24\,a^2\,C\right)\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}[2\,(c+d\,x)]\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(2\,a\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\frac{a+b}{a},i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}\left(2\,a^2-b^2-4\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+2\,(a+b\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\left(\frac{1}{24\,a^3}\mathrm{Sec}[c+d\,x]\,\left(16\,a^2\,A\,\mathrm{Sin}[c+d\,x]+15\,A\,b^2\,\mathrm{Sin}[c+d\,x]+24\,a^2\,C\,\mathrm{Sin}[c+d\,x]\right)-\frac{5\,A\,b\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{12\,a^2}+\frac{A\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{3\,a}\right)$$

Problem 660: Unable to integrate problem.

$$\int\frac{\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]}{(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 259 leaves, 9 steps):

$$-\frac{2\left(A b^2+a^2 C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2 b}{a+b}\right]}{a\,b\left(a^2-b^2\right)d\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{2\,C\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2 b}{a+b}\right]}{b\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{2\,A\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2 b}{a+b}\right]}{a\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{2\left(A b^2+a^2 C\right)\text{Sin}[c+d\,x]}{a\left(a^2-b^2\right)d\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 8, 35 leaves) :

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]}{\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Problem 661: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^2}{\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 296 leaves, 10 steps) :

$$\frac{\left(3 A b^2-a^2(A-2 C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2 b}{a+b}\right]}{a^2\left(a^2-b^2\right)d\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{A\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2 b}{a+b}\right]}{a\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}}-$$

$$\frac{3\,A\,b\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2 b}{a+b}\right]}{a^2\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}}-$$

$$\frac{b\left(3 A b^2-a^2(A-2 C)\right)\text{Sin}[c+d\,x]}{a^2\left(a^2-b^2\right)d\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{A\,\text{Tan}[c+d\,x]}{a\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 677 leaves) :

$$\frac{1}{2\,a^2\,(a-b)\,(a+b)\,d\,(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x])}\,\mathrm{Cos}[c+d\,x]^2\,\left(C+A\,\mathrm{Sec}[c+d\,x]^2\right)$$

$$\left(\frac{2\,(4\,a\,A\,b^2+4\,a^3\,C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\left(2\,\left(-7\,a^2\,A\,b+9\,A\,b^3+2\,a^2\,b\,C\right)\right.\right.$$

$$\left.\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(2\,i\,\left(-a^2\,A\,b+3\,A\,b^3+2\,a^2\,b\,C\right)\,\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\right.$$

$$\mathrm{Cos}[2\,(c+d\,x)]\,\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\,\left(2\,a\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\left.\frac{a+b}{a},\,i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\,\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+2\,(a+b\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\left(\mathrm{Cos}[c+d\,x]^2\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(C+A\,\mathrm{Sec}[c+d\,x]^2\right)\right.$$

$$\left.\left(-\frac{4\,\left(A\,b^3\,\mathrm{Sin}[c+d\,x]+a^2\,b\,C\,\mathrm{Sin}[c+d\,x]\right)}{a^2\,(a^2-b^2)\,(a+b\,\mathrm{Cos}[c+d\,x])}+\frac{2\,A\,\mathrm{Tan}[c+d\,x]}{a^2}\right)\right)\Big/$$

$$\left(d\,(2\,A+C+C\,\mathrm{Cos}[2\,c+2\,d\,x])\right)$$

Problem 662: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^3}{(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 370 leaves, 11 steps):

$$-\left(\left(b\left(15 A b^2-a^2(7 A-8 C)\right)\sqrt{a+b \operatorname{Cos}[c+d x]}\, \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right)\Big/\left(4 a^3\left(a^2-b^2\right) d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)\right)-\frac{5 A b \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\, \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{4 a^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}}+\left(\left(15 A b^2+4 a^2(A+2 C)\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\, \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right)\Big/\left(4 a^3 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\frac{b^2\left(15 A b^2-a^2(7 A-8 C)\right) \operatorname{Sin}[c+d x]}{4 a^3\left(a^2-b^2\right) d \sqrt{a+b \operatorname{Cos}[c+d x]}}-\frac{5 A b \operatorname{Tan}[c+d x]}{4 a^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}}+\frac{A \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 a d \sqrt{a+b \operatorname{Cos}[c+d x]}}$$

Result (type 4, 727 leaves):

$$-\frac{1}{8 a^3 (-a+b) (a+b) d (2 A+C+C \operatorname{Cos}[2 c+2 d x])} \operatorname{Cos}[c+d x]^2 \left(C+A \operatorname{Sec}[c+d x]^2\right) \left(\left(\left(2 \left(4 a^3 A b-20 a A b^3-16 a^3 b C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\left(2 \left(8 a^4 A+29 a^2 A b^2-45 A b^4+16 a^4 C-24 a^2 b^2 C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(2 i \left(7 a^2 A b^2-15 A b^4-8 a^2 b^2 C\right) \sqrt{\frac{b-b \operatorname{Cos}[c+d x]}{a+b}} \sqrt{-\frac{b+b \operatorname{Cos}[c+d x]}{a-b}} \operatorname{Cos}[2 (c+d x)] \left(2 a (a-b) \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]+b \left(2 a \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]-b \operatorname{EllipticPi}\left[\frac{a+b}{a}, i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]\right)\right) \operatorname{Sin}[c+d x]\right) \Big/ \left(a \sqrt{-\frac{1}{a+b}} \sqrt{1-\operatorname{Cos}[c+d x]^2} \sqrt{-\frac{a^2-b^2-2 a (a+b \operatorname{Cos}[c+d x])+(a+b \operatorname{Cos}[c+d x])^2}{b^2}} \left(2 a^2-b^2-4 a (a+b \operatorname{Cos}[c+d x])+2 (a+b \operatorname{Cos}[c+d x])^2\right)\right)\right)+$$

$$\left(\operatorname{Cos}[c+d x]^2 \sqrt{a+b \operatorname{Cos}[c+d x]} \left(C+A \operatorname{Sec}[c+d x]^2\right) \left(\frac{4 \left(A b^4 \operatorname{Sin}[c+d x]+a^2 b^2 C \operatorname{Sin}[c+d x]\right)}{a^3 \left(a^2-b^2\right) (a+b \operatorname{Cos}[c+d x])}-\frac{7 A b \operatorname{Tan}[c+d x]}{2 a^3}+\frac{A \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{a^2}\right)\right) \Big/ (d (2 A+C+C \operatorname{Cos}[2 c+2 d x]))$$

Problem 667: Unable to integrate problem.

$$\int \frac{\left(A + C \cos[c + d x]^2\right) \sec[c + d x]}{\left(a + b \cos[c + d x]\right)^{5/2}} \, dx$$

Optimal (type 4, 375 leaves, 10 steps):

$$\left(2 \left(3 A b^4 - a^4 C - a^2 b^2 (7 A + 3 C)\right) \sqrt{a + b \cos[c + d x]} \ \text{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 b}{a + b}\right]\right) \Bigg/ \left(3 a^2 b \left(a^2 - b^2\right)^2 d \sqrt{\frac{a + b \cos[c + d x]}{a + b}}\right) + \frac{2 \left(A b^2 + a^2 C\right) \sqrt{\frac{a+b \cos[c+d x]}{a+b}} \ \text{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{3 a b \left(a^2 - b^2\right) d \sqrt{a + b \cos[c + d x]}} + \frac{2 A \sqrt{\frac{a+b \cos[c+d x]}{a+b}} \ \text{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{a^2 d \sqrt{a + b \cos[c + d x]}} + \frac{2 \left(A b^2 + a^2 C\right) \sin[c + d x]}{3 a \left(a^2 - b^2\right) d \left(a + b \cos[c + d x]\right)^{3/2}} - \frac{2 \left(3 A b^4 - a^4 C - a^2 b^2 (7 A + 3 C)\right) \sin[c + d x]}{3 a^2 \left(a^2 - b^2\right)^2 d \sqrt{a + b \cos[c + d x]}}$$

Result (type 8, 35 leaves):

$$\int \frac{\left(A + C \cos[c + d x]^2\right) \sec[c + d x]}{\left(a + b \cos[c + d x]\right)^{5/2}} \, dx$$

Problem 668: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A + C \cos[c + d x]^2\right) \sec[c + d x]^2}{\left(a + b \cos[c + d x]\right)^{5/2}} \, dx$$

Optimal (type 4, 416 leaves, 11 steps):

$$\left(\left(26 a^2 A b^2-15 A b^4-a^4 (3 A-8 C)\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(3 a^3 \left(a^2-b^2\right)^2 d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)-$$

$$\frac{\left(5 A b^2-a^2 (3 A-2 C)\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]}{3 a^2 \left(a^2-b^2\right) d \sqrt{a+b \operatorname{Cos}[c+d x]}}-$$

$$\frac{5 A b \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]}{a^3 d \sqrt{a+b \operatorname{Cos}[c+d x]}}-\frac{b \left(5 A b^2-a^2 (3 A-2 C)\right) \operatorname{Sin}[c+d x]}{3 a^2 \left(a^2-b^2\right) d (a+b \operatorname{Cos}[c+d x])^{3/2}}-$$

$$\frac{b \left(26 a^2 A b^2-15 A b^4-a^4 (3 A-8 C)\right) \operatorname{Sin}[c+d x]}{3 a^3 \left(a^2-b^2\right)^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}}+\frac{A \operatorname{Tan}[c+d x]}{a d (a+b \operatorname{Cos}[c+d x])^{3/2}}$$

Result (type 4, 786 leaves):

$$\frac{1}{6 a^3 (-a+b)^2 (a+b)^2 d (2 A+C+C \operatorname{Cos}[2 c+2 d x])}$$

$$\operatorname{Cos}[c+d x]^2 \left(C+A \operatorname{Sec}[c+d x]^2\right) \left(\left(\left(2 \left(36 a^3 A b^2-20 a A b^4+12 a^5 C+4 a^3 b^2 C\right)\right.\right.\right.$$

$$\left.\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)+$$

$$\left(2 \left(-33 a^4 A b+86 a^2 A b^3-45 A b^5+8 a^4 b C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right.$$

$$\left.\operatorname{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)-$$

$$\left(2 i \left(-3 a^4 A b+26 a^2 A b^3-15 A b^5+8 a^4 b C\right) \sqrt{\frac{b-b \operatorname{Cos}[c+d x]}{a+b}} \sqrt{-\frac{b+b \operatorname{Cos}[c+d x]}{a-b}}\right.$$

$$\operatorname{Cos}[2 (c+d x)] \left(2 a (a-b) \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]+\right.$$

$$b \left(2 a \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]-b \operatorname{EllipticPi}\left[\right.\right.$$

$$\frac{a+b}{a}, \text{i} \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b\operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\Bigg]\Bigg)\Bigg) \operatorname{Sin}[c+d x]\Bigg) \Bigg/$$

$$\left(a \sqrt{-\frac{1}{a+b}} \sqrt{1-\operatorname{Cos}[c+d x]^2} \sqrt{-\frac{a^2-b^2-2 a (a+b \operatorname{Cos}[c+d x])+(a+b \operatorname{Cos}[c+d x])^2}{b^2}}\right.$$

$$\left.\left(2 a^2-b^2-4 a (a+b \operatorname{Cos}[c+d x])+2 (a+b \operatorname{Cos}[c+d x])^2\right)\right)\Bigg) +$$

$$\Bigg(\operatorname{Cos}[c+d x]^2 \sqrt{a+b \operatorname{Cos}[c+d x]} \left(C+A \operatorname{Sec}[c+d x]^2\right)$$

$$\left(-\frac{4 \left(A b^3 \operatorname{Sin}[c+d x]+a^2 b C \operatorname{Sin}[c+d x]\right)}{3 a^2 \left(a^2-b^2\right) (a+b \operatorname{Cos}[c+d x])^2}-\right.$$

$$\left(8 \left(5 a^2 A b^3 \operatorname{Sin}[c+d x]-3 A b^5 \operatorname{Sin}[c+d x]+2 a^4 b C \operatorname{Sin}[c+d x]\right)\right) \Big/$$

$$\left.\left(3 a^3 \left(a^2-b^2\right)^2 (a+b \operatorname{Cos}[c+d x])\right)+\frac{2 A \operatorname{Tan}[c+d x]}{a^3}\right)\Bigg) \Bigg/ \left(d \left(2 A+C+C \operatorname{Cos}[2 c+2 d x]\right)\right)$$

Problem 709: Result more than twice size of optimal antiderivative.

$$\int \frac{A+C \operatorname{Cos}[c+d x]^2}{\operatorname{Cos}[c+d x]^{3/2} (a+b \operatorname{Cos}[c+d x])} \, dx$$

Optimal (type 4, 112 leaves, 6 steps):

$$-\frac{2 A \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{a d}+\frac{2 C \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{b d}-$$
$$\frac{2 \left(A b^2+a^2 C\right) \operatorname{EllipticPi}\left[\frac{2 b}{a+b}, \frac{1}{2} (c+d x), 2\right]}{a b (a+b) d}+\frac{2 A \operatorname{Sin}[c+d x]}{a d \sqrt{\operatorname{Cos}[c+d x]}}$$

Result (type 4, 242 leaves):

$$\frac{2\,A\,\text{Sin}[c+d\,x]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{1}{2\,a\,d}\left(\frac{6\,A\,b\,\text{EllipticPi}\left[\frac{2\,b}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]}{a+b}+\frac{1}{b}\right.$$
$$(2\,a\,A-2\,a\,C)\left(2\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]-\frac{2\,a\,\text{EllipticPi}\left[\frac{2\,b}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]}{a+b}\right)+$$
$$\Big(2\,A\,\text{Cos}[2\,(c+d\,x)]\,\Big(-2\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],\,-1\right]+$$
$$2\,a\,(a+b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],\,-1\right]+$$
$$\left(2\,a^2-b^2\right)\,\text{EllipticPi}\left[-\frac{b}{a},\,-\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],\,-1\right]\Big)\,\text{Sin}[c+d\,x]\Big)\Big/$$
$$\left.\left(a\,b\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\left(-1+2\,\text{Cos}[c+d\,x]^2\right)\right)\right)$$

Problem 727: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 553 leaves, 8 steps):

$$\frac{1}{24\,a\,b^2\,d}(a-b)\sqrt{a+b}\left(3a^2C-8b^2(3A+2C)\right)\text{Cot}[c+dx]$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\text{Sec}[c+dx])}{a+b}}$$

$$\sqrt{\frac{a(1+\text{Sec}[c+dx])}{a-b}}-\frac{1}{24\,b^2\,d}\sqrt{a+b}\left(3a^2C-2abC-8b^2(3A+2C)\right)\text{Cot}[c+dx]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\text{Sec}[c+dx])}{a+b}}$$

$$\sqrt{\frac{a(1+\text{Sec}[c+dx])}{a-b}}-\frac{1}{8\,b^3\,d}a\sqrt{a+b}\left(8Ab^2+(a^2+4b^2)C\right)\text{Cot}[c+dx]$$

$$\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\text{Sec}[c+dx])}{a+b}}$$

$$\sqrt{\frac{a(1+\text{Sec}[c+dx])}{a-b}}-\frac{\left(3a^2C-8b^2(3A+2C)\right)\sqrt{a+b\,\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{24\,b^2\,d\sqrt{\text{Cos}[c+dx]}}-$$

$$\frac{a\,C\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{4\,b\,d}+$$

$$\frac{C\sqrt{\text{Cos}[c+dx]}\,(a+b\,\text{Cos}[c+dx])^{3/2}\,\text{Sin}[c+dx]}{3\,b\,d}$$

Result (type 4, 1220 leaves):

$$\frac{1}{48\,b\,d}\left(-\left(\left(\left(4a\left(24Ab^2-a^2C+16b^2C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\right.\right.\right.\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}$$

$$\text{Csc}[c+dx]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/\left((a+b)\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)\right)-$$

$$4\,a\,\left(48\,a\,A\,b+28\,a\,b\,C\right)\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(24\,A\,b^2-3\,a^2\,C+16\,b^2\,C\right)\left(\left(\mathrm{i}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b} 2 a \left(\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right) - \left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right) + \frac{\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{b \sqrt{\operatorname{Cos}[c+d x]}}\right) +$$

$$\frac{1}{d} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]} \left(\frac{a C \operatorname{Sin}[c+d x]}{12 b} + \frac{1}{6} C \operatorname{Sin}[2 (c+d x)]\right)$$

Problem 728: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 455 leaves, 7 steps):

$$-\frac{1}{4\,b\,d}(a-b)\sqrt{a+b}\;C\,\text{Cot}[c+d\,x]\;\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{4\,b\,d}\sqrt{a+b}\,\left(8\,A\,b+(a+2\,b)\,C\right)\text{Cot}[c+d\,x]\;\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{4\,b^2\,d}\sqrt{a+b}\,\left(a^2\,C-4\,b^2\,(2\,A+C)\right)\text{Cot}[c+d\,x]\;\text{EllipticPi}\Big[\frac{a+b}{b},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{a\,C\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 1169 leaves):

$$\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}+\frac{1}{8\,d}\Bigg(-\Bigg(\Bigg(4\,a\,(8\,a\,A+3\,a\,C)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]^4\Bigg)\Bigg/$$

$$\left.\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,(8\,A\,b+4\,b\,C)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\,a\,C\left(\left(i\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\right.\right.\right.$$

$$\left.\left.-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 729: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 439 leaves, 7 steps):

$$\frac{1}{a\,d}(a-b)\sqrt{a+b}\,(2A-C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{a\,d}$$

$$\sqrt{a+b}\,(2\,a\,A-2\,A\,b-a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{b\,d}$$

$$a\sqrt{a+b}\,C\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{2\,A\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\sqrt{\text{Cos}[c+d\,x]}}-\frac{(2\,A-C)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 1166 leaves):

$$\frac{2\,A\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\sqrt{\text{Cos}[c+d\,x]}}+$$

$$\frac{1}{2\,d}\Bigg(-\Bigg(\Bigg(4\,a\,b\,C\sqrt{\frac{(a+b)\,\text{Cot}\big[\frac{1}{2}(c+d\,x)\big]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\big[\frac{1}{2}(c+d\,x)\big]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\big[\frac{1}{2}(c+d\,x)\big]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]^4\Bigg)\Big/$$

$$\Big((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\Big)\Bigg)-4\,a\,(-2\,a\,A+2\,a\,C)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\,(-2\,A\,b+b\,C)\left(\left(i\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\right[\right.\right.$$

$$\left.\left.i\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\,\text{Csc}[c+dx]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/\left((a+b)\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\,\text{Csc}[c+dx]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{b\sqrt{\text{Cos}[c+dx]}}\right)$$

Problem 731: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+b\,\text{Cos}[c+dx]}\,\left(A+C\,\text{Cos}[c+dx]^2\right)}{\text{Cos}[c+dx]^{7/2}}\,dx$$

Optimal (type 4, 345 leaves, 5 steps):

$$-\frac{1}{15 a^3 d} 2 (a-b) \sqrt{a+b} \left(2 A b^2-3 a^2 (3 A+5 C)\right) \text{Cot}[c+d x] \text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\Big], -\frac{a+b}{a-b}\Big] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{15 a^2 d} 2 (a-b) \sqrt{a+b} (9 a A+2 A b+15 a C) \text{Cot}[c+d x] \text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\Big], -\frac{a+b}{a-b}\Big] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 A \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{5 d \text{Cos}[c+d x]^{5/2}} + \frac{2 A b \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{15 a d \text{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1288 leaves):

$$-\frac{1}{15 a^2 d} \Bigg(-\Bigg(\Bigg(4 a \left(2 a^2 A b-2 A b^3\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\Big], -\frac{2 a}{-a+b}\Big] \text{Sin}\Big[\frac{1}{2} (c+d x)\Big]^4\Bigg) \Big/ \left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\Bigg) - 4 a \left(9 a^3 A-2 a A b^2+15 a^3 C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(9\,a^2\,A\,b-2\,A\,b^3+15\,a^2\,b\,C\right)\left(\left(\mathrm{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg/$$

$$\left.\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{1}{15\,a^2}2\,\text{Sec}[c+d\,x]\right.$$
$$\left(9\,a^2\,A\,\text{Sin}[c+d\,x]-2\,A\,b^2\,\text{Sin}[c+d\,x]+15\,a^2\,C\,\text{Sin}[c+d\,x]\right)+$$
$$\left.\frac{2\,A\,b\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{15\,a}+\frac{2}{5}\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)$$

Problem 732: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 415 leaves, 6 steps):

$$\frac{1}{105 a^4 d}2 (a-b) b \sqrt{a+b} \left(8 A b^2+a^2 (19 A+35 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{105 a^3 d}2 (a-b) \sqrt{a+b} \left(6 a A b+8 A b^2+5 a^2 (5 A+7 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 A \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{7 d \text{Cos}[c+d x]^{7/2}}+\frac{2 A b \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{35 a d \text{Cos}[c+d x]^{5/2}}-\frac{2 \left(4 A b^2-5 a^2 (5 A+7 C)\right) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{105 a^2 d \text{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1373 leaves):

$$\frac{1}{105 a^3 d}\left(-\left(\left(4 a \left(25 a^4 A-17 a^2 A b^2-8 A b^4+35 a^4 C-35 a^2 b^2 C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right)\Big/\left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\right)-4 a \left(-19 a^3 A b-8 a A b^3-35 a^3 b C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\bigg/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+d\,x]}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\bigg/\left(b\sqrt{\mathrm{Cos}[c+d\,x]}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-19\,a^2\,A\,b^2-8\,A\,b^4-35\,a^2\,b^2\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\bigg/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\ \sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left((a+b)\sqrt{\mathrm{Cos}[c+d\,x]}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+d\,x]}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{b\sqrt{\mathrm{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\mathrm{Cos}[c+d\,x]}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}$$

$$\left(\frac{1}{105\,a^2}2\,\mathrm{Sec}[c+d\,x]^2\left(25\,a^2\,A\,\mathrm{Sin}[c+d\,x]-4\,A\,b^2\,\mathrm{Sin}[c+d\,x]+35\,a^2\,C\,\mathrm{Sin}[c+d\,x]\right)+\right.$$

$$\frac{1}{105\,a^3}2\,\mathrm{Sec}[c+d\,x]\left(19\,a^2\,A\,b\,\mathrm{Sin}[c+d\,x]+8\,A\,b^3\,\mathrm{Sin}[c+d\,x]+35\,a^2\,b\,C\,\mathrm{Sin}[c+d\,x]\right)+$$

$$\frac{2\,A\,b\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{35\,a}+$$

$$\frac{2}{7} A \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]\Big)$$

Problem 733: Result unnecessarily involves imaginary or complex numbers.

$$\int \sqrt{\operatorname{Cos}[c+d x]}\,(a+b \operatorname{Cos}[c+d x])^{3/2}\left(A+C \operatorname{Cos}[c+d x]^2\right) dx$$

Optimal (type 4, 638 leaves, 9 steps):

$$-\frac{1}{64 b^2 d}(a-b)\sqrt{a+b}\left(80 A b^2-3 a^2 C+52 b^2 C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\Big[\operatorname{ArcSin}\Big[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\operatorname{Cos}[c+d x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}-\frac{1}{64 b^2 d}\sqrt{a+b}\left(3 a^3 C-2 a^2 b C-8 b^3(4 A+3 C)-4 a b^2(20 A+13 C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\Big[\operatorname{ArcSin}\Big[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\operatorname{Cos}[c+d x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}-\frac{1}{64 b^3 d}\sqrt{a+b}\left(3 a^4 C+24 a^2 b^2(2 A+C)+16 b^4(4 A+3 C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\Big[\frac{a+b}{b}, \operatorname{ArcSin}\Big[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\operatorname{Cos}[c+d x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{a\left(80 A b^2-3 a^2 C+52 b^2 C\right)\sqrt{a+b \operatorname{Cos}[c+d x]}\operatorname{Sin}[c+d x]}{64 b^2 d \sqrt{\operatorname{Cos}[c+d x]}}-\frac{1}{32 b d}\left(3 a^2 C-4 b^2(4 A+3 C)\right)\sqrt{\operatorname{Cos}[c+d x]}\sqrt{a+b \operatorname{Cos}[c+d x]}\operatorname{Sin}[c+d x]-\frac{a C \sqrt{\operatorname{Cos}[c+d x]}(a+b \operatorname{Cos}[c+d x])^{3/2}\operatorname{Sin}[c+d x]}{8 b d}+\frac{C \sqrt{\operatorname{Cos}[c+d x]}(a+b \operatorname{Cos}[c+d x])^{5/2}\operatorname{Sin}[c+d x]}{4 b d}$$

Result (type 4, 1270 leaves):

$$-\frac{1}{128\,b\,d}\Bigg(-\Bigg(\Bigg(4\,a\,\left(-112\,a\,A\,b^2+a^3\,C-76\,a\,b^2\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-$$

$$4\,a\,\left(-128\,a^2\,A\,b-64\,A\,b^3-76\,a^2\,b\,C-48\,b^3\,C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(-80\,a\,A\,b^2+3\,a^3\,C-52\,a\,b^2\,C\right)\,\left(\left(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

$$\left.\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)\right)+$$

$$\frac{1}{b}\,2\,a\,\left(\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\ \left(\frac{\left(16\,A\,b^2+a^2\,C+14\,b^2\,C\right)\,\text{Sin}[c+d\,x]}{32\,b}+\frac{3}{16}\,a\,C\,\text{Sin}[2\,(c+d\,x)]+\frac{1}{16}\,b\,C\,\text{Sin}[3\,(c+d\,x)]\right)$$

Problem 734: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 553 leaves, 8 steps):

$$-\frac{1}{24\,a\,b\,d}(a-b)\sqrt{a+b}\left(3\,a^2\,C+8\,b^2\,(3\,A+2\,C)\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{24\,b\,d}\sqrt{a+b}\left(48\,a\,A\,b+24\,A\,b^2+3\,a^2\,C+14\,a\,b\,C+16\,b^2\,C\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{8\,b^2\,d}a\sqrt{a+b}\left(24\,A\,b^2-a^2\,C+12\,b^2\,C\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\Big[\frac{a+b}{b},\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{\left(3\,a^2\,C+8\,b^2\,(3\,A+2\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{24\,b\,d\sqrt{\mathrm{Cos}[c+d\,x]}}+\frac{a\,C\sqrt{\mathrm{Cos}[c+d\,x]}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{4\,d}+\frac{C\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 1221 leaves):

$$\frac{1}{48\,d}\Bigg(-\Bigg(\Bigg(4\,a\,\left(48\,a^2\,A+24\,A\,b^2+17\,a^2\,C+16\,b^2\,C\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}[\frac{1}{2}(c+d\,x)]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}[\frac{1}{2}(c+d\,x)]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}[\frac{1}{2}(c+d\,x)]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}[\frac{1}{2}(c+d\,x)]^2}{a}}}{\sqrt{2}}\Big],-\frac{2\,a}{-a+b}\Big]\,\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]^4\Bigg)\Big/\left((a+b)\sqrt{\mathrm{Cos}[c+d\,x]}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\Bigg)-$$

$$4\,a\,\left(96\,a\,A\,b+52\,a\,b\,C\right)\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(24\,A\,b^2+3\,a^2\,C+16\,b^2\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\operatorname{Cos}[c+dx]\operatorname{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\operatorname{Cos}[c+dx])\operatorname{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\operatorname{Csc}[c+dx]\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+dx])\operatorname{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\operatorname{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/\left((a+b)\sqrt{\operatorname{Cos}[c+dx]}\sqrt{a+b\operatorname{Cos}[c+dx]}\right)-\left(a\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\operatorname{Cos}[c+dx]\operatorname{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\operatorname{Cos}[c+dx])\operatorname{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\operatorname{Csc}[c+dx]\operatorname{EllipticPi}\left[-\frac{a}{b},\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+dx])\operatorname{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\operatorname{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/\left(b\sqrt{\operatorname{Cos}[c+dx]}\sqrt{a+b\operatorname{Cos}[c+dx]}\right)+\frac{\sqrt{a+b\operatorname{Cos}[c+dx]}\operatorname{Sin}[c+dx]}{b\sqrt{\operatorname{Cos}[c+dx]}}\right)+$$

$$\frac{1}{d}\sqrt{\operatorname{Cos}[c+dx]}\sqrt{a+b\operatorname{Cos}[c+dx]}\left(\frac{7}{12}aC\operatorname{Sin}[c+dx]+\frac{1}{6}bC\operatorname{Sin}[2(c+dx)]\right)$$

Problem 735: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b \operatorname{Cos}[c+d x])^{3/2} \left(A+C \operatorname{Cos}[c+d x]^2\right)}{\operatorname{Cos}[c+d x]^{3/2}} \, dx$$

Optimal (type 4, 509 leaves, 8 steps):

$$\frac{1}{4 d}(a-b) \sqrt{a+b} \, (8 A-5 C) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}} - \frac{1}{4 d}\sqrt{a+b} \, (8 a A-16 A b-5 a C-2 b C) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}} - \frac{1}{4 b d}\sqrt{a+b} \left(8 A b^2+3 a^2 C+4 b^2 C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}} - \frac{a (8 A-5 C) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{4 d \sqrt{\operatorname{Cos}[c+d x]}} - \frac{b (4 A-C) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{2 d} + \frac{2 A (a+b \operatorname{Cos}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{d \sqrt{\operatorname{Cos}[c+d x]}}$$

Result (type 4, 1209 leaves):

$$\frac{1}{8 d}\left(\left(4 a (-8 a A b-7 a b C) \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right) + 4 a \left(8 a^2 A-8 A b^2-8 a^2 C-4 b^2 C\right)\right.$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/\left(b\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-$$

$$2\,(8\,a\,A\,b-5\,a\,b\,C)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Bigg/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\,\text{Csc}[c+dx]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/\left((a+b)\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\,\text{Csc}[c+dx]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{b\sqrt{\text{Cos}[c+dx]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\left(\frac{1}{2}b\,C\,\text{Sin}[c+dx]+2\,a\,A\,\text{Tan}[c+dx]\right)$$

Problem 736: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d\,x])^{3/2}\,(A+C\,\text{Cos}[c+d\,x]^2)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 500 leaves, 8 steps):

$$\frac{1}{3\,a\,d}(a-b)\,b\,\sqrt{a+b}\,(8\,A-3\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{3\,a\,d}\sqrt{a+b}\,\left(6\,A\,b^2+2\,a^2\,(A+3\,C)-a\,(8\,A\,b-3\,b\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}3\,a\,\sqrt{a+b}\,C\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,A\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{b\,(8\,A-3\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1219 leaves):

$$\frac{1}{6\,d}\Bigg(-\Bigg(\Bigg(4\,a\,\left(2\,a^2\,A-2\,A\,b^2+6\,a^2\,C+3\,b^2\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4\Bigg)\Bigg/\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-4\,a$$

$$\left(-8\,a\,A\,b+12\,a\,b\,C\right)\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-8\,A\,b^2+3\,b^2\,C\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b} 2 a \left(\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-$$

$$\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left.\left.\left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right)+\frac{\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{b \sqrt{\operatorname{Cos}[c+d x]}}\right)+$$

$$\frac{1}{d} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]} \left(\frac{8}{3} A b \operatorname{Tan}[c+d x]+\frac{2}{3} a A \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]\right)$$

Problem 737: Result unnecessarily involves complex numbers and more than

twice size of optimal antiderivative.

$$\int \frac{(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+C\,\mathrm{Cos}[c+d\,x]^2)}{\mathrm{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 465 leaves, 7 steps):

$$\frac{1}{5\,a^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(A\,b^2+a^2\,(3\,A+5\,C)\right)\,\mathrm{Cot}[c+d\,x]\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{5\,a\,d}2\,\sqrt{a+b}\,\left(A\,b^2-2\,a\,b\,(2\,A+5\,C)+a^2\,(3\,A+5\,C)\right)\,\mathrm{Cot}[c+d\,x]\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}2\,b\,\sqrt{a+b}\,C\,\mathrm{Cot}[c+d\,x]\;\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{2\,A\,b\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{5\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}+\frac{2\,A\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{5\,d\,\mathrm{Cos}[c+d\,x]^{5/2}}$$

Result (type 4, 1296 leaves):

$$-\frac{1}{5\,a\,d}\left(-\left(\left(4\,a\,\left(-a^2\,A\,b+A\,b^3-5\,a^2\,b\,C\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\right.\right.\right.$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(3\,a^3\,A+a\,A\,b^2+5\,a^3\,C-5\,a\,b^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(3a^2Ab+Ab^3+5a^2bC\right)\left(\left(i\,\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]\sqrt{a+b\,\mathrm{Cos}[c+dx]}\;\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{\mathrm{Cos}[c+dx]}}\right],-\frac{2a}{-a-b}\right]\mathrm{Sec}[c+dx]\right)\Big/\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]^2\mathrm{Sec}[c+dx]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Sec}[c+dx]}{a+b}}\right)+\right.$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]\,\mathrm{EllipticF}\Big[$$

$$\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\Bigg)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]\,\mathrm{EllipticPi}\Big[-\frac{a}{b},$$

$$\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\Bigg)\Big/$$

$$\left.\left.\left(b\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}\;\mathrm{Sin}[c+dx]}{b\sqrt{\mathrm{Cos}[c+dx]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\ \left(\frac{1}{5 a}2\,\text{Sec}[c+d x]\left(3 a^2 A\,\text{Sin}[c+d x]+A b^2\,\text{Sin}[c+d x]+5 a^2 C\,\text{Sin}[c+d x]\right)+\frac{4}{5} A b\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]+\frac{2}{5} a A\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\right)$$

Problem 738: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d x])^{3/2}\left(A+C\,\text{Cos}[c+d x]^2\right)}{\text{Cos}[c+d x]^{9/2}}\,dx$$

Optimal (type 4, 418 leaves, 6 steps):

$$-\frac{1}{105 a^3 d}4 (a-b)\, b\,\sqrt{a+b}\,\left(3 A b^2-a^2 (41 A+70 C)\right)\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{105 a^2 d}2 (a-b)\sqrt{a+b}\,\left(25 a^2 A-57 a A b-6 A b^2+35 a^2 C-105 a b C\right)\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}+\frac{6 A b\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{35 d\,\text{Cos}[c+d x]^{5/2}}+\frac{2\left(3 A b^2+5 a^2 (5 A+7 C)\right)\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{105 a d\,\text{Cos}[c+d x]^{3/2}}+\frac{2 A\,(a+b\,\text{Cos}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{7 d\,\text{Cos}[c+d x]^{7/2}}$$

Result (type 4, 1371 leaves):

$$\frac{1}{105\,a^2\,d}\left(-\left(\left(4\,a\,\left(25\,a^4\,A-31\,a^2\,A\,b^2+6\,A\,b^4+35\,a^4\,C-35\,a^2\,b^2\,C\right)\right.\right.\right.$$

$$\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(-82\,a^3\,A\,b+6\,a\,A\,b^3-140\,a^3\,b\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\ \mathrm{EllipticPi}\left[-\frac{a}{b},\ \mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-82\,a^2\,A\,b^2+6\,A\,b^4-140\,a^2\,b^2\,C\right)\left(\left(\mathbb{i}\,\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathbb{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],\ -\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\mathrm{Sec}[c+d\,x]}\ \sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\ \sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\ \mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(a\,\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\ \sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\ \mathrm{EllipticPi}\Big[-\frac{a}{b},\ \mathrm{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\ -\frac{2\,a}{-a+b}\Big]$$

$$\left.\left.\left.\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\ \mathrm{Sin}[c+d\,x]}{b\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\mathrm{Cos}[c+d\,x]}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}$$

$$\left(\frac{1}{105\,a}2\,\mathrm{Sec}[c+d\,x]^2\,\left(25\,a^2\,A\,\mathrm{Sin}[c+d\,x]+3\,A\,b^2\,\mathrm{Sin}[c+d\,x]+35\,a^2\,C\,\mathrm{Sin}[c+d\,x]\right)+\right.$$

$$\frac{1}{105\,a^2}\,4\,\mathrm{Sec}[c+d\,x]\,\left(41\,a^2\,A\,b\,\mathrm{Sin}[c+d\,x]-3\,A\,b^3\,\mathrm{Sin}[c+d\,x]+70\,a^2\,b\,C\,\mathrm{Sin}[c+d\,x]\right)+\frac{16}{35}$$

$$\left.A\,b\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]+\frac{2}{7}\,a\,A\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 739: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)}{\mathrm{Cos}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 502 leaves, 7 steps):

$$\frac{1}{315 a^4 d} 2 (a-b) \sqrt{a+b} \left(8 A b^4+21 a^4 (7 A+9 C)+3 a^2 b^2 (11 A+21 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{315 a^3 d} 2 (a-b) \sqrt{a+b} \left(6 a A b^2+8 A b^3-21 a^3 (7 A+9 C)+a^2 (39 A b+63 b C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 A b \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{21 d \text{Cos}[c+d x]^{7/2}}+\frac{2 \left(3 A b^2+7 a^2 (7 A+9 C)\right) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{315 a d \text{Cos}[c+d x]^{5/2}}-\frac{4 b \left(2 A b^2-a^2 (44 A+63 C)\right) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{315 a^2 d \text{Cos}[c+d x]^{3/2}}+\frac{2 A (a+b \text{Cos}[c+d x])^{3/2} \text{Sin}[c+d x]}{9 d \text{Cos}[c+d x]^{9/2}}$$

Result (type 4, 1485 leaves) :

$$-\frac{1}{315 a^3 d}\left(-\left(\left(4 a \left(-39 a^4 A b+31 a^2 A b^3+8 A b^5-63 a^4 b C+63 a^2 b^3 C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\right)-\right.$$

$$4 a \left(147 a^5 A+33 a^3 A b^2+8 a A b^4+189 a^5 C+63 a^3 b^2 C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\,\mathrm{Csc}[c+dx]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+dx]}\,\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}$$

$$\mathrm{Csc}[c+dx]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+dx]}\,\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)\right)+$$

$$2\left(147a^4Ab+33a^2Ab^3+8Ab^5+189a^4bC+63a^2b^3C\right)$$

$$\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{\mathrm{Cos}[c+dx]}}\right],-\frac{2a}{-a-b}\right]\mathrm{Sec}[c+dx]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]^2\mathrm{Sec}[c+dx]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Sec}[c+dx]}{a+b}}\right)+$$

$$\frac{1}{b} 2 a \left(\left(\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right) - \left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right) + \frac{\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{b \sqrt{\operatorname{Cos}[c+d x]}}\right)\right) +$$

$$\frac{1}{d} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]} \left(\frac{1}{315 a} 2 \operatorname{Sec}[c+d x]^3 \left(49 a^2 A \operatorname{Sin}[c+d x] + 3 A b^2 \operatorname{Sin}[c+d x] + 63 a^2 C \operatorname{Sin}[c+d x]\right) + \frac{1}{315 a^2} 4 \operatorname{Sec}[c+d x]^2 \left(44 a^2 A b \operatorname{Sin}[c+d x] - 2 A b^3 \operatorname{Sin}[c+d x] + 63 a^2 b C \operatorname{Sin}[c+d x]\right) + \frac{1}{315 a^3} 2 \operatorname{Sec}[c+d x] \left(147 a^4 A \operatorname{Sin}[c+d x] + 33 a^2 A b^2 \operatorname{Sin}[c+d x] + 8 A b^4 \operatorname{Sin}[c+d x] + 189 a^4 C \operatorname{Sin}[c+d x] + 63 a^2 b^2 C \operatorname{Sin}[c+d x]\right) + \frac{20}{63} A b \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x] + \frac{2}{9} a A \operatorname{Sec}[c+d x]^4 \operatorname{Tan}[c+d x]\right)$$

Problem 740: Result unnecessarily involves imaginary or complex numbers.

$$\int \sqrt{\text{Cos}[c+d x]}\,(a+b\,\text{Cos}[c+d x])^{5/2}\,(A+C\,\text{Cos}[c+d x]^2)\,dx$$

Optimal (type 4, 746 leaves, 10 steps):

$$\frac{1}{1920\,a\,b^2\,d}(a-b)\sqrt{a+b}\,\left(45\,a^4\,C-256\,b^4\,(5\,A+4\,C)-12\,a^2\,b^2\,(220\,A+141\,C)\right)$$
$$\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{1920\,b^2\,d}$$
$$\sqrt{a+b}\,\left(45\,a^4\,C-30\,a^3\,b\,C-256\,b^4\,(5\,A+4\,C)-12\,a^2\,b^2\,(220\,A+141\,C)-8\,a\,b^3\,(260\,A+193\,C)\right)$$
$$\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}$$
$$\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{128\,b^3\,d}a\,\sqrt{a+b}\,\left(3\,a^4\,C+40\,a^2\,b^2\,(2\,A+C)+80\,b^4\,(4\,A+3\,C)\right)$$
$$\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}-$$
$$\left(\left(45\,a^4\,C-256\,b^4\,(5\,A+4\,C)-12\,a^2\,b^2\,(220\,A+141\,C)\right)\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]\right)\Big/$$
$$\left(1920\,b^2\,d\,\sqrt{\text{Cos}[c+d x]}\right)+\frac{1}{320\,b\,d}$$
$$a\,\left(240\,A\,b^2-15\,a^2\,C+172\,b^2\,C\right)\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]-\frac{1}{240\,b\,d}$$
$$\left(15\,a^2\,C-16\,b^2\,(5\,A+4\,C)\right)\sqrt{\text{Cos}[c+d x]}\,(a+b\,\text{Cos}[c+d x])^{3/2}\,\text{Sin}[c+d x]-$$
$$\frac{3\,a\,C\,\sqrt{\text{Cos}[c+d x]}\,(a+b\,\text{Cos}[c+d x])^{5/2}\,\text{Sin}[c+d x]}{40\,b\,d}+$$
$$\frac{C\,\sqrt{\text{Cos}[c+d x]}\,(a+b\,\text{Cos}[c+d x])^{7/2}\,\text{Sin}[c+d x]}{5\,b\,d}$$

Result (type 4, 1341 leaves):

$$-\frac{1}{3840\,b\,d}$$

$$- \left(\left(\left(4\,a\,\left(-4720\,a^2\,A\,b^2 - 1280\,A\,b^4 + 15\,a^4\,C - 3236\,a^2\,b^2\,C - 1024\,b^4\,C\right) \sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}} \right.\right.\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right) \Big/ \left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg) -$$

$$4\,a\,\left(-3840\,a^3\,A\,b - 6080\,a\,A\,b^3 - 2292\,a^3\,b\,C - 4624\,a\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right) \Big/$$

$$\left(\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right) - \left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\operatorname{Sin}\left[\frac{1}{2}\left(c+d x\right)\right]^4\right) \Big/ \left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right) +$$

$$2\left(-2640 a^2 A b^2-1280 A b^4+45 a^4 C-1692 a^2 b^2 C-1024 b^4 C\right)$$

$$\left(\left(\mathrm{i} \operatorname{Cos}\left[\frac{1}{2}\left(c+d x\right)\right] \sqrt{a+b \operatorname{Cos}[c+d x]}\right.\right.$$

$$\left.\operatorname{EllipticE}\left[\mathrm{i} \operatorname{ArcSinh}\left[\frac{\operatorname{Sin}\left[\frac{1}{2}\left(c+d x\right)\right]}{\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right] \operatorname{Sec}[c+d x]\right) \Big/$$

$$\left(b \sqrt{\operatorname{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]^2 \operatorname{Sec}[c+d x]} \sqrt{\frac{\left(a+b \operatorname{Cos}[c+d x]\right) \operatorname{Sec}[c+d x]}{a+b}}\right) +$$

$$\frac{1}{b} 2 a\left(\left(a \sqrt{\frac{\left(a+b\right) \operatorname{Cot}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{-a+b}} \sqrt{-\frac{\left(a+b\right) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b \operatorname{Cos}[c+d x]\right) \operatorname{Csc}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\Big[$$

$$\left.\operatorname{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b \operatorname{Cos}[c+d x]\right) \operatorname{Csc}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}\left(c+d x\right)\right]^4\right) \Big/$$

$$\left(\left(a+b\right) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right) -$$

$$\left(a \sqrt{\frac{\left(a+b\right) \operatorname{Cot}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{-a+b}} \sqrt{-\frac{\left(a+b\right) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b \operatorname{Cos}[c+d x]\right) \operatorname{Csc}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticPi}\Big[-\frac{a}{b},$$

$$\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{a\left(1040\,A\,b^2+15\,a^2\,C+898\,b^2\,C\right)\text{Sin}[c+d\,x]}{960\,b}+\right.$$

$$\frac{1}{480}\left(80\,A\,b^2+93\,a^2\,C+88\,b^2\,C\right)\text{Sin}[2(c+d\,x)]+\frac{21}{160}\,a\,b\,C\,\text{Sin}[3(c+d\,x)]+\frac{1}{40}\,b^2\,C\,\text{Sin}[4(c+d\,x)]\Bigg)$$

Problem 741: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d\,x])^{5/2}\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 635 leaves, 9 steps):

$$-\frac{1}{192\,b\,d}(a-b)\sqrt{a+b}\left(432\,A\,b^2+15\,a^2\,C+284\,b^2\,C\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{192\,b\,d}$$
$$\sqrt{a+b}\,\left(15\,a^3\,C+24\,b^3\,(4\,A+3\,C)+2\,a^2\,b\,(192\,A+59\,C)+4\,a\,b^2\,(108\,A+71\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{64\,b^2\,d}$$
$$\sqrt{a+b}\,\left(5\,a^4\,C-120\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\right)\,\text{Cot}[c+d\,x]$$
$$\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\frac{a\,\left(432\,A\,b^2+15\,a^2\,C+284\,b^2\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{192\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{1}{32\,d}$$
$$\left(5\,a^2\,C+4\,b^2\,(4\,A+3\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]+$$
$$\frac{5\,a\,C\,\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{24\,d}+$$
$$\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 4, 1275 leaves):

$$\frac{1}{384\,d}\left(-\left(\left(4\,a\,\left(384\,a^3\,A+528\,a\,A\,b^2+133\,a^3\,C+356\,a\,b^2\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.$$
$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$
$$\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(\left(a+b\right)\sqrt{\operatorname{Cos}[c+d x]}\ \sqrt{a+b\operatorname{Cos}[c+d x]}\right)\right) -$$

$$4\,a\left(1152\,a^2\,A\,b+192\,A\,b^3+644\,a^2\,b\,C+144\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\operatorname{Cos}[c+d x]\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\operatorname{Cos}[c+d x]\right)\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left(\left(a+b\right)\sqrt{\operatorname{Cos}[c+d x]}\ \sqrt{a+b\operatorname{Cos}[c+d x]}\right) - \left(\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\operatorname{Cos}[c+d x]\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \sqrt{\frac{\left(a+b\operatorname{Cos}[c+d x]\right)\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\operatorname{Csc}[c+d x]\operatorname{EllipticPi}\left[-\frac{a}{b},\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b\sqrt{\operatorname{Cos}[c+d x]}\ \sqrt{a+b\operatorname{Cos}[c+d x]}\right)\right) +$$

$$2\left(432\,a\,A\,b^2+15\,a^3\,C+284\,a\,b^2\,C\right)\left(\left(\mathrm{i}\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\operatorname{Cos}[c+d x]}\right.\right.$$

$$\left.\operatorname{EllipticE}\left[\mathrm{i}\operatorname{ArcSinh}\left[\frac{\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{2\,a}{-a-b}\right]\operatorname{Sec}[c+d x]\right) \Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{1}{96}\left(48\,A\,b^2+59\,a^2\,C+42\,b^2\,C\right)\right.$$

$$\text{Sin}[c+d\,x]+\frac{17}{48}$$

a
b
C

$$\text{Sin}[2\,(c+d\,x)]+\frac{1}{16}$$
$$b^2$$
$$C$$
$$\text{Sin}[3\,(c+d\,x)]\Big)\Big)$$

Problem 742: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d\,x])^{5/2}\,(A+C\,\text{Cos}[c+d\,x]^2)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 609 leaves, 9 steps):

$$\frac{1}{24\,a\,d}(a-b)\,\sqrt{a+b}\,\left(a^2\,(48\,A-33\,C)-8\,b^2\,(3\,A+2\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{24\,d}\sqrt{a+b}\,\left(a^2\,(48\,A-33\,C)-8\,b^2\,(3\,A+2\,C)-2\,a\,b\,(72\,A+13\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{8\,b\,d}5\,a\,\sqrt{a+b}\,\left(8\,A\,b^2+(a^2+4\,b^2)\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{\left(a^2\,(48\,A-33\,C)-8\,b^2\,(3\,A+2\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{a\,b\,(8\,A-3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}-\frac{b\,(6\,A-C)\,\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 1262 leaves):

$$\frac{1}{48\,d}\left(\left(4\,a\,\left(-96\,a^2\,A\,b-24\,A\,b^3-59\,a^2\,b\,C-16\,b^3\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[$$

$$\left.c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+4\,a\,\left(48\,a^3\,A-144\,a\,A\,b^2-48\,a^3\,C-76\,a\,b^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$2\left(48\,a^2\,A\,b-24\,A\,b^3-33\,a^2\,b\,C-16\,b^3\,C\right)\left(\left(\mathrm{i}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right. + \frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\Bigg) +$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{13}{12}\,a\,b\,C\,\text{Sin}[c+d\,x] + \frac{1}{6}\,b^2\,C\,\text{Sin}\left[2\,(c+d\,x)\right] + 2\,a^2\,A\,\text{Tan}[c+d\,x]\right)$$

Problem 743: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 567 leaves, 9 steps) :

$$\frac{1}{12\,d}(a-b)\,b\sqrt{a+b}\,(56\,A-27\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{12\,d}$$

$$\sqrt{a+b}\,\left(6\,b^2\,(12\,A+C)+8\,a^2\,(A+3\,C)-a\,(56\,A\,b-27\,b\,C)\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}$$

$$\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,d}\sqrt{a+b}\,\left(8\,A\,b^2+15\,a^2\,C+4\,b^2\,C\right)\,\text{Cot}[c+d\,x]$$

$$\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}$$

$$\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{a\,b\,(56\,A-27\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{\text{Cos}[c+d\,x]}}-$$

$$\frac{b^2\,(8\,A-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}+$$

$$\frac{10\,A\,b\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1256 leaves):

$$\frac{1}{24\,d}\left(-\left(\left(4\,a\,\left(8\,a^3\,A+16\,a\,A\,b^2+24\,a^3\,C+33\,a\,b^2\,C\right)\right.\right.\right.$$

$$\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-4\,a\,\left(-56\,a^2\,A\,b+24\,A\,b^3+72\,a^2\,b\,C+12\,b^3\,C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\Bigg)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\Bigg)\Bigg/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\,\left(-56\,a\,A\,b^2+27\,a\,b^2\,C\right)\Bigg(\Bigg(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\Bigg)\Bigg/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{1}{2}b^2\,C\,\text{Sin}[c+d\,x]+\right.$$

$\frac{14}{3}$

a

A

b

$\text{Tan}[c+d x]+\frac{2}{3}$
a^2
A
$\text{Sec}[c+d x]$
$\text{Tan}[c+d x]\Big)$

Problem 744: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d x])^{5/2}\,(A+C\,\text{Cos}[c+d x]^2)}{\text{Cos}[c+d x]^{7/2}}\,dx$$

Optimal (type 4, 606 leaves, 9 steps):

$$\frac{1}{15\,a\,d}(a-b)\sqrt{a+b}\,\left(b^2\,(46\,A-15\,C)+6\,a^2\,(3\,A+5\,C)\right)\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{15\,a\,d}\sqrt{a+b}\,\left(30\,A\,b^3-a\,b^2\,(46\,A-15\,C)-6\,a^3\,(3\,A+5\,C)+a^2\,(34\,A\,b+90\,b\,C)\right)\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{d}5\,a\,b\,\sqrt{a+b}\,C\,\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}+\frac{2\,\left(5\,A\,b^2+a^2\,(3\,A+5\,C)\right)\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{5\,d\,\sqrt{\text{Cos}[c+d x]}}-\frac{\left(b^2\,(46\,A-15\,C)+6\,a^2\,(3\,A+5\,C)\right)\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{15\,d\,\sqrt{\text{Cos}[c+d x]}}+\frac{2\,A\,b\,(a+b\,\text{Cos}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{3\,d\,\text{Cos}[c+d x]^{3/2}}+\frac{2\,A\,(a+b\,\text{Cos}[c+d x])^{5/2}\,\text{Sin}[c+d x]}{5\,d\,\text{Cos}[c+d x]^{5/2}}$$

Result (type 4, 1309 leaves):

$$\frac{1}{30\,d}\left(\left(4\,a\,\left(-16\,a^2\,A\,b+16\,A\,b^3-60\,a^2\,b\,C-15\,b^3\,C\right)\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[$$

$$\left.c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+4\,a\,\left(18\,a^3\,A+46\,a\,A\,b^2+30\,a^3\,C-90\,a\,b^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$2\left(18 a^2 A b+46 A b^3+30 a^2 b C-15 b^3 C\right)\left(\left(\mathrm{i} \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] \sqrt{a+b \operatorname{Cos}[c+d x]}\right.\right.$$

$$\left.\operatorname{EllipticE}\left[\mathrm{i} \operatorname{ArcSinh}\left[\frac{\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right] \operatorname{Sec}[c+d x]\right) \Big/$$

$$\left(b \sqrt{\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Sec}[c+d x]} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b} 2 a\left(\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/\left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2}{15}\,\text{Sec}[c+d\,x]\,\left(9\,a^2\,A\,\text{Sin}[c+d\,x]+23\,A\,b^2\,\text{Sin}[c+d\,x]+15\,a^2\,C\,\text{Sin}[c+d\,x]\right)+\right.$$

$$\frac{22}{15}$$
a
A
b
Sec[c + d x]
$$\text{Tan}[c+d\,x]+\frac{2}{5}$$
a^2
A
$\text{Sec}[c+d\,x]^2$
$$\left.\text{Tan}[c+d\,x]\right)$$

Problem 745: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 540 leaves, 8 steps):

$$\frac{1}{21 a^2 d} 2 (a-b) b \sqrt{a+b} \left(3 A b^2 + a^2 (29 A + 49 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{21 a d} 2 \sqrt{a+b} \left(3 A b^3 - 9 a b^2 (3 A + 7 C) - a^3 (5 A + 7 C) + a^2 b (29 A + 49 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{d} 2 b^2 \sqrt{a+b}\, C \,\text{Cot}[c+d x] \text{EllipticPi}\left[\frac{a+b}{b}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 \left(3 A b^2 + a^2 (5 A + 7 C)\right) \sqrt{a+b \text{Cos}[c+d x]} \,\text{Sin}[c+d x]}{21 d \,\text{Cos}[c+d x]^{3/2}} + \frac{2 A b (a+b \text{Cos}[c+d x])^{3/2} \text{Sin}[c+d x]}{7 d \,\text{Cos}[c+d x]^{5/2}} + \frac{2 A (a+b \text{Cos}[c+d x])^{5/2} \text{Sin}[c+d x]}{7 d \,\text{Cos}[c+d x]^{7/2}}$$

Result (type 4, 1378 leaves):

$$\frac{1}{21 a d} \left(-\left(\left(4 a \left(5 a^4 A - 2 a^2 A b^2 - 3 A b^4 + 7 a^4 C + 14 a^2 b^2 C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\right) - 4 a \left(-29 a^3 A b - 3 a A b^3 - 49 a^3 b C + 21 a b^3 C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-29\,a^2\,A\,b^2-3\,A\,b^4-49\,a^2\,b^2\,C\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\ \mathrm{Csc}[c+dx]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)-\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}$$

$$\mathrm{Csc}[c+dx]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]$$

$$\left.\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}\,\mathrm{Sin}[c+dx]}{b\sqrt{\mathrm{Cos}[c+dx]}}\right)\right)+\frac{1}{d}\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}$$

$$\left(\frac{2}{21}\mathrm{Sec}[c+dx]^2\left(5a^2A\,\mathrm{Sin}[c+dx]+9Ab^2\,\mathrm{Sin}[c+dx]+7a^2C\,\mathrm{Sin}[c+dx]\right)+\right.$$

$$\frac{1}{21a}$$

2

$$\mathrm{Sec}[c+dx]$$

$$\left(29a^2Ab\,\mathrm{Sin}[c+dx]+3Ab^3\,\mathrm{Sin}[c+dx]+49a^2bC\,\mathrm{Sin}[c+dx]\right)+\frac{6}{7}$$

a

A

b
Sec[c + d x]^2
Tan[c + d x] + $\frac{2}{7}$
a^2
A
Sec[c + d x]^3
Tan[c + d x])

Problem 746: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a + b\,\text{Cos}[c + d\,x])^{5/2}\,(A + C\,\text{Cos}[c + d\,x]^2)}{\text{Cos}[c + d\,x]^{11/2}}\,dx$$

Optimal (type 4, 504 leaves, 7 steps):

$$-\frac{1}{315\,a^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(10\,A\,b^4-21\,a^4\,(7\,A+9\,C)-3\,a^2\,b^2\,(93\,A+161\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{315\,a^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(10\,A\,b^3+21\,a^3\,(7\,A+9\,C)+15\,a\,b^2\,(11\,A+21\,C)-6\,a^2\,b\,(19\,A+28\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,(15\,A\,b^2+7\,a^2\,(7\,A+9\,C))\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{315\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,b\,(5\,A\,b^2+a^2\,(163\,A+231\,C))\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{315\,a\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{10\,A\,b\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{63\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{9\,d\,\text{Cos}[c+d\,x]^{9/2}}$$

Result (type 4, 1485 leaves):

$$-\frac{1}{315\,a^2\,d}$$

$$\left(-\left(\left(\left(4\,a\,\left(-114\,a^4\,A\,b+124\,a^2\,A\,b^3-10\,A\,b^5-168\,a^4\,b\,C+168\,a^2\,b^3\,C\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\,\left(147\,a^5\,A+279\,a^3\,A\,b^2-10\,a\,A\,b^4+189\,a^5\,C+483\,a^3\,b^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right) \Big/ \left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(147\,a^4\,A\,b+279\,a^2\,A\,b^3-10\,A\,b^5+189\,a^4\,b\,C+483\,a^2\,b^3\,C\right)$$

$$\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\,\left(\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\Bigg)\Bigg/$$

$$\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{2}{315}\,\text{Sec}[c+d\,x]^3\,\left(49\,a^2\,A\,\text{Sin}[c+d\,x]+75\,A\,b^2\,\text{Sin}[c+d\,x]+63\,a^2\,C\,\text{Sin}[c+d\,x]\right)+\frac{1}{315\,a}\,2\,\text{Sec}[c+d\,x]^2\,\left(163\,a^2\,A\,b\,\text{Sin}[c+d\,x]+5\,A\,b^3\,\text{Sin}[c+d\,x]+231\,a^2\,b\,C\,\text{Sin}[c+d\,x]\right)+\frac{1}{315\,a^2}\,2\,\text{Sec}[c+d\,x]\,\left(147\,a^4\,A\,\text{Sin}[c+d\,x]+279\,a^2\,A\,b^2\,\text{Sin}[c+d\,x]-10\,A\,b^4\,\text{Sin}[c+d\,x]+189\,a^4\,C\,\text{Sin}[c+d\,x]+483\,a^2\,b^2\,C\,\text{Sin}[c+d\,x]\right)+\frac{38}{63}\,a\,A\,b\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]+\frac{2}{9}\,a^2\,A\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]\right)$$

Problem 747: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{13/2}}\,dx$$

Optimal (type 4, 587 leaves, 8 steps):

$$\frac{1}{693 a^4 d}2 (a-b) b \sqrt{a+b} \left(8 A b^4+3 a^2 b^2 (17 A+33 C)+a^4 (741 A+957 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{693 a^3 d}2 (a-b) \sqrt{a+b} \left(6 a A b^3+8 A b^4+15 a^4 (9 A+11 C)+3 a^2 b^2 (19 A+33 C)-6 a^3 b (101 A+132 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 \left(5 A b^2+3 a^2 (9 A+11 C)\right) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{231 d \text{Cos}[c+d x]^{7/2}}+\frac{2 b \left(3 A b^2+a^2 (229 A+297 C)\right) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{693 a d \text{Cos}[c+d x]^{5/2}}-\left(2 \left(4 A b^4-15 a^4 (9 A+11 C)-a^2 b^2 (205 A+297 C)\right) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]\right) \Big/ \left(693 a^2 d \text{Cos}[c+d x]^{3/2}\right)+\frac{10 A b (a+b \text{Cos}[c+d x])^{3/2} \text{Sin}[c+d x]}{99 d \text{Cos}[c+d x]^{9/2}}+\frac{2 A (a+b \text{Cos}[c+d x])^{5/2} \text{Sin}[c+d x]}{11 d \text{Cos}[c+d x]^{11/2}}$$

Result (type 4, 1591 leaves):

$$\frac{1}{693 a^3 d}\left(-\left(\left(\left(4 a \left(135 a^6 A-78 a^4 A b^2-49 a^2 A b^4-8 A b^6+165 a^6 C-66 a^4 b^2 C-99 a^2 b^4 C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\right.\right.\right.-$$

$$4\,a\,\left(-741\,a^5\,A\,b-51\,a^3\,A\,b^3-8\,a\,A\,b^5-957\,a^5\,b\,C-99\,a^3\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(-741\,a^4\,A\,b^2-51\,a^2\,A\,b^4-8\,A\,b^6-957\,a^4\,b^2\,C-99\,a^2\,b^4\,C\right)$$

$$\left(\left(i\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)-\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}$$

$$\mathrm{Csc}[c+dx]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]$$

$$\left.\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}\;\mathrm{Sin}[c+dx]}{b\sqrt{\mathrm{Cos}[c+dx]}}\right)\right)+\frac{1}{d}\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}$$

$$\left(\frac{2}{693}\mathrm{Sec}[c+dx]^4\left(81a^2A\,\mathrm{Sin}[c+dx]+113Ab^2\,\mathrm{Sin}[c+dx]+99a^2C\,\mathrm{Sin}[c+dx]\right)+\right.$$

$$\frac{1}{693a}$$

$$2\,\mathrm{Sec}[c+dx]^3$$

$$\left(229a^2Ab\,\mathrm{Sin}[c+dx]+3Ab^3\,\mathrm{Sin}[c+dx]+297a^2bC\,\mathrm{Sin}[c+dx]\right)+$$

$$\frac{1}{693a^2}2\,\mathrm{Sec}[c+dx]^2\left(135a^4A\,\mathrm{Sin}[c+dx]+205a^2Ab^2\,\mathrm{Sin}[c+dx]-\right.$$

$$\left.4Ab^4\,\mathrm{Sin}[c+dx]+165a^4C\,\mathrm{Sin}[c+dx]+297a^2b^2C\,\mathrm{Sin}[c+dx]\right)+$$

$$\frac{1}{693 a^3} 2 \operatorname{Sec}[c+d x] \left(741 a^4 A b \operatorname{Sin}[c+d x]+51 a^2 A b^3 \operatorname{Sin}[c+d x]+8 A b^5 \operatorname{Sin}[c+d x]+957 a^4 b C \operatorname{Sin}[c+d x]+99 a^2 b^3 C \operatorname{Sin}[c+d x]\right)+\frac{46}{99} a A b \operatorname{Sec}[c+d x]^4 \operatorname{Tan}[c+d x]+\frac{2}{11} a^2 A \operatorname{Sec}[c+d x]^5 \operatorname{Tan}[c+d x]\Bigg)$$

Problem 748: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Cos}[c+d x]^{3/2} \left(A+C \operatorname{Cos}[c+d x]^2\right)}{\sqrt{a+b \operatorname{Cos}[c+d x]}} \, dx$$

Optimal (type 4, 554 leaves, 8 steps):

$$-\frac{1}{24 a b^3 d}(a-b) \sqrt{a+b} \left(15 a^2 C+8 b^2 (3 A+2 C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{1}{24 b^3 d}\sqrt{a+b} \left(15 a^2 C-10 a b C+8 b^2 (3 A+2 C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{1}{8 b^4 d}a \sqrt{a+b} \left(8 A b^2+5 a^2 C+4 b^2 C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{b},\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{\left(15 a^2 C+8 b^2 (3 A+2 C)\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{24 b^3 d \sqrt{\operatorname{Cos}[c+d x]}}-\frac{5 a C \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{12 b^2 d}+\frac{C \operatorname{Cos}[c+d x]^{3/2} \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{3 b d}$$

Result (type 4, 1216 leaves):

$$\frac{1}{48 b^2 d}\left(-\left(\left(4 a \left(24 A b^2+5 a^2 C+16 b^2 C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\right)-16 a^2 b C \left(\left(\sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)-\left(\sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\right.\right.\right.$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Bigg/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(24\,A\,b^2+15\,a^2\,C+16\,b^2\,C\right)\left(\left(\mathrm{i}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Bigg/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Bigg/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\right. + \frac{\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{b\sqrt{\text{Cos}[c+d x]}}\right)\right) +$$

$$\frac{\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\ \left(-\frac{5\,a\,C\,\text{Sin}[c+d x]}{12\,b^2}+\frac{C\,\text{Sin}[2\,(c+d x)]}{6\,b}\right)}{d}$$

Problem 749: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\text{Cos}[c+d x]}\ \left(A+C\,\text{Cos}[c+d x]^2\right)}{\sqrt{a+b\,\text{Cos}[c+d x]}}\,dx$$

Optimal (type 4, 455 leaves, 7 steps):

$$\frac{1}{4\,b^2\,d}3\,(a-b)\,\sqrt{a+b}\ C\,\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{4\,b^2\,d}$$
$$(3\,a-2\,b)\,\sqrt{a+b}\ C\,\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{4\,b^3\,d}\sqrt{a+b}\ \left(3\,a^2\,C+4\,b^2\,(2\,A+C)\right)$$
$$\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}-$$
$$\frac{3\,a\,C\,\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{4\,b^2\,d\,\sqrt{\text{Cos}[c+d x]}}+\frac{C\,\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{2\,b\,d}$$

Result (type 4, 1169 leaves):

$$\frac{C\,\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{2\,b\,d}-$$
$$\frac{1}{8\,b\,d}\left(-\left(\left(4\,a^2\,C\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}\,(c+d x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/$$

$$\left.\left(\left(a+b\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(-8\,A\,b-4\,b\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/$$

$$\left(\left(a+b\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\,\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\Bigg)+$$

$$6\,a\,C\left(\left(i\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Bigg/\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+\right.$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/$$

$$\left.\left.\left(b\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 750: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A + C \cos[c + d x]^2}{\sqrt{\cos[c + d x]} \sqrt{a + b \cos[c + d x]}} \, dx$$

Optimal (type 4, 393 leaves, 6 steps):

$$-\frac{1}{a b d}(a-b)\sqrt{a+b}\, C \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \cos[c+d x]}}{\sqrt{a+b}\sqrt{\cos[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}} + \frac{1}{a b d} \sqrt{a+b}\,(2 A b + a C) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \cos[c+d x]}}{\sqrt{a+b}\sqrt{\cos[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}} + \frac{1}{b^2 d} a \sqrt{a+b}\, C \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \cos[c+d x]}}{\sqrt{a+b}\sqrt{\cos[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}} + \frac{C \sqrt{a+b \cos[c+d x]} \operatorname{Sin}[c+d x]}{b d \sqrt{\cos[c+d x]}}$$

Result (type 4, 741 leaves):

$$\frac{1}{2 d}\left(-\left(\left(4 a (2 A + C) \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \cos[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \cos[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \cos[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left((a+b)\sqrt{\cos[c+d x]}\sqrt{a+b \cos[c+d x]}\right)\right) + \right.$$

$$2\,C\left(\left(i\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Bigg/\left(b\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+\right.$$

$$\frac{1}{b}\,2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 751: Result more than twice size of optimal antiderivative.

$$\int \frac{A + C \operatorname{Cos}[c + d x]^2}{\operatorname{Cos}[c + d x]^{3/2} \sqrt{a + b \operatorname{Cos}[c + d x]}} \, dx$$

Optimal (type 4, 343 leaves, 6 steps):

$$\frac{1}{a^2 d} 2 A (a - b) \sqrt{a + b} \operatorname{Cot}[c + d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \operatorname{Sec}[c + d x])}{a - b}} - \frac{1}{a d} 2 A \sqrt{a + b} \operatorname{Cot}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \operatorname{Sec}[c + d x])}{a - b}} - \frac{1}{b d} 2 \sqrt{a + b} \, C \operatorname{Cot}[c + d x] \operatorname{EllipticPi}\left[\frac{a + b}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \operatorname{Sec}[c + d x])}{a - b}}$$

Result (type 4, 2642 leaves):

$$\frac{2 A \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{a d \sqrt{\operatorname{Cos}[c + d x]}} - \Bigg((1 + \operatorname{Cos}[c + d x])^{3/2} \left(-\frac{A \sqrt{\operatorname{Cos}[c + d x]}}{\sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{C \sqrt{\operatorname{Cos}[c + d x]}}{\sqrt{a + b \operatorname{Cos}[c + d x]}} - \frac{2 A b \operatorname{Cos}[c + d x]^{3/2}}{a \sqrt{a + b \operatorname{Cos}[c + d x]}}\right) \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2 \Bigg(2 A (a + b) \sqrt{\frac{a + b \operatorname{Cos}[c + d x]}{(a + b) (1 + \operatorname{Cos}[c + d x])}} \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]\right], \frac{-a + b}{a + b}\right] - 2 a (A - C) \sqrt{\frac{a + b \operatorname{Cos}[c + d x]}{(a + b) (1 + \operatorname{Cos}[c + d x])}} \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]\right], \frac{-a + b}{a + b}\right] + 4 a C \sqrt{\frac{a + b \operatorname{Cos}[c + d x]}{(a + b) (1 + \operatorname{Cos}[c + d x])}} \operatorname{EllipticPi}\left[-1, -\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]\right], \frac{-a + b}{a + b}\right] + A b \sqrt{\frac{\operatorname{Cos}[c + d x]}{1 + \operatorname{Cos}[c + d x]}} \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right] \operatorname{Sin}\left[\frac{3}{2} (c + d x)\right] + 2 a A \sqrt{\frac{\operatorname{Cos}[c + d x]}{1 + \operatorname{Cos}[c + d x]}} \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right] - A b \sqrt{\frac{\operatorname{Cos}[c + d x]}{1 + \operatorname{Cos}[c + d x]}} \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right] \Bigg) \Bigg) \Big/$$

$$\left(2\,a\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(-\frac{1}{4\,a\,(a+b\,\text{Cos}[c+d\,x])^{3/2}}\,b\,(1+\text{Cos}[c+d\,x])^{3/2}\right.\right.$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sin}[c+d\,x]\,\left(2\,A\,(a+b)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\right.$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]-2\,a\,(A-C)$$

$$\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+4\,a\,C$$

$$\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$A\,b\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+$$

$$\left.2\,a\,A\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-A\,b\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)+$$

$$\frac{1}{4\,a\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,3\,\sqrt{1+\text{Cos}[c+d\,x]}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sin}[c+d\,x]$$

$$\left(2\,A\,(a+b)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]-\right.$$

$$2\,a\,(A-C)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$4\,a\,C\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\right.$$

$$\frac{-a+b}{a+b}\right]+A\,b\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+$$

$$\left.2\,a\,A\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-A\,b\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)-$$

$$\frac{1}{2\,a\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,(1+\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]$$

$$\left(2\,A\,(a+b)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]-\right.$$

$$2\,a\,(A-C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$4\,a\,C\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\right.$$

$$\left.\frac{-a+b}{a+b}\right]+A\,b\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\mathrm{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+$$

$$\left.2\,a\,A\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-A\,b\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)-$$

$$\frac{1}{2\,a\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}\,(1+\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\left(\frac{3}{2}\,A\,b\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Cos}\left[\frac{3}{2}\,(c+d\,x)\right]\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]+\right.$$

$$a\,A\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2-\frac{1}{2}\,A\,b\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2+$$

$$\left(A\,(a+b)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\right.$$

$$\left.\left(-\frac{b\,\mathrm{Sin}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}+\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sin}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])^2}\right)\right)\Big/$$

$$\left(\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\right)-\left(a\,(A-C)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\right.\right.$$

$$\left.\left.\frac{-a+b}{a+b}\right]\left(-\frac{b\,\mathrm{Sin}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}+\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sin}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])^2}\right)\right)\Big/$$

$$\left(\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\right)+\left(2\,a\,C\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\right.\right.$$

$$\left.\left.\frac{-a+b}{a+b}\right]\left(-\frac{b\,\mathrm{Sin}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}+\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sin}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])^2}\right)\right)\Big/$$

$$\left(\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\right)+\frac{1}{2\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}A\,b\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]$$

$$\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+$$

$$\frac{a\,A\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}-$$

$$\frac{A\,b\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{2\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+$$

$$\frac{1}{2}\,A\,b\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$

$$\frac{a\,(A-C)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}}-$$

$$\left(2\,a\,C\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\Big/$$

$$\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)+$$

$$\left(A\,(a+b)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right.$$

$$\left.\left.\left.\sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\Big/\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right)\right)\right)\right)$$

Problem 752: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + C \cos[c + d x]^2}{\cos[c + d x]^{5/2} \sqrt{a + b \cos[c + d x]}} \, dx$$

Optimal (type 4, 283 leaves, 4 steps):

$$-\frac{1}{3 a^3 d} 4 A (a - b) b \sqrt{a + b} \cot[c + d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a + b \cos[c + d x]}}{\sqrt{a + b} \sqrt{\cos[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \sec[c + d x])}{a + b}} \sqrt{\frac{a (1 + \sec[c + d x])}{a - b}} + \frac{1}{3 a^2 d} 2 \sqrt{a + b} (2 A b + a (A + 3 C)) \cot[c + d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a + b \cos[c + d x]}}{\sqrt{a + b} \sqrt{\cos[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \sec[c + d x])}{a + b}} \sqrt{\frac{a (1 + \sec[c + d x])}{a - b}} + \frac{2 A \sqrt{a + b \cos[c + d x]} \sin[c + d x]}{3 a d \cos[c + d x]^{3/2}}$$

Result (type 4, 1204 leaves):

$$\frac{1}{3 a^2 d} \left(-\left(\left(4 a (a^2 A + 2 A b^2 + 3 a^2 C) \sqrt{\frac{(a + b) \cot\left[\frac{1}{2} (c + d x)\right]^2}{-a + b}} \sqrt{-\frac{(a + b) \cos[c + d x] \csc\left[\frac{1}{2} (c + d x)\right]^2}{a}} \sqrt{\frac{(a + b \cos[c + d x]) \csc\left[\frac{1}{2} (c + d x)\right]^2}{a}} \csc[c + d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a + b \cos[c + d x]) \csc\left[\frac{1}{2} (c + d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a + b}\right] \sin\left[\frac{1}{2} (c + d x)\right]^4 \right) \Big/ \left((a + b) \sqrt{\cos[c + d x]} \sqrt{a + b \cos[c + d x]} \right) \right) - \right.$$

$$8 a^2 A b \left(\left(\sqrt{\frac{(a + b) \cot\left[\frac{1}{2} (c + d x)\right]^2}{-a + b}} \sqrt{-\frac{(a + b) \cos[c + d x] \csc\left[\frac{1}{2} (c + d x)\right]^2}{a}} \sqrt{\frac{(a + b \cos[c + d x]) \csc\left[\frac{1}{2} (c + d x)\right]^2}{a}} \csc[c + d x] \right.\right.$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$4\,A\,b^2\Bigg(\Bigg(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\right.$$

$$\left.-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\Bigg)\Bigg/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\Bigg(\Bigg(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg) \Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg) \Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(-\frac{4\,A\,b\,\text{Tan}[c+d\,x]}{3\,a^2}+\right.$$

$$\left.\frac{2\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{3\,a}\right)$$

Problem 753: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{7/2}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 354 leaves, 5 steps):

$$\frac{1}{15 a^4 d} 2 (a-b) \sqrt{a+b} \left(8 A b^2+3 a^2 (3 A+5 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{15 a^3 d} 2 \sqrt{a+b} \left(2 a A b-8 A b^2-3 a^2 (3 A+5 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 A \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{5 a d \text{Cos}[c+d x]^{5/2}}-\frac{8 A b \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{15 a^2 d \text{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1298 leaves) :

$$-\frac{1}{15 a^3 d}\left(-\left(\left(4 a \left(7 a^2 A b+8 A b^3+15 a^2 b C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\right)-4 a \left(9 a^3 A+8 a A b^2+15 a^3 C\right) \left(\left(\sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(9\,a^2\,A\,b+8\,A\,b^3+15\,a^2\,b\,C\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\Big[$$

$$\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2\,a}{-a+b}\Big]\;\text{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]^4\Bigg)\Big/$$

$$\Big((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\Big)\,-$$

$$\Bigg(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2\,a}{-a+b}\Big]\;\text{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]^4\Bigg)\Big/$$

$$\Big(b\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\Big)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\Bigg(\frac{1}{15\,a^3}2\,\text{Sec}[c+d\,x]$$

$$\Big(9\,a^2\,A\,\text{Sin}[c+d\,x]+$$

$$8\,A\,b^2\,\text{Sin}[c+d\,x]+15\,a^2\,C\,\text{Sin}[c+d\,x]\Big)-$$

$$\frac{8\,A\,b\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{15\,a^2}+\frac{2\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{5\,a}\Bigg)$$

Problem 754: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{9/2}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 429 leaves, 6 steps):

$$-\frac{1}{105 a^5 d}4 (a-b) b \sqrt{a+b} \left(24 A b^2+a^2 (22 A+35 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{105 a^4 d}2 \sqrt{a+b} \left(12 a A b^2-48 A b^3-5 a^3 (5 A+7 C)-a^2 (44 A b+70 b C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 A \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{7 a d \text{Cos}[c+d x]^{7/2}}-\frac{12 A b \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{35 a^2 d \text{Cos}[c+d x]^{5/2}}+\frac{2 \left(24 A b^2+5 a^2 (5 A+7 C)\right) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{105 a^3 d \text{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1376 leaves):

$$\frac{1}{105 a^4 d}\left(-\left(\left(4 a \left(25 a^4 A+32 a^2 A b^2+48 A b^4+35 a^4 C+70 a^2 b^2 C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right)\Big/\left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\right)-4 a \left(44 a^3 A b+48 a A b^3+70 a^3 b C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\,\left(44\,a^2\,A\,b^2+48\,A\,b^4+70\,a^2\,b^2\,C\right)\Bigg(\Bigg(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}$$

$$\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\Bigg)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)-\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}$$

$$\mathrm{Csc}[c+dx]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]$$

$$\left.\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}\;\mathrm{Sin}[c+dx]}{b\sqrt{\mathrm{Cos}[c+dx]}}\right)\right)+\frac{1}{d}\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}$$

$$\left(\frac{1}{105a^3}2\,\mathrm{Sec}[c+dx]^2\left(25a^2A\,\mathrm{Sin}[c+dx]+24Ab^2\,\mathrm{Sin}[c+dx]+35a^2C\,\mathrm{Sin}[c+dx]\right)-\right.$$

$$\frac{1}{105a^4}$$

$$4$$

$$\mathrm{Sec}[c+dx]$$

$$\left(22a^2Ab\,\mathrm{Sin}[c+dx]+24Ab^3\,\mathrm{Sin}[c+dx]+35a^2bC\,\mathrm{Sin}[c+dx]\right)-$$

$$\frac{12Ab\,\mathrm{Sec}[c+dx]^2\,\mathrm{Tan}[c+dx]}{35a^2}+$$

$$\left.\frac{2\,A\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{7\,a}\right)$$

Problem 755: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 604 leaves, 8 steps):

$$\frac{1}{4\,b^3\,\sqrt{a+b}\,d}\left(8\,A\,b^2+15\,a^2\,C-7\,b^2\,C\right)\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,b^3\,\sqrt{a+b}\,d}$$
$$\left(8\,A\,b^2+\left(15\,a^2+5\,a\,b-2\,b^2\right)C\right)\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,b^4\,d}\sqrt{a+b}\,\left(8\,A\,b^2+15\,a^2\,C+4\,b^2\,C\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{2\left(A\,b^2+a^2\,C\right)\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{b\left(a^2-b^2\right)d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-$$
$$\frac{a\left(8\,A\,b^2+15\,a^2\,C-7\,b^2\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,b^3\left(a^2-b^2\right)d\,\sqrt{\text{Cos}[c+d\,x]}}+$$
$$\frac{\left(4\,A\,b^2+5\,a^2\,C-b^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,b^2\left(a^2-b^2\right)d}$$

Result (type 4, 1276 leaves):

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{C\,\text{Sin}[c+d\,x]}{2\,b^2}-\frac{2\left(a\,A\,b^2\,\text{Sin}[c+d\,x]+a^3\,C\,\text{Sin}[c+d\,x]\right)}{b^2\left(-a^2+b^2\right)\left(a+b\,\text{Cos}[c+d\,x]\right)}\right)-$$
$$\frac{1}{8\,(a-b)\,b^2\,(a+b)\,d}$$

$$\left(-\left(\left(4\,a\,\left(5\,a^3\,C-5\,a\,b^2\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(8\,A\,b^3+4\,a^2\,b\,C+4\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(8\,a\,A\,b^2+15\,a^3\,C-7\,a\,b^2\,C\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right|+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 756: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 503 leaves, 7 steps):

$$-\frac{1}{a\,b^2\sqrt{a+b}\,d}\left(2\,A\,b^2+3\,a^2\,C-b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}+\frac{1}{a\,b^2\sqrt{a+b}\,d}\left(2\,A\,b^2+a\,\left(3\,a+b\right)\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}+\frac{1}{b^3\,d}3\,a\sqrt{a+b}\,C\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}-\frac{2\,\left(A\,b^2+a^2\,C\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{\left(2\,A\,b^2+3\,a^2\,C-b^2\,C\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b^2\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 1234 leaves):

$$\frac{2\sqrt{\text{Cos}[c+d\,x]}\,\left(A\,b^2\,\text{Sin}[c+d\,x]+a^2\,C\,\text{Sin}[c+d\,x]\right)}{b\,\left(-a^2+b^2\right)\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{1}{2\,\left(a-b\right)\,b\,\left(a+b\right)\,d}\left(-\left(\left(4\,a\,\left(a^2\,C-b^2\,C\right)\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(2\,a\,A\,b+2\,a\,b\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(2\,A\,b^2+3\,a^2\,C-b^2\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\mathrm{Sec}[c+d\,x]}\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\mathrm{Cos}[c+d\,x]}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{b\sqrt{\mathrm{Cos}[c+d\,x]}}\right)\right)$$

Problem 757: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + C\,\text{Cos}[c + d\,x]^2}{\sqrt{\text{Cos}[c + d\,x]}\,\left(a + b\,\text{Cos}[c + d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 421 leaves, 6 steps):

$$\frac{1}{a^2\,b\,\sqrt{a+b}\,d}2\,\left(A\,b^2 + a^2\,C\right)\,\text{Cot}[c + d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a + b\,\text{Cos}[c + d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c + d\,x]}}\right], -\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1 - \text{Sec}[c + d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1 + \text{Sec}[c + d\,x]\right)}{a-b}} + \frac{1}{a\,b\,\sqrt{a+b}\,d}2\,\left(A\,b - a\,C\right)\,\text{Cot}[c + d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a + b\,\text{Cos}[c + d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c + d\,x]}}\right], -\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1 - \text{Sec}[c + d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1 + \text{Sec}[c + d\,x]\right)}{a-b}} - \frac{1}{b^2\,d}2\,\sqrt{a+b}\,C\,\text{Cot}[c + d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b}, \text{ArcSin}\left[\frac{\sqrt{a + b\,\text{Cos}[c + d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c + d\,x]}}\right], -\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1 - \text{Sec}[c + d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1 + \text{Sec}[c + d\,x]\right)}{a-b}} - \frac{2\,\left(A\,b^2 + a^2\,C\right)\,\text{Sin}[c + d\,x]}{b\,\left(a^2 - b^2\right)\,d\,\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{a + b\,\text{Cos}[c + d\,x]}}$$

Result (type 4, 1225 leaves):

$$\frac{2\,\sqrt{\text{Cos}[c + d\,x]}\,\left(A\,b^2\,\text{Sin}[c + d\,x] + a^2\,C\,\text{Sin}[c + d\,x]\right)}{a\,\left(a^2 - b^2\right)\,d\,\sqrt{a + b\,\text{Cos}[c + d\,x]}} + \frac{1}{a\,\left(a-b\right)\,\left(a+b\right)\,d}\left(-\left(\left(4\,a\,\left(a^2\,A - A\,b^2\right)\,\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\,\left(c + d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c + d\,x]\,\text{Csc}\left[\frac{1}{2}\,\left(c + d\,x\right)\right]^2}{a}}\,\sqrt{\frac{\left(a + b\,\text{Cos}[c + d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c + d\,x\right)\right]^2}{a}}\,\text{Csc}[c + d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a + b\,\text{Cos}[c + d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c + d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,\left(c + d\,x\right)\right]^4\right)\Big/\right.\right.$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\Bigg) - 4 a\left(-a A b - a b C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \text{Csc}[c+d x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right) - \Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\Bigg)\Bigg/\left(b\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\Bigg) +$$

$$2\left(-A b^2 - a^2 C\right)\Bigg(\Bigg(i\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{EllipticE}\Bigg[$$

$$i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\Bigg]\,\text{Sec}[c+d x]\Bigg)\Bigg/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 758: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 308 leaves, 4 steps):

$$-\frac{1}{a^3\sqrt{a+b}\,d}2\left(2\,A\,b^2-a^2\,(A-C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{a^2\sqrt{a+b}\,d}2\left(2\,A\,b+a\,(A-C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,(A\,b^2+a^2\,C)\,\text{Sin}[c+d\,x]}{a\,(a^2-b^2)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 1269 leaves):

$$\frac{1}{a^2\,(-a+b)\,(a+b)\,d}\Bigg(-\Bigg(\Bigg(4\,a\,(2\,a^2\,A\,b-2\,A\,b^3)\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Big/\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-4\,a\,(a^3\,A-2\,a\,A\,b^2-a^3\,C)\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\left(a^2\,A\,b-2\,A\,b^3-a^2\,b\,C\right)\left(\left(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Bigg/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(-\frac{2\left(A\,b^3\,\text{Sin}[c+d\,x]+a^2\,b\,C\,\text{Sin}[c+d\,x]\right)}{a^2\left(a^2-b^2\right)\left(a+b\,\text{Cos}[c+d\,x]\right)}+\frac{2\,A\,\text{Tan}[c+d\,x]}{a^2}\right)$$

Problem 759: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{5/2}\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 392 leaves, 5 steps):

$$\frac{1}{3 a^4 \sqrt{a+b}\, d} 2 b \left(8 A b^2-a^2 (5 A-3 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{3 a^3 \sqrt{a+b}\, d} 2 \left(6 a A b+8 A b^2+a^2 (A+3 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 \left(A b^2+a^2 C\right) \text{Sin}[c+d x]}{a \left(a^2-b^2\right) d \text{Cos}[c+d x]^{3/2} \sqrt{a+b \text{Cos}[c+d x]}}-\frac{2 \left(4 A b^2-a^2 (A-3 C)\right) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{3 a^2 \left(a^2-b^2\right) d \text{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1327 leaves):

$$\frac{1}{3 a^3 (a-b) (a+b) d}\left(-\left(\left(4 a \left(a^4 A+7 a^2 A b^2-8 A b^4+3 a^4 C-3 a^2 b^2 C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\right)-4 a \left(5 a^3 A b-8 a A b^3-3 a^3 b C\right)\right.$$

$$\left(\left(\sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(5\,a^2\,A\,b^2-8\,A\,b^4-3\,a^2\,b^2\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\;\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\,\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}$$

$$\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{2\,\left(A\,b^4\,\text{Sin}[c+d\,x]+a^2\,b^2\,C\,\text{Sin}[c+d\,x]\right)}{a^3\,\left(a^2-b^2\right)\,\left(a+b\,\text{Cos}[c+d\,x]\right)}-\right.$$

$$\left.\frac{10\,A\,b\,\text{Tan}[c+d\,x]}{3\,a^3}+\frac{2\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{3\,a^2}\right)$$

Problem 760: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{7/2}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 494 leaves, 6 steps):

$$-\frac{1}{5 a^5 \sqrt{a+b}\, d} 2 \left(16 A b^4-2 a^2 b^2 (4 A-5 C)-a^4 (3 A+5 C)\right) \mathrm{Cot}[c+d x]\, \mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b \mathrm{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\mathrm{Sec}[c+d x])}{a-b}}-\frac{1}{5 a^4 \sqrt{a+b}\, d} 2 \left(12 a A b^2+16 A b^3+2 a^2 b (2 A+5 C)+a^3 (3 A+5 C)\right) \mathrm{Cot}[c+d x]\, \mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b \mathrm{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\mathrm{Sec}[c+d x])}{a-b}}+\frac{2 \left(A b^2+a^2 C\right) \mathrm{Sin}[c+d x]}{a \left(a^2-b^2\right) d\, \mathrm{Cos}[c+d x]^{5/2} \sqrt{a+b \mathrm{Cos}[c+d x]}}-\frac{2 \left(6 A b^2-a^2 (A-5 C)\right) \sqrt{a+b \mathrm{Cos}[c+d x]}\, \mathrm{Sin}[c+d x]}{5 a^2 \left(a^2-b^2\right) d\, \mathrm{Cos}[c+d x]^{5/2}}+\frac{2 b \left(8 A b^2-a^2 (3 A-5 C)\right) \sqrt{a+b \mathrm{Cos}[c+d x]}\, \mathrm{Sin}[c+d x]}{5 a^3 \left(a^2-b^2\right) d\, \mathrm{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1418 leaves):

$$\frac{1}{5 a^4 (-a+b) (a+b) d} \left(-\left(\left(4 a \left(4 a^4 A b+12 a^2 A b^3-16 A b^5+10 a^4 b C-10 a^2 b^3 C\right) \sqrt{\frac{(a+b) \mathrm{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \mathrm{Cos}[c+d x] \mathrm{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \mathrm{Cos}[c+d x]) \mathrm{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \mathrm{Csc}[c+d x]\, \mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b \mathrm{Cos}[c+d x]) \mathrm{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \mathrm{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\mathrm{Cos}[c+d x]} \sqrt{a+b \mathrm{Cos}[c+d x]}\right)\right)-\right.$$

$$4 a \left(3 a^5 A+8 a^3 A b^2-16 a A b^4+5 a^5 C-10 a^3 b^2 C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\,\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(3\,a^4\,A\,b+8\,a^2\,A\,b^3-16\,A\,b^5+5\,a^4\,b\,C-10\,a^2\,b^3\,C\right)\,\left(\left(i\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],\,-\frac{2\,a}{-a-b}\right]\,\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{1}{5\,a^4}2\,\text{Sec}[c+d\,x]\left(3\,a^2\,A\,\text{Sin}[c+d\,x]+11\,A\,b^2\,\text{Sin}[c+d\,x]+5\,a^2\,C\,\text{Sin}[c+d\,x]\right)-\right.$$

$$\frac{2\left(A\,b^5\,\text{Sin}[c+d\,x]+a^2\,b^3\,C\,\text{Sin}[c+d\,x]\right)}{a^4\left(a^2-b^2\right)(a+b\,\text{Cos}[c+d\,x])}-$$

$$\frac{6\,A\,b\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{5\,a^3}+$$

$$\left.\frac{2\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{5\,a^2}\right)$$

Problem 761: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^{3/2} \left(A+C\,\text{Cos}[c+d x]^2\right)}{\left(a+b\,\text{Cos}[c+d x]\right)^{5/2}}\,dx$$

Optimal (type 4, 650 leaves, 8 steps):

$$\left(\left(8 A b^4-15 a^4 C+26 a^2 b^2 C-3 b^4 C\right) \text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a\,(a-b)\,b^3\,(a+b)^{3/2} d\right)+$$

$$\left(\left(2 a A b^3-6 A b^4+15 a^4 C+5 a^3 b C-21 a^2 b^2 C-3 a b^3 C\right) \text{Cot}[c+d x]\right.$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}$$

$$\left.\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a\,(a-b)\,b^3\,(a+b)^{3/2} d\right)+\frac{1}{b^4 d}$$

$$5 a \sqrt{a+b}\;C\,\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}-$$

$$\frac{2\left(A b^2+a^2 C\right) \text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{3 b\left(a^2-b^2\right) d\left(a+b\,\text{Cos}[c+d x]\right)^{3/2}}+$$

$$\frac{2\left(3 A b^4-5 a^4 C+a^2 b^2 (A+9 C)\right) \sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{3 b^2\left(a^2-b^2\right)^2 d\sqrt{a+b\,\text{Cos}[c+d x]}}-$$

$$\frac{\left(8 A b^4-\left(15 a^4-26 a^2 b^2+3 b^4\right) C\right) \sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{3 b^3\left(a^2-b^2\right)^2 d\sqrt{\text{Cos}[c+d x]}}$$

Result (type 4, 1366 leaves):

$$\frac{1}{d}\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+b\,\text{Cos}[c+d x]}\left(-\frac{2\left(a A b^2\,\text{Sin}[c+d x]+a^3 C\,\text{Sin}[c+d x]\right)}{3 b^2\left(-a^2+b^2\right)\left(a+b\,\text{Cos}[c+d x]\right)^2}+\right.$$

$$\left.\frac{4\left(2\,A\,b^4\,\mathrm{Sin}[c+d\,x]-3\,a^4\,C\,\mathrm{Sin}[c+d\,x]+5\,a^2\,b^2\,C\,\mathrm{Sin}[c+d\,x]\right)}{3\,b^2\left(-a^2+b^2\right)^2\left(a+b\,\mathrm{Cos}[c+d\,x]\right)}\right)+$$

$$\frac{1}{6\,(a-b)^2\,b^2\,(a+b)^2\,d}\left(-\left(\left(4\,a\left(2\,a^2\,A\,b^2-2\,A\,b^4+5\,a^4\,C-8\,a^2\,b^2\,C+3\,b^4\,C\right)\right.\right.\right.$$

$$\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-4\,a\left(-8\,a\,A\,b^3+4\,a^3\,b\,C-12\,a\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-8\,A\,b^4+15\,a^4\,C-26\,a^2\,b^2\,C+3\,b^4\,C\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2\,a}{-a+b}\Big]\;\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4\Bigg)\Bigg/$$

$$\left(b\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)$$

Problem 762: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\;\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 563 leaves, 7 steps):

$$-\left(\left(2\left(A b^4-3 a^4 C+a^2 b^2 (3 A+7 C)\right) \mathrm{Cot}[c+d x]\, \mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b \mathrm{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\mathrm{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\mathrm{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a^2 b^2 \sqrt{a+b} \left(a^2-b^2\right) d\right)\right)+$$

$$\left(2\left(3 a A b^2-A b^3-3 a^3 C-a^2 b C+6 a b^2 C\right) \mathrm{Cot}[c+d x]\, \mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b \mathrm{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\mathrm{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\mathrm{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a (a-b) b^2 (a+b)^{3/2} d\right)-$$

$$\frac{1}{b^3 d} 2 \sqrt{a+b}\, C\, \mathrm{Cot}[c+d x]\, \mathrm{EllipticPi}\left[\frac{a+b}{b}, \mathrm{ArcSin}\left[\frac{\sqrt{a+b \mathrm{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\mathrm{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\mathrm{Sec}[c+d x])}{a-b}}-$$

$$\frac{2\left(A b^2+a^2 C\right) \sqrt{\mathrm{Cos}[c+d x]}\, \mathrm{Sin}[c+d x]}{3 b \left(a^2-b^2\right) d\, (a+b \mathrm{Cos}[c+d x])^{3/2}}+$$

$$\frac{2\left(A b^4-3 a^4 C+a^2 b^2 (3 A+7 C)\right) \mathrm{Sin}[c+d x]}{3 b^2 \left(a^2-b^2\right)^2 d \sqrt{\mathrm{Cos}[c+d x]} \sqrt{a+b \mathrm{Cos}[c+d x]}}$$

Result (type 4, 1388 leaves):

$$\frac{1}{d}\sqrt{\mathrm{Cos}[c+d x]} \sqrt{a+b \mathrm{Cos}[c+d x]} \left(\frac{2\left(A b^2 \mathrm{Sin}[c+d x]+a^2 C \mathrm{Sin}[c+d x]\right)}{3 b \left(-a^2+b^2\right) (a+b \mathrm{Cos}[c+d x])^2}+\right.$$

$$\left(2\left(-3 a^2 A b^2 \mathrm{Sin}[c+d x]-A b^4 \mathrm{Sin}[c+d x]+3 a^4 C \mathrm{Sin}[c+d x]-7 a^2 b^2 C \mathrm{Sin}[c+d x]\right)\right) \Big/$$

$$\left.\left(3 a b \left(a^2-b^2\right)^2 (a+b \mathrm{Cos}[c+d x])\right)\right)-$$

$$\frac{1}{3 a (a-b)^2 b (a+b)^2 d}\left(-\left(\left(4 a \left(a^2 A b^2-A b^4+a^4 C-a^2 b^2 C\right)\right.\right.\right.$$

$$\sqrt{\frac{(a+b)\, \mathrm{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b)\, \mathrm{Cos}[c+d x]\, \mathrm{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b \mathrm{Cos}[c+d x])\, \mathrm{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}\, \mathrm{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left.\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\left(-3\,a^3\,A\,b-a\,A\,b^3-a^3\,b\,C-3\,a\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-3a^2Ab^2-Ab^4+3a^4C-7a^2b^2C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]\sqrt{a+b\,\mathrm{Cos}[c+dx]}\;\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{\mathrm{Cos}[c+dx]}}\right],-\frac{2a}{-a-b}\right]\mathrm{Sec}[c+dx]\right)\Big/\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]^2\mathrm{Sec}[c+dx]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Sec}[c+dx]}{a+b}}\right)+\right.$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]\right.\right.$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\right.\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}\,\mathrm{Sin}[c+dx]}{b\sqrt{\mathrm{Cos}[c+dx]}}\right)\right)$$

Problem 763: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + C \,\text{Cos}[c + d\,x]^2}{\sqrt{\text{Cos}[c + d\,x]}\,\left(a + b\,\text{Cos}[c + d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 417 leaves, 5 steps):

$$\left(4\,b\,\left(3\,a^2\,A - A\,b^2 + 2\,a^2\,C\right)\,\text{Cot}[c + d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a + b\,\text{Cos}[c + d\,x]}}{\sqrt{a + b}\,\sqrt{\text{Cos}[c + d\,x]}}\right],\,-\frac{a + b}{a - b}\right]\right.$$
$$\left.\sqrt{\frac{a\,\left(1 - \text{Sec}[c + d\,x]\right)}{a + b}}\,\sqrt{\frac{a\,\left(1 + \text{Sec}[c + d\,x]\right)}{a - b}}\right) \Big/ \left(3\,a^3\,\left(a - b\right)\,\left(a + b\right)^{3/2}\,d\right) -$$
$$\left(2\,\left(2\,A\,b^2 + 3\,a\,b\,\left(A + C\right) - a^2\,\left(3\,A + C\right)\right)\,\text{Cot}[c + d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a + b\,\text{Cos}[c + d\,x]}}{\sqrt{a + b}\,\sqrt{\text{Cos}[c + d\,x]}}\right],\right.\right.$$
$$\left.\left.-\frac{a + b}{a - b}\right]\,\sqrt{\frac{a\,\left(1 - \text{Sec}[c + d\,x]\right)}{a + b}}\,\sqrt{\frac{a\,\left(1 + \text{Sec}[c + d\,x]\right)}{a - b}}\right) \Big/ \left(3\,a^2\,\sqrt{a + b}\,\left(a^2 - b^2\right)\,d\right) +$$
$$\frac{2\,\left(A\,b^2 + a^2\,C\right)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{Sin}[c + d\,x]}{3\,a\,\left(a^2 - b^2\right)\,d\,\left(a + b\,\text{Cos}[c + d\,x]\right)^{3/2}} + \frac{4\,b\,\left(A\,b^2 - a^2\,\left(3\,A + 2\,C\right)\right)\,\text{Sin}[c + d\,x]}{3\,a\,\left(a^2 - b^2\right)^2\,d\,\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{a + b\,\text{Cos}[c + d\,x]}}$$

Result (type 4, 1364 leaves):

$$\frac{1}{d}\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{a + b\,\text{Cos}[c + d\,x]}\,\left(\frac{2\,\left(A\,b^2\,\text{Sin}[c + d\,x] + a^2\,C\,\text{Sin}[c + d\,x]\right)}{3\,a\,\left(a^2 - b^2\right)\,\left(a + b\,\text{Cos}[c + d\,x]\right)^2} +\right.$$
$$\left.\frac{4\,\left(3\,a^2\,A\,b^2\,\text{Sin}[c + d\,x] - A\,b^4\,\text{Sin}[c + d\,x] + 2\,a^2\,b^2\,C\,\text{Sin}[c + d\,x]\right)}{3\,a^2\,\left(a^2 - b^2\right)^2\,\left(a + b\,\text{Cos}[c + d\,x]\right)}\right) +$$
$$\frac{1}{3\,a^2\,\left(a - b\right)^2\,\left(a + b\right)^2\,d}\left(-\left(\left(4\,a\,\left(3\,a^4\,A - 5\,a^2\,A\,b^2 + 2\,A\,b^4 + a^4\,C - a^2\,b^2\,C\right)\right.\right.\right.$$
$$\sqrt{\frac{\left(a + b\right)\,\text{Cot}\left[\frac{1}{2}\,\left(c + d\,x\right)\right]^2}{-a + b}}\,\sqrt{-\frac{\left(a + b\right)\,\text{Cos}[c + d\,x]\,\text{Csc}\left[\frac{1}{2}\,\left(c + d\,x\right)\right]^2}{a}}$$
$$\sqrt{\frac{\left(a + b\,\text{Cos}[c + d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c + d\,x\right)\right]^2}{a}}\,\text{Csc}[c + d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-4\,a\left(-6\,a^3\,A\,b+2\,a\,A\,b^3-4\,a^3\,b\,C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\left(-6 a^2 A b^2+2 A b^4-4 a^2 b^2 C\right)\left(\left(\mathrm{i}\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\operatorname{Cos}[c+d x]}\right.\right.$$

$$\left.\operatorname{EllipticE}\left[\mathrm{i}\operatorname{ArcSinh}\left[\frac{\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\operatorname{Sec}[c+d x]\right)\Bigg/$$

$$\left(b\sqrt{\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^2\operatorname{Sec}[c+d x]}\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\operatorname{Cos}[c+d x]\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Bigg/$$

$$\left((a+b)\sqrt{\operatorname{Cos}[c+d x]}\sqrt{a+b\operatorname{Cos}[c+d x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\operatorname{Cos}[c+d x]\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\operatorname{Csc}[c+d x]\operatorname{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Bigg/$$

$$\left.\left.\left(b\sqrt{\operatorname{Cos}[c+d x]}\sqrt{a+b\operatorname{Cos}[c+d x]}\right)\right)+\frac{\sqrt{a+b\operatorname{Cos}[c+d x]}\operatorname{Sin}[c+d x]}{b\sqrt{\operatorname{Cos}[c+d x]}}\right)\right)$$

Problem 764: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + C \operatorname{Cos}[c + d x]^2}{\operatorname{Cos}[c + d x]^{3/2} \left(a + b \operatorname{Cos}[c + d x]\right)^{5/2}} \, dx$$

Optimal (type 4, 449 leaves, 5 steps):

$$\left(2 \left(8 A b^4 + 3 a^4 (A - C) - a^2 b^2 (15 A + C)\right) \operatorname{Cot}[c + d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \operatorname{Sec}[c + d x])}{a - b}}\right) \Big/ \left(3 a^4 \sqrt{a + b} (a^2 - b^2) d\right) + \left(2 \left(6 a A b^2 + 8 A b^3 - 3 a^3 (A - C) - a^2 b (9 A + C)\right) \operatorname{Cot}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \operatorname{Sec}[c + d x])}{a - b}}\right) \Big/ \left(3 a^3 \sqrt{a + b} (a^2 - b^2) d\right) + \frac{2 (A b^2 + a^2 C) \operatorname{Sin}[c + d x]}{3 a (a^2 - b^2) d \sqrt{\operatorname{Cos}[c + d x]} (a + b \operatorname{Cos}[c + d x])^{3/2}} - \frac{4 \left(2 A b^4 - a^4 C - a^2 b^2 (4 A + C)\right) \operatorname{Sin}[c + d x]}{3 a^2 (a^2 - b^2)^2 d \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + b \operatorname{Cos}[c + d x]}}$$

Result (type 4, 1421 leaves):

$$-\frac{1}{3 a^3 (a - b)^2 (a + b)^2 d} \left(- \left(\left(4 a \left(9 a^4 A b - 17 a^2 A b^3 + 8 A b^5 + a^4 b C - a^2 b^3 C\right) \sqrt{\frac{(a + b) \operatorname{Cot}\left[\frac{1}{2} (c + d x)\right]^2}{-a + b}} \sqrt{-\frac{(a + b) \operatorname{Cos}[c + d x] \operatorname{Csc}\left[\frac{1}{2} (c + d x)\right]^2}{a}} \sqrt{\frac{(a + b \operatorname{Cos}[c + d x]) \operatorname{Csc}\left[\frac{1}{2} (c + d x)\right]^2}{a}} \operatorname{Csc}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a + b \operatorname{Cos}[c + d x]) \operatorname{Csc}\left[\frac{1}{2} (c + d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a + b}\right]\right.\right.\right.$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right/\left((a+b)\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)\right)-$$

$$4\,a\left(3\,a^5\,A-15\,a^3\,A\,b^2+8\,a\,A\,b^4-3\,a^5\,C-a^3\,b^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\text{Csc}[c+dx]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}$$

$$\text{Csc}[c+dx]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right/\left(b\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)\right)+$$

$$2\left(3\,a^4\,A\,b-15\,a^2\,A\,b^3+8\,A\,b^5-3\,a^4\,b\,C-a^2\,b^3\,C\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\sqrt{a+b\,\text{Cos}[c+dx]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{\text{Cos}[c+dx]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+dx]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(-\frac{2\left(A\,b^3\,\text{Sin}[c+d\,x]+a^2\,b\,C\,\text{Sin}[c+d\,x]\right)}{3\,a^2\,(a^2-b^2)\,(a+b\,\text{Cos}[c+d\,x])^2}-\right.$$

$$\left(2\left(9\,a^2\,A\,b^3\,\text{Sin}[c+d\,x]-5\,A\,b^5\,\text{Sin}[c+d\,x]+3\,a^4\,b\,C\,\text{Sin}[c+d\,x]+a^2\,b^3\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/$$

$$\left(3\,a^3\,(a^2-b^2)^2\,(a+b\,\text{Cos}[c+d\,x])\right)+$$

$$\left.\frac{2\,A\,\text{Tan}[c+d\,x]}{a^3}\right)$$

Problem 765: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + C \operatorname{Cos}[c + d x]^2}{\operatorname{Cos}[c + d x]^{5/2} \left(a + b \operatorname{Cos}[c + d x]\right)^{5/2}} \, dx$$

Optimal (type 4, 549 leaves, 6 steps):

$$-\left(\left(4 b \left(8 A b^4 + a^4 (4 A - 3 C) - a^2 b^2 (14 A - C)\right) \operatorname{Cot}[c + d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \operatorname{Sec}[c + d x])}{a - b}}\right) \Big/ \left(3 a^5 \sqrt{a + b} \left(a^2 - b^2\right) d\right)\right) - \left(2 \left(12 a A b^3 + 16 A b^4 - 2 a^2 b^2 (8 A - C) - a^4 (A + 3 C) - a^3 (9 A b - 3 b C)\right) \operatorname{Cot}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \operatorname{Sec}[c + d x])}{a - b}}\right) \Big/ \left(3 a^4 \sqrt{a + b} \left(a^2 - b^2\right) d\right) + \frac{2 \left(A b^2 + a^2 C\right) \operatorname{Sin}[c + d x]}{3 a \left(a^2 - b^2\right) d \operatorname{Cos}[c + d x]^{3/2} \left(a + b \operatorname{Cos}[c + d x]\right)^{3/2}} + \frac{4 \left(5 a^2 A b^2 - 3 A b^4 + 2 a^4 C\right) \operatorname{Sin}[c + d x]}{3 a^2 \left(a^2 - b^2\right)^2 d \operatorname{Cos}[c + d x]^{3/2} \sqrt{a + b \operatorname{Cos}[c + d x]}} + \left(2 \left(8 A b^4 + a^4 (A - 5 C) - a^2 b^2 (13 A - C)\right) \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]\right) \Big/ \left(3 a^3 \left(a^2 - b^2\right)^2 d \operatorname{Cos}[c + d x]^{3/2}\right)$$

Result (type 4, 1471 leaves):

$$\frac{1}{3 a^4 (a - b)^2 (a + b)^2 d} \left(-\left(\left(\left(4 a \left(a^6 A + 15 a^4 A b^2 - 32 a^2 A b^4 + 16 A b^6 + 3 a^6 C - 5 a^4 b^2 C + 2 a^2 b^4 C\right) \sqrt{\frac{(a + b) \operatorname{Cot}\left[\frac{1}{2} (c + d x)\right]^2}{-a + b}} \sqrt{-\frac{(a + b) \operatorname{Cos}[c + d x] \operatorname{Csc}\left[\frac{1}{2} (c + d x)\right]^2}{a}}\right.\right.\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/$$

$$\left.\left(\left(a+b\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\,\left(8\,a^5\,A\,b-28\,a^3\,A\,b^3+16\,a\,A\,b^5-6\,a^5\,b\,C+2\,a^3\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/$$

$$\left(\left(a+b\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(8\,a^4\,A\,b^2-28\,a^2\,A\,b^4+16\,A\,b^6-6\,a^4\,b^2\,C+2\,a^2\,b^4\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right.\right.$$

$$\left.\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right) \Big/ \left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{b\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\mathrm{Cos}[c+d\,x]}$$

$$\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(\frac{2\left(A\,b^4\,\mathrm{Sin}[c+d\,x]+a^2\,b^2\,C\,\mathrm{Sin}[c+d\,x]\right)}{3\,a^3\left(a^2-b^2\right)\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2}+\right.$$
$$\left(4\left(6\,a^2\,A\,b^4\,\mathrm{Sin}[c+d\,x]-4\,A\,b^6\,\mathrm{Sin}[c+d\,x]+3\,a^4\,b^2\,C\,\mathrm{Sin}[c+d\,x]-a^2\,b^4\,C\,\mathrm{Sin}[c+d\,x]\right)\right)\Big/$$
$$\left(3\,a^4\left(a^2-b^2\right)^2\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\right)-$$
$$\frac{16\,A\,b\,\mathrm{Tan}[c+d\,x]}{3\,a^4}+$$
$$\left.\frac{2\,A\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{3\,a^3}\right)$$

Problem 766: Result more than twice size of optimal antiderivative.

$$\int \mathrm{Cos}[c+d\,x]^m\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 318 leaves, 6 steps):

$$\frac{\left(2\,a^2\,C+b^2\left(C\,(3+m)+A\,(4+m)\right)\right)\mathrm{Cos}[c+d\,x]^{1+m}\,\mathrm{Sin}[c+d\,x]}{d\,(2+m)\,(4+m)}+$$
$$\frac{2\,a\,b\,C\,\mathrm{Cos}[c+d\,x]^{2+m}\,\mathrm{Sin}[c+d\,x]}{d\,(3+m)\,(4+m)}+\frac{C\,\mathrm{Cos}[c+d\,x]^{1+m}\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2\mathrm{Sin}[c+d\,x]}{d\,(4+m)}-$$
$$\left(\left(a^2\,(4+m)\left(C\,(1+m)+A\,(2+m)\right)+b^2\,(1+m)\left(C\,(3+m)+A\,(4+m)\right)\right)\right.$$
$$\left.\mathrm{Cos}[c+d\,x]^{1+m}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\mathrm{Cos}[c+d\,x]^2\right]\mathrm{Sin}[c+d\,x]\right)\Big/$$
$$\left(d\,(1+m)\,(2+m)\,(4+m)\,\sqrt{\mathrm{Sin}[c+d\,x]^2}\right)-$$
$$\left(2\,a\,b\left(C\,(2+m)+A\,(3+m)\right)\mathrm{Cos}[c+d\,x]^{2+m}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},\mathrm{Cos}[c+d\,x]^2\right]\right.$$
$$\left.\mathrm{Sin}[c+d\,x]\right)\Big/\left(d\,(2+m)\,(3+m)\,\sqrt{\mathrm{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 664 leaves):

$$\frac{1}{8 d} \text{Cos}[c+d x]^{1+m} \text{Csc}[c+d x] \left(-\frac{b^2 C \text{ Hypergeometric2F1}\left[-\frac{3}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \text{Cos}[c+d x]^2\right]}{1+m} + \frac{1}{1+m} 4 \left(A b^2+\left(a^2+b^2\right) C\right) \text{Hypergeometric2F1}\left[-\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \text{Cos}[c+d x]^2\right] + \frac{1}{2+m} 12 a b C \text{Cos}[c+d x] \text{ Hypergeometric2F1}\left[-\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, \text{Cos}[c+d x]^2\right] + \frac{1}{3+m} 6 b^2 C \text{Cos}[c+d x]^2 \text{ Hypergeometric2F1}\left[-\frac{1}{2}, \frac{3+m}{2}, \frac{5+m}{2}, \text{Cos}[c+d x]^2\right] - \frac{8 a^2 A \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \text{Cos}[c+d x]^2\right]}{1+m} - \frac{4 A b^2 \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \text{Cos}[c+d x]^2\right]}{1+m} - \frac{4 a^2 C \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \text{Cos}[c+d x]^2\right]}{1+m} - \frac{3 b^2 C \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \text{Cos}[c+d x]^2\right]}{1+m} - \frac{1}{2+m} 16 a A b \text{Cos}[c+d x] \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, \text{Cos}[c+d x]^2\right] - \frac{1}{2+m} 12 a b C \text{Cos}[c+d x] \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, \text{Cos}[c+d x]^2\right] - \frac{1}{3+m} 4 A b^2 \text{Cos}[c+d x]^2 \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{3+m}{2}, \frac{5+m}{2}, \text{Cos}[c+d x]^2\right] - \frac{1}{3+m} 4 a^2 C \text{Cos}[c+d x]^2 \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{3+m}{2}, \frac{5+m}{2}, \text{Cos}[c+d x]^2\right] - \frac{1}{3+m} 4 b^2 C \text{Cos}[c+d x]^2 \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{3+m}{2}, \frac{5+m}{2}, \text{Cos}[c+d x]^2\right] - \frac{1}{4+m} 4 a b C \text{Cos}[c+d x]^3 \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{4+m}{2}, \frac{6+m}{2}, \text{Cos}[c+d x]^2\right] - \frac{b^2 C \text{Cos}[c+d x]^4 \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{5+m}{2}, \frac{7+m}{2}, \text{Cos}[c+d x]^2\right]}{5+m}\right) \sqrt{\text{Sin}[c+d x]^2}$$

Problem 768: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^m \left(A+C \text{Cos}[c+d x]^2\right)}{a+b \text{Cos}[c+d x]} \, dx$$

Optimal (type 6, 353 leaves, 8 steps):

$$\frac{1}{b^2\left(a^2-b^2\right)d}a\left(A b^2+a^2 C\right)\text{AppellF1}\left[\frac{1}{2},\frac{1-m}{2},1,\frac{3}{2},\text{Sin}[c+d x]^2,-\frac{b^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]$$
$$\text{Cos}[c+d x]^{-1+m}\left(\text{Cos}[c+d x]^2\right)^{\frac{1-m}{2}}\text{Sin}[c+d x]-\frac{1}{b\left(a^2-b^2\right)d}$$
$$\left(A b^2+a^2 C\right)\text{AppellF1}\left[\frac{1}{2},-\frac{m}{2},1,\frac{3}{2},\text{Sin}[c+d x]^2,-\frac{b^2\,\text{Sin}[c+d x]^2}{a^2-b^2}\right]$$
$$\text{Cos}[c+d x]^m\left(\text{Cos}[c+d x]^2\right)^{-m/2}\text{Sin}[c+d x]+$$
$$\left(a\,C\,\text{Cos}[c+d x]^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Cos}[c+d x]^2\right]\text{Sin}[c+d x]\right)\Big/$$
$$\left(b^2 d\,(1+m)\sqrt{\text{Sin}[c+d x]^2}\right)-$$
$$\left(C\,\text{Cos}[c+d x]^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},\text{Cos}[c+d x]^2\right]\text{Sin}[c+d x]\right)\Big/$$
$$\left(b\,d\,(2+m)\sqrt{\text{Sin}[c+d x]^2}\right)$$

Result (type 6, 10459 leaves):

$$\left(\left(\frac{A\,\text{Cos}[c+d x]^m}{a+b\,\text{Cos}[c+d x]}+\frac{C\,\text{Cos}[c+d x]^m}{2\left(a+b\,\text{Cos}[c+d x]\right)}+\frac{C\,\text{Cos}[c+d x]^m\,\text{Cos}\left[2\left(c+d x\right)\right]}{2\left(a+b\,\text{Cos}[c+d x]\right)}\right)\right.$$
$$\text{Tan}[c+d x]\left(-\frac{a\,C\,\text{Hypergeometric2F1}\left[\frac{1}{2},1+\frac{m}{2},\frac{3}{2},-\text{Tan}[c+d x]^2\right]}{b^2}+\right.$$
$$\frac{A\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3}{2},-\text{Tan}[c+d x]^2\right]}{b}+$$
$$\frac{a^2\,C\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3}{2},-\text{Tan}[c+d x]^2\right]}{b^3}+$$
$$\frac{C\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3+m}{2},\frac{3}{2},-\text{Tan}[c+d x]^2\right]}{b}+\left(3\,a^2\left(a^2-b^2\right)\left(A b^2+a^2 C\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),1,\frac{3}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]\left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Big/$$
$$\left(b^3\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1+m\right),2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right)\left(-1+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\text{Tan}[c+d x]^2\right)\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\right)-\left(3\,a\,A\left(a^2-b^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\right)\Big/$$
$$\left(\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right) m \text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\text{Tan}[c+d x]^2\right) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\right)+$$
$$\left(3 a^3 C \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\right) \Big/$$
$$\left(\left(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right) m \text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\text{Tan}[c+d x]^2\right) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\right)-$$
$$\left(3 a^5 C \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\right) \Big/$$
$$\left(b^2 \left(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right) m \text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\left.\left.\text{Tan}[c+d x]^2\right) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\right)\right)\right) \Big/$$
$$\left(d \left(\text{Sec}[c+d x]^2 \left(-\frac{a C \text{Hypergeometric2F1}\left[\frac{1}{2}, 1+\frac{m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right]}{b^2}+\right.\right.\right.$$
$$\frac{A \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right]}{b}+$$
$$\frac{a^2 C \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right]}{b^3}+$$
$$\frac{C \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3+m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right]}{b}+\left(3 a^2 \left(a^2-b^2\right) \left(A b^2+a^2 C\right) \text{AppellF1}\left[\right.\right.$$
$$\left.\left.\frac{1}{2}, \frac{1}{2} (-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right) \Big/$$
$$\left(b^3 \left(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2} (-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2} (-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left.\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}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\right.\\ \text{Tan}[c+d\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)-\left(3\,a\,A\,\left(a^2-b^2\right)\right.\\ \left.\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\left(1+\text{Tan}[c+d\,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}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,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}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,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}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\\ \left.\left.\text{Tan}[c+d\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)+\\ \left(3\,a^3\,C\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\,\left(1+\text{Tan}[c+d\,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}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,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}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,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}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\\ \left.\left.\text{Tan}[c+d\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)-\\ \left(3\,a^5\,C\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\,\left(1+\text{Tan}[c+d\,x]^2\right)^{-m/2}\right)\Big/\\ \left(b^2\,\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,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}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,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}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\\ \left.\left.\left.\text{Tan}[c+d\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)\right)+\\ \text{Tan}[c+d\,x]\,\left(-\left(\left(6\,a^4\,\left(a^2-b^2\right)\,\left(A\,b^2+a^2\,C\right)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\,(-1+m),1,\frac{3}{2},\right.\right.\right.\right.\\ \left.\left.-\text{Tan}[c+d\,x]^2,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\,\left(1+\text{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Big/\\ \left(b^3\,\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}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,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}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left(a^2-b^2\right)(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d x]^2\Bigg)\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Bigg)\Bigg)+$$

$$\Bigg(6 a^3 A\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg)\Big/$$

$$\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Bigg(2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)m$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)\text{Tan}[c+d x]^2\Bigg)$$

$$\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Bigg)-\Bigg(6 a^5 C\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,\right.$$

$$\left.\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg)\Big/$$

$$\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Bigg(2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)m$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)\text{Tan}[c+d x]^2\Bigg)$$

$$\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Bigg)+\Bigg(6 a^7 C\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,\right.$$

$$\left.\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg)\Big/$$

$$\Bigg(b^2\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Bigg(2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)m$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)\text{Tan}[c+d x]^2\Bigg)$$

$$\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Bigg)+\Bigg(6 a^2\left(a^2-b^2\right)\left(A b^2+a^2 C\right)\left(\frac{1}{2}-\frac{m}{2}\right)$$

$$\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]$$

$$\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{-\frac{1}{2}-\frac{m}{2}}\Bigg)\Big/$$

$$\Bigg(b^3\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,\left(-1+m\right),\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\,\left(-1+m\right)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[c+d\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)+$$

$$\left(3\,a^2\,\left(a^2-b^2\right)\,\left(A\,b^2+a^2\,C\right)\,\left(-\frac{1}{3}\,\left(-1+m\right)\,\text{AppellF1}\left[\frac{3}{2},\,1+\frac{1}{2}\,\left(-1+m\right),\,1,\,\frac{5}{2},\right.\right.\right.$$

$$\left.-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]+\frac{1}{3\,\left(-a^2+b^2\right)}$$

$$2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,\left(-1+m\right),\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]$$

$$\left.\left.\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\,\left(1+\text{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Big/$$

$$\left(b^3\,\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,\left(-1+m\right),\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,\left(-1+m\right),\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\,\left(-1+m\right)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[c+d\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)+$$

$$\left(3\,a\,A\,\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right.$$

$$\left.\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\,\left(1+\text{Tan}[c+d\,x]^2\right)^{-1-\frac{m}{2}}\right)\Big/$$

$$\left(\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)\,m\right.$$

$$\left.\left.\text{AppellF1}\left[\frac{3}{2},\,\frac{2+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\,\text{Tan}[c+d\,x]^2\right)$$

$$\left.\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)-\left(3\,a^3\,C\,m\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\right.\right.$$

$$\left.\left.\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\,\left(1+\text{Tan}[c+d\,x]^2\right)^{-1-\frac{m}{2}}\right)\Big/$$

$$\left(\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)\,m\right.$$

$$\left.\left.\text{AppellF1}\left[\frac{3}{2},\,\frac{2+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\,\text{Tan}[c+d\,x]^2\right)$$

$$\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)+\Bigg(3 a^5 C m \text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{-1-\frac{m}{2}}\Bigg)\Bigg/$$

$$\Bigg(b^2\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\Bigg(2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)\text{Tan}[c+d x]^2\Bigg)\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)-$$

$$\Bigg(3 a A\left(a^2-b^2\right)\Bigg(-\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]-\frac{1}{3\left(a^2-b^2\right)}2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\Bigg)\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\Bigg(2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)\text{Tan}[c+d x]^2\Bigg)\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)+$$

$$\Bigg(3 a^3 C\Bigg(-\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]+\frac{1}{3\left(-a^2+b^2\right)}2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\Bigg)\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\Bigg(2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)\text{Tan}[c+d x]^2\Bigg)\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)-$$

$$\Bigg(3 a^5 C\Bigg(-\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]$$

$$\text{Sec}[c+d x]^2 \,\text{Tan}[c+d x] + \frac{1}{3\left(-a^2+b^2\right)} 2 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \,\text{Tan}[c+d x]^2}{-a^2+b^2}\right] \text{Sec}[c+d x]^2 \,\text{Tan}[c+d x]\Big) \left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Big) \Big/$$

$$\Bigg(b^2 \Bigg(-3\left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right] +$$

$$\Bigg(2 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) m$$

$$\text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg) \text{Tan}[c+d x]^2\Bigg)$$

$$\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg) + \frac{1}{b} C \,\text{Csc}[c+d x] \,\text{Sec}[c+d x]$$

$$\left(-\text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3+m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right] + \left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}(-3-m)}\right) +$$

$$\frac{1}{b} A \,\text{Csc}[c+d x] \,\text{Sec}[c+d x] \left(-\text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right] +\right.$$

$$\left.\left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}(-1-m)}\right) + \frac{1}{b^3} a^2 C \,\text{Csc}[c+d x] \,\text{Sec}[c+d x]$$

$$\left(-\text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right] + \left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}(-1-m)}\right) -$$

$$\frac{1}{b^2} a C \,\text{Csc}[c+d x] \,\text{Sec}[c+d x]$$

$$\left(-\text{Hypergeometric2F1}\left[\frac{1}{2}, 1+\frac{m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right] + \left(1+\text{Tan}[c+d x]^2\right)^{-1-\frac{m}{2}}\right) -$$

$$\Bigg(3 a^2\left(a^2-b^2\right)\left(A b^2+a^2 C\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2},\right.$$

$$\left.-\text{Tan}[c+d x]^2, \frac{a^2 \,\text{Tan}[c+d x]^2}{-a^2+b^2}\right] \left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}$$

$$\Bigg(2\Bigg(2 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right] +$$

$$\left(a^2-b^2\right)(-1+m) \,\text{AppellF1}\left[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Sec}[c+d x]^2 \,\text{Tan}[c+d x] - 3\left(a^2-b^2\right)\Bigg(-\frac{1}{3}(-1+m) \,\text{AppellF1}\left[\frac{3}{2}, 1+\frac{1}{2}(-1+m), 1,\right.$$

$$\left.\frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \,\text{Tan}[c+d x] - \frac{1}{3\left(a^2-b^2\right)}$$

$$2 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d x]^2 \,\text{Tan}[c+d x]\Bigg) + \text{Tan}[c+d x]^2 \Bigg(2 a^2 \Bigg(-\frac{3}{5}(-1+m) \,\text{AppellF1}\left[\frac{5}{2},\right.$$

$$\left.1+\frac{1}{2}(-1+m), 2, \frac{7}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \,\text{Tan}[$$

$$c+d\,x]-\frac{1}{5\left(a^2-b^2\right)}12\,a^2\,\text{AppellF1}\left[\frac{5}{2},\,\frac{1}{2}\,\left(-1+m\right),\,3,\,\frac{7}{2},\,-\text{Tan}[c+d\,x]^2,\right.$$

$$\left.-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Bigg)+\left(a^2-b^2\right)\,\left(-1+m\right)$$

$$\Bigg(-\frac{1}{5\left(a^2-b^2\right)}6\,a^2\,\text{AppellF1}\left[\frac{5}{2},\,\frac{1+m}{2},\,2,\,\frac{7}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-\frac{3}{5}\,\left(1+m\right)\,\text{AppellF1}\left[\frac{5}{2},\,1+\frac{1+m}{2},\,1,\,\frac{7}{2},\right.$$

$$\left.-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(b^3\,\Bigg(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,\left(-1+m\right),\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+$$

$$\Bigg(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,\left(-1+m\right),\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)\,\left(-1+m\right)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\right.$$

$$\left.-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\Bigg)\,\text{Tan}[c+d\,x]^2\Bigg)^2\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\Bigg)+$$

$$\Bigg(3\,a\,A\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]$$

$$\left(1+\text{Tan}[c+d\,x]^2\right)^{-m/2}\,\Bigg(2\,\Bigg(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\right.$$

$$\left.-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{3}{2},\,\frac{2+m}{2},\,1,\,\frac{5}{2},\right.$$

$$\left.-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\Bigg)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-$$

$$3\,\left(a^2-b^2\right)\,\Bigg(-\frac{1}{3}\,m\,\text{AppellF1}\left[\frac{3}{2},\,1+\frac{m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-\frac{1}{3\left(a^2-b^2\right)}2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\right.$$

$$\left.-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Bigg)+\text{Tan}[c+d\,x]^2$$

$$\Bigg(2\,a^2\,\Bigg(-\frac{3}{5}\,m\,\text{AppellF1}\left[\frac{5}{2},\,1+\frac{m}{2},\,2,\,\frac{7}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-\frac{1}{5\left(a^2-b^2\right)}12\,a^2\,\text{AppellF1}\left[\frac{5}{2},\,\frac{m}{2},\,3,\,\frac{7}{2},\right.$$

$$\left.-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Bigg)+\left(a^2-b^2\right)\,m$$

$$\Bigg(-\frac{1}{5\left(a^2-b^2\right)}6\,a^2\,\text{AppellF1}\left[\frac{5}{2},\,\frac{2+m}{2},\,2,\,\frac{7}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-\frac{3}{5}\,(2+m)\,\text{AppellF1}\Big[\frac{5}{2},1+\frac{2+m}{2},1,\frac{7}{2},$$

$$-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(\Big(-3\,(a^2-b^2)\,\text{AppellF1}\Big[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+$$

$$\Big(2\,a^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+$$

$$(a^2-b^2)\,m\,\text{AppellF1}\Big[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\Big)$$

$$\text{Tan}[c+d\,x]^2\Big)^2\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\Big)-$$

$$\Big(3\,a^3\,C\,\text{AppellF1}\Big[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\Big]\,\left(1+\text{Tan}[c+d\,x]^2\right)^{-m/2}$$

$$\Big(2\,\Big(2\,a^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+$$

$$(a^2-b^2)\,m\,\text{AppellF1}\Big[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\Big)$$

$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-3\,(a^2-b^2)\,\Big(-\frac{1}{3}\,m\,\text{AppellF1}\Big[\frac{3}{2},1+\frac{m}{2},1,\frac{5}{2},$$

$$-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-\frac{1}{3\,(a^2-b^2)}$$

$$2\,a^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Big)+\text{Tan}[c+d\,x]^2$$

$$\Big(2\,a^2\,\Big(-\frac{3}{5}\,m\,\text{AppellF1}\Big[\frac{5}{2},1+\frac{m}{2},2,\frac{7}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-\frac{1}{5\,(a^2-b^2)}12\,a^2\,\text{AppellF1}\Big[\frac{5}{2},\frac{m}{2},3,\frac{7}{2},$$

$$-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Big)+(a^2-b^2)\,m$$

$$\Big(-\frac{1}{5\,(a^2-b^2)}6\,a^2\,\text{AppellF1}\Big[\frac{5}{2},\frac{2+m}{2},2,\frac{7}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-\frac{3}{5}\,(2+m)\,\text{AppellF1}\Big[\frac{5}{2},1+\frac{2+m}{2},1,\frac{7}{2},$$

$$-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(\Big(-3\,(a^2-b^2)\,\text{AppellF1}\Big[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{3}{2},\,\frac{2+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$
$$\left.\text{Tan}[c+d\,x]^2\right)^2\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\Bigg)+$$
$$\left(3\,a^5\,C\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\,\left(1+\text{Tan}[c+d\,x]^2\right)^{-m/2}\right.$$
$$\left(2\,\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left.\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{3}{2},\,\frac{2+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$
$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\,-3\,\left(a^2-b^2\right)\,\left(-\frac{1}{3}\,m\,\text{AppellF1}\left[\frac{3}{2},\,1+\frac{m}{2},\,1,\,\frac{5}{2},\right.\right.$$
$$\left.-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\,-\frac{1}{3\,\left(a^2-b^2\right)}$$
$$2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]$$
$$\left.\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)+\text{Tan}[c+d\,x]^2$$
$$\left(2\,a^2\,\left(-\frac{3}{5}\,m\,\text{AppellF1}\left[\frac{5}{2},\,1+\frac{m}{2},\,2,\,\frac{7}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right.\right.$$
$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\,-\frac{1}{5\,\left(a^2-b^2\right)}12\,a^2\,\text{AppellF1}\left[\frac{5}{2},\,\frac{m}{2},\,3,\,\frac{7}{2},\right.$$
$$\left.\left.-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)+\left(a^2-b^2\right)\,m$$
$$\left(-\frac{1}{5\,\left(a^2-b^2\right)}6\,a^2\,\text{AppellF1}\left[\frac{5}{2},\,\frac{2+m}{2},\,2,\,\frac{7}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right.$$
$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\,-\frac{3}{5}\,\left(2+m\right)\,\text{AppellF1}\left[\frac{5}{2},\,1+\frac{2+m}{2},\,1,\,\frac{7}{2},\right.$$
$$\left.\left.\left.\left.\left.-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\right)\right)\right)\Bigg/$$
$$\left(b^2\,\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{3}{2},\,\frac{2+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$
$$\left.\text{Tan}[c+d\,x]^2\right)^2\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

Problem 769: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^m \left(A+C \text{Cos}[c+d x]^2\right)}{\left(a+b \text{Cos}[c+d x]\right)^2} \, dx$$

Optimal (type 6, 514 leaves, 9 steps):

$$\frac{1}{b^2 \left(a^2-b^2\right)^2 d}\left(A b^4 m-a^4 C (1+m)+a^2 b^2 (A-A m+C (2+m))\right) \text{AppellF1}\left[\frac{1}{2},\frac{1-m}{2},1,\frac{3}{2},\text{Sin}[c+d x]^2,-\frac{b^2 \text{Sin}[c+d x]^2}{a^2-b^2}\right] \text{Cos}[c+d x]^{-1+m} \left(\text{Cos}[c+d x]^2\right)^{\frac{1-m}{2}} \text{Sin}[c+d x]-\frac{1}{a b \left(a^2-b^2\right)^2 d}\left(A b^4 m-a^4 C (1+m)+a^2 b^2 (A-A m+C (2+m))\right) \text{AppellF1}\left[\frac{1}{2},-\frac{m}{2},1,\frac{3}{2},\text{Sin}[c+d x]^2,-\frac{b^2 \text{Sin}[c+d x]^2}{a^2-b^2}\right] \text{Cos}[c+d x]^m \left(\text{Cos}[c+d x]^2\right)^{-m/2} \text{Sin}[c+d x]+\frac{\left(A b^2+a^2 C\right) \text{Cos}[c+d x]^{1+m} \text{Sin}[c+d x]}{a \left(a^2-b^2\right) d (a+b \text{Cos}[c+d x])}-\left(\left(a^2 C (1+m)-b^2 (C-A m)\right) \text{Cos}[c+d x]^{1+m} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Cos}[c+d x]^2\right] \text{Sin}[c+d x]\right)\Big/\left(b^2 \left(a^2-b^2\right) d (1+m) \sqrt{\text{Sin}[c+d x]^2}\right)+\left(\left(A b^2+a^2 C\right) (1+m) \text{Cos}[c+d x]^{2+m} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},\text{Cos}[c+d x]^2\right] \text{Sin}[c+d x]\right)\Big/\left(a b \left(a^2-b^2\right) d (2+m) \sqrt{\text{Sin}[c+d x]^2}\right)$$

Result (type 6, 17 999 leaves):

$$\left(\left(\frac{A \text{Cos}[c+d x]^m}{(a+b \text{Cos}[c+d x])^2}+\frac{C \text{Cos}[c+d x]^m}{2 (a+b \text{Cos}[c+d x])^2}+\frac{C \text{Cos}[c+d x]^m \text{Cos}[2 (c+d x)]}{2 (a+b \text{Cos}[c+d x])^2}\right)\right.$$
$$\left(-\frac{1}{b^3}2 a C \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}+\frac{m}{2},\frac{3}{2},-\text{Tan}[c+d x]^2\right] \text{Tan}[c+d x]+\right.$$
$$\frac{C \text{Hypergeometric2F1}\left[\frac{1}{2},1+\frac{m}{2},\frac{3}{2},-\text{Tan}[c+d x]^2\right] \text{Tan}[c+d x]}{b^2}-\left(6 A b^2 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2},\right.\right.$$
$$\left.\left.\frac{m}{2},2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Tan}[c+d x] \left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\right)\Big/$$
$$\left(\left(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2},\frac{m}{2},2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(\left(a^2-b^2\right) m \text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$
$$\left.4 a^2 \text{AppellF1}\left[\frac{3}{2},\frac{m}{2},3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\right)$$

$$\left(b^2-a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Big)-\Big(6 a^2\left(a^2-b^2\right) C\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},2,\frac{3}{2},\right.$$

$$\left.-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Big)\Big/$$

$$\Big(\Big(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Big(\left(a^2-b^2\right) m\,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$4 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Big)\text{Tan}[c+d x]^2\Big)$$

$$\left(b^2-a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Big)+\Big(6 a A b\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),2,\right.$$

$$\left.\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Big)\Big/$$

$$\Big(\Big(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Big(4 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Big)$$

$$\text{Tan}[c+d x]^2\Big)\left(b^2-a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Big)+$$

$$\Big(6 a^3\left(a^2-b^2\right) C\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),2,\frac{3}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]$$

$$\text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Big)\Big/$$

$$\Big(b\Big(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Big(4 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Big)$$

$$\text{Tan}[c+d x]^2\Big)\left(b^2-a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Big)-$$

$$\Big(6 a^3\left(a^2-b^2\right) C\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]$$

$$\text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Big)\Big/$$

$$\Big(b^3\Big(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Big(2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)\left(-1+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg)\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)-$$

$$\Bigg(3\,A\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]$$

$$\text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Bigg(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg)\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)+$$

$$\Bigg(3\,a^2\left(a^2-b^2\right)C\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]$$

$$\text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg)\Bigg/$$

$$\Bigg(b^2\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Bigg(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg)\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(d\Bigg(-\frac{1}{b^3}2\,a\,C\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}+\frac{m}{2},\frac{3}{2},-\text{Tan}[c+d x]^2\right]\text{Sec}[c+d x]^2+$$

$$\frac{C\,\text{Hypergeometric2F1}\left[\frac{1}{2},1+\frac{m}{2},\frac{3}{2},-\text{Tan}[c+d x]^2\right]\text{Sec}[c+d x]^2}{b^2}-$$

$$\Bigg(24\,a^2\,A\,b^2\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]^2\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Bigg(\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$4\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{m}{2},\,3,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\Bigg)\,\text{Tan}[c+d\,x]^2\Bigg)$$

$$\left(b^2-a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)^3\Bigg)-\Bigg(24\,a^4\,\left(a^2-b^2\right)\,C\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,2,\,\frac{3}{2},\right.$$

$$\left.-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]^2\,\left(1+\text{Tan}[c+d\,x]^2\right)^{-m/2}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,2,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+$$

$$\Bigg(\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{3}{2},\,1+\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+$$

$$4\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{m}{2},\,3,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\Bigg)\,\text{Tan}[c+d\,x]^2\Bigg)$$

$$\left(b^2-a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)^3\Bigg)+\Bigg(24\,a^3\,A\,b\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,\left(-1+m\right),\,2,\right.$$

$$\left.\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]^2\,\left(1+\text{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,\left(-1+m\right),\,2,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+$$

$$\Bigg(4\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,\left(-1+m\right),\,3,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)\,\left(-1+m\right)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1+m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d\,x]^2\Bigg)\,\left(b^2-a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)^3\Bigg)+$$

$$\Bigg(24\,a^5\,\left(a^2-b^2\right)\,C\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,\left(-1+m\right),\,2,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]$$

$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]^2\,\left(1+\text{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Bigg)\Bigg/$$

$$\Bigg(b\,\Bigg(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,\left(-1+m\right),\,2,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+$$

$$\Bigg(4\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,\left(-1+m\right),\,3,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)\,\left(-1+m\right)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1+m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d\,x]^2\Bigg)\,\left(b^2-a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)^3\Bigg)+$$

$$\Bigg(6\,A\,b^2\,\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,2,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]^2\,\left(1+\text{Tan}[c+d\,x]^2\right)^{-1-\frac{m}{2}}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,2,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+$$

$$\left(\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2}, 1+\frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$
$$\left.4 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 3, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\Big)$$
$$\left.\left(b^2-a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)^2\right)+\left(6 a^2 \left(a^2-b^2\right) C\, m \,\text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 2, \frac{3}{2},\right.\right.$$
$$\left.\left.-\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \,\text{Tan}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-1-\frac{m}{2}}\right) \Big/$$
$$\left(\left(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 2, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2}, 1+\frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$
$$\left.4 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 3, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\Big)$$
$$\left.\left(b^2-a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)^2\right)-\left(6 A b^2 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 2, \frac{3}{2},\right.\right.$$
$$\left.\left.-\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\right) \Big/$$
$$\left(\left(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 2, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2}, 1+\frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$
$$\left.4 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 3, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\Big)$$
$$\left.\left(b^2-a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)^2\right)-\left(6 a^2 \left(a^2-b^2\right) C \,\text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 2, \frac{3}{2},\right.\right.$$
$$\left.\left.-\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\right) \Big/$$
$$\left(\left(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 2, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2}, 1+\frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$
$$\left.4 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 3, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\Big)$$
$$\left.\left(b^2-a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)^2\right)-\left(6 A b^2 \left(a^2-b^2\right) \text{Tan}[c+d x]\right.$$
$$\left(-\frac{1}{3} m \,\text{AppellF1}\left[\frac{3}{2}, 1+\frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2\right.$$
$$\text{Tan}[c+d x]-\frac{1}{3 \left(a^2-b^2\right)} 4 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 3, \frac{5}{2}, -\text{Tan}[c+d x]^2,\right.$$
$$\left.\left.\left.-\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \,\text{Tan}[c+d x]\right) \left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\right) \Big/$$

$$\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$
$$\left(\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$
$$\left.4a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d x]^2\Bigg)$$
$$\left(b^2-a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Bigg)-\Bigg(6a^2\left(a^2-b^2\right)C\,\text{Tan}[c+d x]$$
$$\left(-\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\right.$$
$$\text{Tan}[c+d x]-\frac{1}{3\left(a^2-b^2\right)}4a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},3,\frac{5}{2},-\text{Tan}[c+d x]^2,\right.$$
$$\left.\left.-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\right)\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg)\Big/$$
$$\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$
$$\left(\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$
$$\left.4a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d x]^2\Bigg)$$
$$\left(b^2-a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Bigg)+\Bigg(12\,a\,A\,b\left(a^2-b^2\right)\left(\frac{1}{2}-\frac{m}{2}\right)$$
$$\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]$$
$$\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]^2\left(1+\text{Tan}[c+d x]^2\right)^{-\frac{1}{2}-\frac{m}{2}}\Bigg)\Big/$$
$$\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$
$$\left(4a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1+m\right),3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right)\left(-1+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)$$
$$\text{Tan}[c+d x]^2\Bigg)\left(b^2-a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Bigg)+$$
$$\Bigg(12a^3\left(a^2-b^2\right)C\left(\frac{1}{2}-\frac{m}{2}\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),2,\frac{3}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]$$
$$\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]^2\left(1+\text{Tan}[c+d x]^2\right)^{-\frac{1}{2}-\frac{m}{2}}\Bigg)\Big/$$
$$\Bigg(b\,\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$
$$\left(4a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1+m\right),3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.$$

$$\left(a^2-b^2\right)\,(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg)\,\left(b^2-a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Bigg)+$$

$$\Bigg(6\,a\,A\,b\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d x]^2\,\left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Bigg(4\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)\,(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg)\,\left(b^2-a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Bigg)+$$

$$\Bigg(6\,a^3\,\left(a^2-b^2\right)\,C\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),2,\frac{3}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]$$

$$\text{Sec}[c+d x]^2\,\left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Bigg)\Bigg/$$

$$\Bigg(b\,\Bigg(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Bigg(4\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)\,(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg)\,\left(b^2-a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\Bigg)+$$

$$\Bigg(6\,a\,A\,b\,\left(a^2-b^2\right)\,\text{Tan}[c+d x]\,\Bigg(-\frac{1}{3}(-1+m)\,\text{AppellF1}\left[\frac{3}{2},1+\frac{1}{2}(-1+m),2,\frac{5}{2},\right.$$

$$\left.-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]-\frac{1}{3\left(a^2-b^2\right)}$$

$$4\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\Bigg)\,\left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Bigg(4\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)\,(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\left.\left.\mathrm{Tan}[c+d\,x]^2\right)\left(b^2-a^2\left(1+\mathrm{Tan}[c+d\,x]^2\right)\right)^2\right)+$$

$$\left(6\,a^3\left(a^2-b^2\right)C\,\mathrm{Tan}[c+d\,x]\left(-\frac{1}{3}\left(-1+m\right)\mathrm{AppellF1}\left[\frac{3}{2},1+\frac{1}{2}\left(-1+m\right),2,\frac{5}{2},\right.\right.\right.$$

$$\left.-\mathrm{Tan}[c+d\,x]^2,\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]+\frac{1}{3\left(-a^2+b^2\right)}$$

$$4\,a^2\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1+m\right),3,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{-a^2+b^2}\right]$$

$$\left.\left.\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\right)\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Big/$$

$$\left(b\left(-3\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),2,\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(4\,a^2\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1+m\right),3,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\left(-1+m\right)\mathrm{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},2,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\mathrm{Tan}[c+d\,x]^2\right)\left(b^2-a^2\left(1+\mathrm{Tan}[c+d\,x]^2\right)\right)^2\right)+$$

$$\left(12\,a^5\left(a^2-b^2\right)C\,\mathrm{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),1,\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2,\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\right.$$

$$\left.\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]^2\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Big/$$

$$\left(b^3\left(-3\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),1,\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1+m\right),2,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\left(-1+m\right)\mathrm{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\mathrm{Tan}[c+d\,x]^2\right)\left(-b^2+a^2\left(1+\mathrm{Tan}[c+d\,x]^2\right)\right)^2\right)+$$

$$\left(6\,a^2\,A\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right.$$

$$\left.\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]^2\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{-m/2}\right)\Big/$$

$$\left(\left(-3\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)m\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\mathrm{Tan}[c+d\,x]^2\right)\left(-b^2+a^2\left(1+\mathrm{Tan}[c+d\,x]^2\right)\right)^2\right)-$$

$$\left(6 a^4 \left(a^2-b^2\right) C \,\text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\right) \Big/ \left(b^2 \left(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\right) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)^2\right) -$$

$$\left(12 a^3 \left(a^2-b^2\right) C \left(\frac{1}{2}-\frac{m}{2}\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-\frac{1}{2}-\frac{m}{2}}\right) \Big/ \left(b^3 \left(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right)(-1+m) \text{AppellF1}\left[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\right) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\right) -$$

$$\left(6 a^3 \left(a^2-b^2\right) C \,\text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \text{Sec}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right) \Big/ \left(b^3 \left(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right)(-1+m) \text{AppellF1}\left[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\right) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\right) -$$

$$\left(6 a^3 \left(a^2-b^2\right) C \,\text{Tan}[c+d x] \left(-\frac{1}{3}(-1+m) \text{AppellF1}\left[\frac{3}{2}, 1+\frac{1}{2}(-1+m), 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x] + \frac{1}{3\left(-a^2+b^2\right)} 2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right]\right.\right.$$

$$\text{Sec}[c+d x]^2 \,\text{Tan}[c+d x]\Big) \left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Bigg) \Big/$$

$$\Bigg(b^3 \Bigg(-3 \left(a^2-b^2\right) \text{AppellF1}\Big[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\Bigg(2 a^2 \,\text{AppellF1}\Big[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\left(a^2-b^2\right)(-1+m) \,\text{AppellF1}\Big[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg) +$$

$$\Bigg(3 A \left(a^2-b^2\right) m \,\text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[c+d x]^2 \,\text{Tan}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-1-\frac{m}{2}}\Bigg) \Big/$$

$$\Bigg(\Bigg(-3 \left(a^2-b^2\right) \text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\Bigg(2 a^2 \,\text{AppellF1}\Big[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\left(a^2-b^2\right) m \,\text{AppellF1}\Big[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg) -$$

$$\Bigg(3 a^2 \left(a^2-b^2\right) C\, m \,\text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \,\text{Tan}[c+d x]^2}{-a^2+b^2}\Big]$$

$$\text{Sec}[c+d x]^2 \,\text{Tan}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-1-\frac{m}{2}}\Bigg) \Big/$$

$$\Bigg(b^2 \Bigg(-3 \left(a^2-b^2\right) \text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\Bigg(2 a^2 \,\text{AppellF1}\Big[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\left(a^2-b^2\right) m \,\text{AppellF1}\Big[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg) -$$

$$\Bigg(3 A \left(a^2-b^2\right) \text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg) \Big/$$

$$\Bigg(\Bigg(-3 \left(a^2-b^2\right) \text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\Bigg(2 a^2 \,\text{AppellF1}\Big[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \,\text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg) +$$

$$\Bigg(3 a^2 \left(a^2-b^2\right) C \,\text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right]$$

$$\text{Sec}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg) \Big/$$

$$\Bigg(b^2 \Bigg(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] +$$

$$\Bigg(2 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] +$$

$$\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg) -$$

$$\Bigg(3 A \left(a^2-b^2\right) \text{Tan}[c+d x] \Bigg(-\frac{1}{3} m \,\text{AppellF1}\left[\frac{3}{2}, 1+\frac{m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d x]^2 \text{Tan}[c+d x] - \frac{1}{3 \left(a^2-b^2\right)} 2 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2,\right.$$

$$\left.-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\Bigg) \left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg) \Big/$$

$$\Bigg(\Bigg(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] +$$

$$\Bigg(2 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) m$$

$$\text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg) \text{Tan}[c+d x]^2\Bigg)$$

$$\left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg) + \Bigg(3 a^2 \left(a^2-b^2\right) C \,\text{Tan}[c+d x]$$

$$\Bigg(-\frac{1}{3} m \,\text{AppellF1}\left[\frac{3}{2}, 1+\frac{m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \text{Sec}[c+d x]^2$$

$$\text{Tan}[c+d x] + \frac{1}{3 \left(-a^2+b^2\right)} 2 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2,\right.$$

$$\left.\frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\Bigg) \left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg) \Big/$$

$$\Bigg(b^2 \Bigg(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] +$$

$$\Bigg(2 a^2 \,\text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] +$$

$$\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\left.\left.\mathrm{Tan}[c+d\,x]^2\right)\left(-b^2+a^2\left(1+\mathrm{Tan}[c+d\,x]^2\right)\right)\right)+\frac{1}{b^2}C\,\mathrm{Sec}[c+d\,x]^2$$

$$\left(-\mathrm{Hypergeometric2F1}\left[\frac{1}{2},1+\frac{m}{2},\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2\right]+\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{-1-\frac{m}{2}}\right)-\frac{1}{b^3}2$$

$$a\,C\,\mathrm{Sec}[c+d\,x]^2$$

$$\left(-\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}+\frac{m}{2},\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2\right]+\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{-\frac{1}{2}-\frac{m}{2}}\right)+$$

$$\left(6\,A\,b^2\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{1}{2},\frac{m}{2},2,\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right.$$

$$\mathrm{Tan}[c+d\,x]\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{-m/2}$$

$$\left(2\left(\left(a^2-b^2\right)m\,\mathrm{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},2,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left.4\,a^2\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{m}{2},3,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Sec}[c+d\,x]^2$$

$$\mathrm{Tan}[c+d\,x]-3\left(a^2-b^2\right)\left(-\frac{1}{3}m\,\mathrm{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},2,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,\right.\right.$$

$$\left.-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]-\frac{1}{3\left(a^2-b^2\right)}4\,a^2\,\mathrm{AppellF1}\left[\frac{3}{2},\right.$$

$$\left.\left.\frac{m}{2},3,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\right)+$$

$$\mathrm{Tan}[c+d\,x]^2\left(\left(a^2-b^2\right)m\left(-\frac{1}{5\left(a^2-b^2\right)}12\,a^2\,\mathrm{AppellF1}\left[\frac{5}{2},1+\frac{m}{2},3,\frac{7}{2},-\mathrm{Tan}[c+d\,x]^2,\right.\right.\right.$$

$$\left.-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]-\frac{6}{5}\left(1+\frac{m}{2}\right)\mathrm{AppellF1}\left[\frac{5}{2},2+\frac{m}{2},\right.$$

$$\left.\left.2,\frac{7}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\right)+$$

$$4\,a^2\left(-\frac{3}{5}m\,\mathrm{AppellF1}\left[\frac{5}{2},1+\frac{m}{2},3,\frac{7}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right.$$

$$\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]-\frac{1}{5\left(a^2-b^2\right)}18\,a^2\,\mathrm{AppellF1}\left[\frac{5}{2},\frac{m}{2},4,\frac{7}{2},\right.$$

$$\left.\left.\left.\left.\left.-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\right)\right)\right)\right)\Big/$$

$$\left(\left(\left(-3\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{1}{2},\frac{m}{2},2,\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.\right.$$

$$\left(\left(a^2-b^2\right)m\,\mathrm{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},2,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]+4\,a^2\right.$$

$$\left.\left.\mathrm{AppellF1}\left[\frac{3}{2},\frac{m}{2},3,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\mathrm{Tan}[c+d\,x]^2\right)^2$$

$$\left.\left(b^2-a^2\left(1+\mathrm{Tan}[c+d\,x]^2\right)\right)^2\right)+\left(6\,a^2\left(a^2-b^2\right)C\,\mathrm{AppellF1}\left[\frac{1}{2},\frac{m}{2},2,\frac{3}{2},\right.\right.$$

$$\left.-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\mathrm{Tan}[c+d\,x]\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{-m/2}$$

$$\Bigg(2\left(\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+4 a^2 \,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]-3\left(a^2-b^2\right)\left(-\frac{1}{3} m \,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]-\frac{1}{3\left(a^2-b^2\right)} 4 a^2 \,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\right)+\text{Tan}[c+d x]^2\left(\left(a^2-b^2\right) m\left(-\frac{1}{5\left(a^2-b^2\right)} 12 a^2 \,\text{AppellF1}\left[\frac{5}{2},1+\frac{m}{2},3,\frac{7}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]-\frac{6}{5}\left(1+\frac{m}{2}\right) \text{AppellF1}\left[\frac{5}{2},2+\frac{m}{2},2,\frac{7}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\right)+4 a^2\left(-\frac{3}{5} m \,\text{AppellF1}\left[\frac{5}{2},1+\frac{m}{2},3,\frac{7}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]-\frac{1}{5\left(a^2-b^2\right)} 18 a^2 \,\text{AppellF1}\left[\frac{5}{2},\frac{m}{2},4,\frac{7}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\right)\right)\right)\right)\Bigg) \Big/$$

$$\left(\left(\left(-3\left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2},\frac{m}{2},2,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+4 a^2 \,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},3,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\right)^2\left(b^2-a^2\left(1+\text{Tan}[c+d x]^2\right)\right)^2\right)+\left(6 a^3\left(a^2-b^2\right) C \,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[c+d x]^2,\frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right.\right.$$

$$\left(2\left(2 a^2 \,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)(-1+m) \,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]-3\left(a^2-b^2\right)\left(-\frac{1}{3}(-1+m) \,\text{AppellF1}\left[\frac{3}{2},1+\frac{1}{2}(-1+m),1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]-\frac{1}{3\left(a^2-b^2\right)}\right.\right.$$

$$2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2$$
$$\left.\text{Tan}[c+d x]\right) + \text{Tan}[c+d x]^2 \left(2 a^2 \left(-\frac{3}{5}(-1+m) \text{AppellF1}\left[\frac{5}{2}, 1+\frac{1}{2}(-1+m),\right.\right.\right.$$
$$\left.2, \frac{7}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x] -$$
$$\frac{1}{5\left(a^2-b^2\right)} 12 a^2 \text{AppellF1}\left[\frac{5}{2}, \frac{1}{2}(-1+m), 3, \frac{7}{2}, -\text{Tan}[c+d x]^2,\right.$$
$$\left.\left.-\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\right) + \left(a^2-b^2\right)(-1+m)$$
$$\left(-\frac{1}{5\left(a^2-b^2\right)} 6 a^2 \text{AppellF1}\left[\frac{5}{2}, \frac{1+m}{2}, 2, \frac{7}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right.$$
$$\text{Sec}[c+d x]^2 \text{Tan}[c+d x] - \frac{3}{5}(1+m) \text{AppellF1}\left[\frac{5}{2}, 1+\frac{1+m}{2}, 1, \frac{7}{2},\right.$$
$$\left.\left.\left.\left.\left.-\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\right)\right)\right)\right)\Big/$$
$$\left(b^3 \left(-3\left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] +\right.\right.$$
$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right)\right.$$
$$\left.(-1+m) \text{AppellF1}\left[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\text{Tan}[c+d x]^2\right)^2 \left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\right) -$$
$$\left(6 a A b \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 2, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right.$$
$$\text{Tan}[c+d x] \left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}$$
$$\left(2\left(4 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 3, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] +\right.\right.$$
$$\left.\left(a^2-b^2\right)(-1+m) \text{AppellF1}\left[\frac{3}{2}, \frac{1+m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)$$
$$\text{Sec}[c+d x]^2 \text{Tan}[c+d x] - 3\left(a^2-b^2\right)\left(-\frac{1}{3}(-1+m) \text{AppellF1}\left[\frac{3}{2}, 1+\frac{1}{2}(-1+m),\right.\right.$$
$$\left.2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x] - \frac{1}{3\left(a^2-b^2\right)}$$
$$4 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 3, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2$$
$$\left.\text{Tan}[c+d x]\right) + \text{Tan}[c+d x]^2 \left(4 a^2 \left(-\frac{3}{5}(-1+m) \text{AppellF1}\left[\frac{5}{2}, 1+\frac{1}{2}(-1+m),\right.\right.\right.$$
$$\left.3, \frac{7}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x] -$$

$$\frac{1}{5\left(a^2-b^2\right)}18\,a^2\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}\left(-1+m\right),4,\frac{7}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Bigg)+\left(a^2-b^2\right)\left(-1+m\right)$$

$$\left(-\frac{1}{5\left(a^2-b^2\right)}12\,a^2\,\text{AppellF1}\left[\frac{5}{2},\frac{1+m}{2},3,\frac{7}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right.$$

$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-\frac{3}{5}\left(1+m\right)\text{AppellF1}\left[\frac{5}{2},1+\frac{1+m}{2},2,\frac{7}{2},\right.$$

$$\left.\left.-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),2,\frac{3}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+$$

$$\left(4\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1+m\right),3,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)\right.$$

$$\left.\left(-1+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$

$$\text{Tan}[c+d\,x]^2\Bigg)^2\left(b^2-a^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)^2\Bigg)-$$

$$\Bigg(6\,a^3\left(a^2-b^2\right)C\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),2,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]$$

$$\text{Tan}[c+d\,x]\left(1+\text{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}$$

$$\Bigg(2\left(4\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1+m\right),3,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\left(-1+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$

$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-3\left(a^2-b^2\right)\left(-\frac{1}{3}\left(-1+m\right)\text{AppellF1}\left[\frac{3}{2},1+\frac{1}{2}\left(-1+m\right),\right.\right.$$

$$2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Bigg]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-\frac{1}{3\left(a^2-b^2\right)}$$

$$4\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1+m\right),3,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2$$

$$\left.\text{Tan}[c+d\,x]\right)+\text{Tan}[c+d\,x]^2\left(4\,a^2\left(-\frac{3}{5}\left(-1+m\right)\text{AppellF1}\left[\frac{5}{2},1+\frac{1}{2}\left(-1+m\right),\right.\right.\right.$$

$$3,\frac{7}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\Bigg]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-$$

$$\frac{1}{5\left(a^2-b^2\right)}18\,a^2\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}\left(-1+m\right),4,\frac{7}{2},-\text{Tan}[c+d\,x]^2,\right.$$

$$\left.-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Bigg)+\left(a^2-b^2\right)\left(-1+m\right)$$

$$\left(-\frac{1}{5\left(a^2-b^2\right)}12\,a^2\,\text{AppellF1}\left[\frac{5}{2},\frac{1+m}{2},3,\frac{7}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right.$$

$$\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]-\frac{3}{5}\left(1+m\right)\mathrm{AppellF1}\Big[\frac{5}{2},\,1+\frac{1+m}{2},\,2,\,\frac{7}{2},$$

$$-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(b\,\Bigg(-3\,\left(a^2-b^2\right)\mathrm{AppellF1}\Big[\frac{1}{2},\,\frac{1}{2}\,\left(-1+m\right),\,2,\,\frac{3}{2},\,-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+$$

$$\Bigg(4\,a^2\,\mathrm{AppellF1}\Big[\frac{3}{2},\,\frac{1}{2}\,\left(-1+m\right),\,3,\,\frac{5}{2},\,-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+\left(a^2-b^2\right)$$

$$\left(-1+m\right)\mathrm{AppellF1}\Big[\frac{3}{2},\,\frac{1+m}{2},\,2,\,\frac{5}{2},\,-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\Bigg)$$

$$\mathrm{Tan}[c+d\,x]^2\Bigg)^2\,\left(b^2-a^2\,\left(1+\mathrm{Tan}[c+d\,x]^2\right)\right)^2\Bigg)+$$

$$\Bigg(3\,A\,\left(a^2-b^2\right)\mathrm{AppellF1}\Big[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]$$

$$\mathrm{Tan}[c+d\,x]\,\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{-m/2}$$

$$\Bigg(2\,\Bigg(2\,a^2\,\mathrm{AppellF1}\Big[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\,-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+\left(a^2-b^2\right)m\,\mathrm{AppellF1}\Big[$$

$$\frac{3}{2},\,\frac{2+m}{2},\,1,\,\frac{5}{2},\,-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\Bigg)\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]-$$

$$3\,\left(a^2-b^2\right)\,\Bigg(-\frac{1}{3}\,m\,\mathrm{AppellF1}\Big[\frac{3}{2},\,1+\frac{m}{2},\,1,\,\frac{5}{2},\,-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]$$

$$\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]-\frac{1}{3\,\left(a^2-b^2\right)}2\,a^2\,\mathrm{AppellF1}\Big[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},$$

$$-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\Bigg)+$$

$$\mathrm{Tan}[c+d\,x]^2\,\Bigg(2\,a^2\,\Bigg(-\frac{3}{5}\,m\,\mathrm{AppellF1}\Big[\frac{5}{2},\,1+\frac{m}{2},\,2,\,\frac{7}{2},\,-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]$$

$$\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]-\frac{1}{5\,\left(a^2-b^2\right)}12\,a^2\,\mathrm{AppellF1}\Big[\frac{5}{2},\,\frac{m}{2},\,3,\,\frac{7}{2},$$

$$-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\Bigg)+\left(a^2-b^2\right)m$$

$$\Bigg(-\frac{1}{5\,\left(a^2-b^2\right)}6\,a^2\,\mathrm{AppellF1}\Big[\frac{5}{2},\,\frac{2+m}{2},\,2,\,\frac{7}{2},\,-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]$$

$$\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]-\frac{3}{5}\left(2+m\right)\mathrm{AppellF1}\Big[\frac{5}{2},\,1+\frac{2+m}{2},\,1,\,\frac{7}{2},$$

$$-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\,\left(a^2-b^2\right)\mathrm{AppellF1}\Big[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+$$

$$\Bigg(2\,a^2\,\mathrm{AppellF1}\Big[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\,-\mathrm{Tan}[c+d\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]+\left(a^2-b^2\right)m$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Big)\,\text{Tan}[c+d x]^2\Big)^2$$

$$\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Big)-\Big(3\,a^2\left(a^2-b^2\right)C\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},\right.$$

$$\left.-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]\text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}$$

$$\Big(2\Big(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)m\,\text{AppellF1}\Big[$$

$$\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Big)\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]-$$

$$3\left(a^2-b^2\right)\Big(-\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]-\frac{1}{3\left(a^2-b^2\right)}2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},\right.$$

$$\left.-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\Big)+$$

$$\text{Tan}[c+d x]^2\Big(2\,a^2\Big(-\frac{3}{5}m\,\text{AppellF1}\left[\frac{5}{2},1+\frac{m}{2},2,\frac{7}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]-\frac{1}{5\left(a^2-b^2\right)}12\,a^2\,\text{AppellF1}\left[\frac{5}{2},\frac{m}{2},3,\frac{7}{2},\right.$$

$$\left.-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\Big)+\left(a^2-b^2\right)m$$

$$\Big(-\frac{1}{5\left(a^2-b^2\right)}6\,a^2\,\text{AppellF1}\left[\frac{5}{2},\frac{2+m}{2},2,\frac{7}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]-\frac{3}{5}(2+m)\,\text{AppellF1}\left[\frac{5}{2},1+\frac{2+m}{2},1,\frac{7}{2},\right.$$

$$\left.-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Big(b^2\Big(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Big(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)$$

$$m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Big)$$

$$\text{Tan}[c+d x]^2\Big)^2\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Big)\Big)\Big)$$

Problem 773: Result more than twice size of optimal antiderivative.

$$\int(a+b\,\text{Cos}[c+d x])\left(B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]^2\,dx$$

Optimal (type 3, 35 leaves, 5 steps):

$$(b B + a C)\, x + \frac{a B \,\text{ArcTanh}[\text{Sin}[c + d x]]}{d} + \frac{b C \,\text{Sin}[c + d x]}{d}$$

Result (type 3, 104 leaves):

$$b B x + a C x - \frac{a B \,\text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{a B \,\text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{b C \,\text{Cos}[d x]\, \text{Sin}[c]}{d} + \frac{b C \,\text{Cos}[c]\, \text{Sin}[d x]}{d}$$

Problem 774: Result more than twice size of optimal antiderivative.

$$\int (a + b \,\text{Cos}[c + d x]) \left(B \,\text{Cos}[c + d x] + C \,\text{Cos}[c + d x]^2\right) \text{Sec}[c + d x]^3 \, dx$$

Optimal (type 3, 35 leaves, 5 steps):

$$b C x + \frac{(b B + a C)\, \text{ArcTanh}[\text{Sin}[c + d x]]}{d} + \frac{a B \,\text{Tan}[c + d x]}{d}$$

Result (type 3, 159 leaves):

$$b C x - \frac{b B \,\text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} - \frac{a C \,\text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{b B \,\text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{a C \,\text{Log}\left[\text{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \text{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{a B \,\text{Tan}[c + d x]}{d}$$

Problem 775: Result more than twice size of optimal antiderivative.

$$\int (a + b \,\text{Cos}[c + d x]) \left(B \,\text{Cos}[c + d x] + C \,\text{Cos}[c + d x]^2\right) \text{Sec}[c + d x]^4 \, dx$$

Optimal (type 3, 61 leaves, 7 steps):

$$\frac{(a B + 2 b C)\, \text{ArcTanh}[\text{Sin}[c + d x]]}{2 d} + \frac{(b B + a C)\, \text{Tan}[c + d x]}{d} + \frac{a B \,\text{Sec}[c + d x]\, \text{Tan}[c + d x]}{2 d}$$

Result (type 3, 164 leaves):

$$\frac{1}{4d}\left(-2\,(a B+2 b C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+2 a B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+4 b C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\frac{a B}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{a B}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+4\,(b B+a C)\,\text{Tan}[c+d x]\right)$$

Problem 777: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d x])\,\left(B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\,\text{Sec}[c+d x]^6\,dx$$

Optimal (type 3, 114 leaves, 8 steps):

$$\frac{(3 a B+4 b C)\,\text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{(b B+a C)\,\text{Tan}[c+d x]}{d}+\frac{(3 a B+4 b C)\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{8 d}+\frac{a B\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{4 d}+\frac{(b B+a C)\,\text{Tan}[c+d x]^3}{3 d}$$

Result (type 3, 403 leaves):

$$-\frac{3 a B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}-\frac{b C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2 d}+\frac{3 a B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+\frac{b C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{2 d}+\frac{a B}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{3 a B}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{b C}{4 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{a B}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}-\frac{3 a B}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{b C}{4 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{2 b B\,\text{Tan}[c+d x]}{3 d}+\frac{2 a C\,\text{Tan}[c+d x]}{3 d}+\frac{b B\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{3 d}+\frac{a C\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{3 d}$$

Problem 783: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d x])^2\,\left(B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\,\text{Sec}[c+d x]^4\,dx$$

Optimal (type 3, 80 leaves, 5 steps):

$$b^2 C x+\frac{\left(a^2 B+2 b^2 B+4 a b C\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{a (2 b B+a C) \text{Tan}[c+d x]}{d}+\frac{a^2 B \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}$$

Result (type 3, 225 leaves):

$$\frac{1}{4 d}\left(4 b^2 c C+4 b^2 C d x-2 \left(a^2 B+2 b^2 B+4 a b C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+2 a^2 B \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+4 b^2 B \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+8 a b C \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\frac{a^2 B}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}-\frac{a^2 B}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+4 a (2 b B+a C) \text{Tan}[c+d x]\right)$$

Problem 785: Result more than twice size of optimal antiderivative.

$$\int (a+b \text{Cos}[c+d x])^2 \left(B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]^6 \, dx$$

Optimal (type 3, 156 leaves, 8 steps):

$$\frac{\left(3 a^2 B+4 b^2 B+8 a b C\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{\left(4 a b B+2 a^2 C+3 b^2 C\right) \text{Tan}[c+d x]}{3 d}+\frac{\left(3 a^2 B+4 b^2 B+8 a b C\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{8 d}+\frac{a (2 b B+a C) \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 d}+\frac{a^2 B \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{4 d}$$

Result (type 3, 457 leaves):

$$\frac{1}{48\,d}\left(-6\,\left(3\,a^2\,B+4\,b^2\,B+8\,a\,b\,C\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+6\,\left(3\,a^2\,B+4\,b^2\,B+8\,a\,b\,C\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\frac{3\,a^2\,B}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{12\,b^2\,B+8\,a\,b\,(B+3\,C)+a^2\,(9\,B+4\,C)}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{8\,a\,(2\,b\,B+a\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+\frac{16\,\left(4\,a\,b\,B+2\,a^2\,C+3\,b^2\,C\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}-\frac{3\,a^2\,B}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{8\,a\,(2\,b\,B+a\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}-\frac{12\,b^2\,B+8\,a\,b\,(B+3\,C)+a^2\,(9\,B+4\,C)}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{16\,\left(4\,a\,b\,B+2\,a^2\,C+3\,b^2\,C\right)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}\right)$$

Problem 790: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])^3\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 3, 124 leaves, 6 steps):

$$b^2\,(b\,B+3\,a\,C)\,x+\frac{a\,\left(a^2\,B+6\,b^2\,B+6\,a\,b\,C\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}-\frac{b^2\,(a\,B-2\,b\,C)\,\text{Sin}[c+d\,x]}{2\,d}+\frac{a^2\,(2\,b\,B+a\,C)\,\text{Tan}[c+d\,x]}{d}+\frac{a\,B\,(a+b\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 277 leaves):

$$\frac{1}{4\,d}\left(4\,b^2\,(b\,B+3\,a\,C)\,(c+d\,x)-2\,a\,\left(a^2\,B+6\,b^2\,B+6\,a\,b\,C\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+2\,a\,\left(a^2\,B+6\,b^2\,B+6\,a\,b\,C\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\frac{a^3\,B}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{4\,a^2\,(3\,b\,B+a\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}-\frac{a^3\,B}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{4\,a^2\,(3\,b\,B+a\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}+4\,b^3\,C\,\text{Sin}[c+d\,x]\right)$$

Problem 791: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])^3\,(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2)\,\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 3, 145 leaves, 6 steps):

$$b^3\,C\,x+\frac{(3\,a^2\,b\,B+2\,b^3\,B+a^3\,C+6\,a\,b^2\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{a\,(2\,a^2\,B+8\,b^2\,B+9\,a\,b\,C)\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a^2\,(5\,b\,B+3\,a\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{6\,d}+\frac{a\,B\,(a+b\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 392 leaves):

$$\frac{1}{12\,d}\left(12\,b^3\,C\,(c+d\,x)-6\,(3\,a^2\,b\,B+2\,b^3\,B+a^3\,C+6\,a\,b^2\,C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+6\,(3\,a^2\,b\,B+2\,b^3\,B+a^3\,C+6\,a\,b^2\,C)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\frac{a^2\,(9\,b\,B+a\,(B+3\,C))}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{2\,a^3\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+\frac{4\,a\,(2\,a^2\,B+9\,b^2\,B+9\,a\,b\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}+\frac{2\,a^3\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}-\frac{a^2\,(9\,b\,B+a\,(B+3\,C))}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{4\,a\,(2\,a^2\,B+9\,b^2\,B+9\,a\,b\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}\right)$$

Problem 792: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])^3\,(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2)\,\text{Sec}[c+d\,x]^6\,dx$$

Optimal (type 3, 188 leaves, 8 steps):

$$\frac{(3\,a^3\,B+12\,a\,b^2\,B+12\,a^2\,b\,C+8\,b^3\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{(6\,a^2\,b\,B+3\,b^3\,B+2\,a^3\,C+9\,a\,b^2\,C)\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,(3\,a^2\,B+10\,b^2\,B+12\,a\,b\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{a^2\,(3\,b\,B+2\,a\,C)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{6\,d}+\frac{a\,B\,(a+b\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 639 leaves):

$$\frac{1}{8 d}\left(-3 a^3 B-12 a b^2 B-12 a^2 b C-8 b^3 C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$\frac{1}{8 d}\left(3 a^3 B+12 a b^2 B+12 a^2 b C+8 b^3 C\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$\frac{a^3 B}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{9 a^3 B+12 a^2 b B+36 a b^2 B+4 a^3 C+36 a^2 b C}{48 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-$$
$$\frac{a^3 B}{16 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{-9 a^3 B-12 a^2 b B-36 a b^2 B-4 a^3 C-36 a^2 b C}{48 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\frac{3 a^2 b B \text{Sin}\left[\frac{1}{2}(c+d x)\right]+a^3 C \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{6 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+\frac{3 a^2 b B \text{Sin}\left[\frac{1}{2}(c+d x)\right]+a^3 C \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{6 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$
$$\left(6 a^2 b B \text{Sin}\left[\frac{1}{2}(c+d x)\right]+3 b^3 B \text{Sin}\left[\frac{1}{2}(c+d x)\right]+2 a^3 C \text{Sin}\left[\frac{1}{2}(c+d x)\right]+\right.$$
$$\left.9 a b^2 C \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\Big/\left(3 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+$$
$$\left(6 a^2 b B \text{Sin}\left[\frac{1}{2}(c+d x)\right]+3 b^3 B \text{Sin}\left[\frac{1}{2}(c+d x)\right]+2 a^3 C \text{Sin}\left[\frac{1}{2}(c+d x)\right]+\right.$$
$$\left.9 a b^2 C \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\Big/\left(3 d\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)$$

Problem 800: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]^4}{a+b \text{Cos}[c+d x]} \, dx$$

Optimal (type 3, 143 leaves, 7 steps):

$$-\frac{2 b^2 (b B-a C) \text{ArcTan}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]}{a^3 \sqrt{a-b} \sqrt{a+b} d}+\frac{\left(a^2 B+2 b^2 B-2 a b C\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 a^3 d}-$$
$$\frac{(b B-a C) \text{Tan}[c+d x]}{a^2 d}+\frac{B \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 a d}$$

Result (type 3, 300 leaves):

$$\frac{1}{4 a^3 d}\left(\frac{8 b^2 (b B - a C)\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{-a^2+b^2}}\right]}{\sqrt{-a^2+b^2}} - 2\left(a^2 B + 2 b^2 B - 2 a b C\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right] - \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] + 2\left(a^2 B + 2 b^2 B - 2 a b C\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right] + \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] + \frac{a^2 B}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right] - \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2} + \frac{4 a (-b B + a C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\text{Cos}\left[\frac{1}{2}(c+d x)\right] - \text{Sin}\left[\frac{1}{2}(c+d x)\right]} - \frac{a^2 B}{\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right] + \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2} + \frac{4 a (-b B + a C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\text{Cos}\left[\frac{1}{2}(c+d x)\right] + \text{Sin}\left[\frac{1}{2}(c+d x)\right]}\right)$$

Problem 818: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \sqrt{a + b\,\text{Cos}[c + d x]}\,\left(B\,\text{Cos}[c + d x] + C\,\text{Cos}[c + d x]^2\right)\text{Sec}[c + d x]^3\,dx$$

Optimal (type 4, 213 leaves, 10 steps):

$$-\frac{B\sqrt{a+b\,\text{Cos}[c+d x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{d\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{a+b}}} + \frac{(a B + 2 b C)\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{d\sqrt{a+b\,\text{Cos}[c+d x]}} + \frac{(b B + 2 a C)\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{a+b}}\;\text{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{d\sqrt{a+b\,\text{Cos}[c+d x]}} + \frac{B\sqrt{a+b\,\text{Cos}[c+d x]}\;\text{Tan}[c+d x]}{d}$$

Result (type 4, 484 leaves):

$$\frac{1}{4\,d}\left(\frac{8\,b\,C\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\,(b\,B+4\,a\,C)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\left(2\,i\,b\,B\,\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(2\,a\,(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},\,i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\,\text{Sin}[c+d\,x]\Bigg)\Bigg/$$

$$\left(a\,\sqrt{-\frac{1}{a+b}}\;\sqrt{1-\text{Cos}[c+d\,x]^2}\;\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\text{Cos}[c+d\,x])+(a+b\,\text{Cos}[c+d\,x])^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\text{Cos}[c+d\,x])+2\,(a+b\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{B\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Tan}[c+d\,x]}{d}$$

Problem 819: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 4, 292 leaves, 11 steps):

$$-\frac{(b B+4 a C) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{4 a d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}}+$$

$$\frac{(3 b B+4 a C) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{4 d \sqrt{a+b \operatorname{Cos}[c+d x]}}+$$

$$\frac{\left(4 a^2 B-b^2 B+4 a b C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{4 a d \sqrt{a+b \operatorname{Cos}[c+d x]}}+$$

$$\frac{(b B+4 a C) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Tan}[c+d x]}{4 a d}+\frac{B \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 d}$$

Result (type 4, 552 leaves) :

$$
\begin{aligned}
&\frac{1}{16\,a\,d}\left(\frac{8\,a\,b\,B\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.\\
&\left(2\,\left(8\,a^2\,B-3\,b^2\,B+4\,a\,b\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\\
&\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(2\,\mathrm{i}\,\left(-b^2\,B-4\,a\,b\,C\right)\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\right.\\
&\quad\text{Cos}[2\,(c+d\,x)]\left(2\,a\,(a-b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.\\
&\quad\quad b\left(2\,a\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.\\
&\quad\quad\quad\left.\left.\left.\frac{a+b}{a},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\Bigg/\\
&\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\text{Cos}[c+d\,x])+(a+b\,\text{Cos}[c+d\,x])^2}{b^2}}\right.\\
&\quad\left.\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\text{Cos}[c+d\,x])+2\,(a+b\,\text{Cos}[c+d\,x])^2\right)\right)\right)\right)+\\
&\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{\text{Sec}[c+d\,x]\,\left(b\,B\,\text{Sin}[c+d\,x]+4\,a\,C\,\text{Sin}[c+d\,x]\right)}{4\,a}+\right.\\
&\quad\left.\frac{1}{2}\,B\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)
\end{aligned}
$$

Problem 823: Result unnecessarily involves imaginary or complex numbers.

$$\int (a+b\,\text{Cos}[c+d\,x])^{3/2}\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^2\,dx$$

Optimal (type 4, 236 leaves, 10 steps):

$$\frac{2\left(3\,b\,B+4\,a\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{3\,d\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{2\left(3\,a\,b\,B-a^2\,C+b^2\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{3\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{2\,a^2\,B\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{d\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{2\,b\,C\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 406 leaves):

$$\frac{1}{6\,d}\left(\frac{4\left(6\,a\,b\,B+3\,a^2\,C+b^2\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\left(6\,a^2\,B+3\,b^2\,B+4\,a\,b\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{1}{a\,b\sqrt{-\frac{1}{a+b}}}$$

$$2\,i\left(3\,b\,B+4\,a\,C\right)\sqrt{-\frac{b\left(-1+\text{Cos}[c+d\,x]\right)}{a+b}}\sqrt{\frac{b\left(1+\text{Cos}[c+d\,x]\right)}{-a+b}}\;\text{Csc}[c+d\,x]$$

$$\left(-2\,a\left(a-b\right)\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$b\left(-2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$\left.\left.b\,\text{EllipticPi}\left[\frac{a+b}{a},i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)+$$

$$\left.4\,b\,C\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]\right)$$

Problem 824: Result unnecessarily involves imaginary or complex numbers.

$$\int (a + b \operatorname{Cos}[c + d x])^{3/2} \left(B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^3 \, dx$$

Optimal (type 4, 232 leaves, 10 steps):

$$-\frac{(a B - 2 b C) \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}} + \frac{\left(a^2 B + 2 b^2 B + 2 a b C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{a (3 b B + 2 a C) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{a B \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Tan}[c + d x]}{d}$$

Result (type 4, 398 leaves):

$$\frac{1}{4\,d}\left(\frac{8\,b\,\left(b\,B+2\,a\,C\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\left(5\,a\,b\,B+4\,a^2\,C+2\,b^2\,C\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\,\frac{1}{2}\,\left(c+d\,x\right),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{1}{a\,b\,\sqrt{-\frac{1}{a+b}}}$$

$$2\,\mathrm{i}\,\left(-a\,B+2\,b\,C\right)\,\sqrt{-\frac{b\,\left(-1+\text{Cos}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{b\,\left(1+\text{Cos}[c+d\,x]\right)}{-a+b}}\,\text{Csc}[c+d\,x]$$

$$\left(-2\,a\,\left(a-b\right)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\,\left(-2\,a\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$\left.\left.b\,\text{EllipticPi}\left[\frac{a+b}{a},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\right],\,\frac{a+b}{a-b}\right]\right)\right)+$$

$$\left.4\,a\,B\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Tan}[c+d\,x]\right)$$

Problem 825: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 4, 295 leaves, 11 steps):

$$-\frac{(5 b B+4 a C) \sqrt{a+b \text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]}{4 d \sqrt{\frac{a+b \text{Cos}[c+d x]}{a+b}}}+$$

$$\frac{\left(7 a b B+4 a^2 C+8 b^2 C\right) \sqrt{\frac{a+b \text{Cos}[c+d x]}{a+b}} \text{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]}{4 d \sqrt{a+b \text{Cos}[c+d x]}}+$$

$$\left(\left(4 a^2 B+3 b^2 B+12 a b C\right) \sqrt{\frac{a+b \text{Cos}[c+d x]}{a+b}} \text{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/$$

$$\left(4 d \sqrt{a+b \text{Cos}[c+d x]}\right)+\frac{(5 b B+4 a C) \sqrt{a+b \text{Cos}[c+d x]} \text{Tan}[c+d x]}{4 d}+$$

$$\frac{a B \sqrt{a+b \text{Cos}[c+d x]} \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}$$

Result (type 4, 556 leaves):

$$\frac{1}{16\,d}\left(\frac{2\left(4\,a\,b\,B+16\,b^2\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\left(2\left(8\,a^2\,B+b^2\,B+20\,a\,b\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,\mathrm{i}\left(-5\,b^2\,B-4\,a\,b\,C\right)\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\right.$$

$$\mathrm{Cos}[2\left(c+d\,x\right)]\left(2\,a\left(a-b\right)\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\right[$$

$$\left.\left.\left.\frac{a+b}{a},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+2\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2\right)\right)\right)+$$

$$\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\left(\frac{1}{4}\,\mathrm{Sec}[c+d\,x]\left(5\,b\,B\,\mathrm{Sin}[c+d\,x]+4\,a\,C\,\mathrm{Sin}[c+d\,x]\right)+\right.$$
$$\left.\frac{1}{2}\,a\,B\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 826: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\left(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\mathrm{Sec}[c+d\,x]^5\,dx$$

Optimal (type 4, 375 leaves, 12 steps):

$$-\left(\left(\left(16 a^2 B+3 b^2 B+30 a b C\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(24 a d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)\right)+$$

$$\left(\left(16 a^2 B+17 b^2 B+42 a b C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/$$

$$\left(24 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+$$

$$\left(\left(12 a^2 b B-b^3 B+8 a^3 C+6 a b^2 C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/$$

$$\left(8 a d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\frac{\left(16 a^2 B+3 b^2 B+30 a b C\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Tan}[c+d x]}{24 a d}+$$

$$\frac{(7 b B+6 a C) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{12 d}+$$

$$\frac{a B \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 d}$$

Result (type 4, 634 leaves) :

$$\frac{1}{96\,a\,d}\left(\frac{2\left(28\,a\,b^2\,B+24\,a^2\,b\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\left(56\,a^2\,b\,B-9\,b^3\,B+48\,a^3\,C+6\,a\,b^2\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right.$$

$$\left.\text{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(2\,i\left(-16\,a^2\,b\,B-3\,b^3\,B-30\,a\,b^2\,C\right)\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\right.$$

$$\text{Cos}\left[2\left(c+d\,x\right)\right]\left(2\,a\left(a-b\right)\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\left.\frac{a+b}{a},i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\text{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\left(a+b\,\text{Cos}[c+d\,x]\right)+\left(a+b\,\text{Cos}[c+d\,x]\right)^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\left(a+b\,\text{Cos}[c+d\,x]\right)+2\left(a+b\,\text{Cos}[c+d\,x]\right)^2\right)\right)\right)+\frac{1}{d}$$

$$\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{1}{12}\text{Sec}[c+d\,x]^2\left(7\,b\,B\,\text{Sin}[c+d\,x]+6\,a\,C\,\text{Sin}[c+d\,x]\right)+\frac{1}{24\,a}\right.$$
$$\text{Sec}[c+d\,x]\left(16\,a^2\,B\,\text{Sin}[c+d\,x]+3\,b^2\,B\,\text{Sin}[c+d\,x]+30\,a\,b\,C\,\text{Sin}[c+d\,x]\right)+$$
$$\left.\frac{1}{3}\,a\,B\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)$$

Problem 830: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^2\,dx$$

Optimal (type 4, 292 leaves, 11 steps):

$$\left(2\left(35\,a\,b\,B+23\,a^2\,C+9\,b^2\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/$$
$$\left(15\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)+$$
$$\left(2\left(10\,a^2\,b\,B+5\,b^3\,B-8\,a^3\,C+8\,a\,b^2\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/$$
$$\left(15\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{2\,a^3\,B\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$
$$\frac{2\,b\left(5\,b\,B+8\,a\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{15\,d}+\frac{2\,b\,C\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 4, 453 leaves) :

$$\frac{1}{30\,d}\left(\left(4\left(45\,a^2\,b\,B+5\,b^3\,B+15\,a^3\,C+17\,a\,b^2\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\right.$$

$$\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\left(2\left(30\,a^3\,B+35\,a\,b^2\,B+23\,a^2\,b\,C+9\,b^3\,C\right)\right.$$

$$\left.\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+$$

$$\frac{1}{a\,b\,\sqrt{-\frac{1}{a+b}}}\,2\,\mathrm{i}\,\left(35\,a\,b\,B+23\,a^2\,C+9\,b^2\,C\right)\sqrt{-\frac{b\,(-1+\text{Cos}[c+d\,x])}{a+b}}\;\sqrt{-\frac{b\,(1+\text{Cos}[c+d\,x])}{a-b}}$$

$$\text{Csc}[c+d\,x]\left(-2\,a\,(a-b)\;\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$b\left(-2\,a\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$\left.\left.b\,\text{EllipticPi}\left[\frac{a+b}{a},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)+$$

$$\left.4\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\left(5\,b\,B+11\,a\,C+3\,b\,C\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]\right)$$

Problem 831: Result unnecessarily involves imaginary or complex numbers.

$$\int(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 4, 296 leaves, 11 steps):

$$-\left(\left(\left(3 a^2 B-6 b^2 B-14 a b C\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(3 d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)\right)+$$

$$\left(\left(3 a^3 B+12 a b^2 B+4 a^2 b C+2 b^3 C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(3 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+$$

$$\frac{a^2 (5 b B+2 a C) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{d \sqrt{a+b \operatorname{Cos}[c+d x]}}-$$

$$\frac{b (3 a B-2 b C) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{3 d}+$$

$$\frac{a B (a+b \operatorname{Cos}[c+d x])^{3/2} \operatorname{Tan}[c+d x]}{d}$$

Result (type 4, 560 leaves) :

$$\frac{1}{12\,d}\left(\left(\left(2\left(36\,a\,b^2\,B+36\,a^2\,b\,C+4\,b^3\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\left(2\left(27\,a^2\,b\,B+6\,b^3\,B+12\,a^3\,C+14\,a\,b^2\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,\mathrm{i}\left(-3\,a^2\,b\,B+6\,b^3\,B+14\,a\,b^2\,C\right)\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}[2\left(c+d\,x\right)]\left(2\,a\left(a-b\right)\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2}{b^2}}\left(2\,a^2-b^2-4\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+2\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2\right)\right)\right)+$$

$$\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\left(\frac{2}{3}\,b^2\,C\,\mathrm{Sin}[c+d\,x]+a^2\,B\,\mathrm{Tan}[c+d\,x]\right)}{d}$$

Problem 832: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{5/2}\left(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\mathrm{Sec}[c+d\,x]^4\,dx$$

Optimal (type 4, 315 leaves, 11 steps):

$$-\left(\left(\left(9\,a\,b\,B+4\,a^2\,C-8\,b^2\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(4\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)\right)+$$

$$\left(\left(11\,a^2\,b\,B+8\,b^3\,B+4\,a^3\,C+16\,a\,b^2\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(4\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+$$

$$\left(a\,\left(4\,a^2\,B+15\,b^2\,B+20\,a\,b\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(4\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{a\,(7\,b\,B+4\,a\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Tan}[c+d\,x]}{4\,d}+$$

$$\frac{a\,B\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 4, 589 leaves) :

$$\frac{1}{16\,d}\left(\left(2\,\left(4\,a^2\,b\,B+16\,b^3\,B+48\,a\,b^2\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\left(2\,\left(8\,a^3\,B+21\,a\,b^2\,B+36\,a^2\,b\,C+8\,b^3\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(2\,i\,\left(-9\,a\,b^2\,B-4\,a^2\,b\,C+8\,b^3\,C\right)\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}[2\,(c+d\,x)]\left(2\,a\,(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\frac{a+b}{a},i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\text{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\text{Cos}[c+d\,x])+(a+b\,\text{Cos}[c+d\,x])^2}{b^2}}\left(2\,a^2-b^2-4\,a\,(a+b\,\text{Cos}[c+d\,x])+2\,(a+b\,\text{Cos}[c+d\,x])^2\right)\right)\right)+\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{1}{4}\,\text{Sec}[c+d\,x]\,(9\,a\,b\,B\,\text{Sin}[c+d\,x]+4\,a^2\,C\,\text{Sin}[c+d\,x])+\frac{1}{2}\,a^2\,B\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)$$

Problem 833: Result unnecessarily involves imaginary or complex numbers.

$$\int(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 4, 376 leaves, 12 steps):

$$-\left(\left(\left(16 a^2 B+33 b^2 B+54 a b C\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(24 d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)\right)+$$

$$\left(\left(16 a^3 B+59 a b^2 B+66 a^2 b C+48 b^3 C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(24 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+$$

$$\left(\left(20 a^2 b B+5 b^3 B+8 a^3 C+30 a b^2 C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(8 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\frac{\left(16 a^2 B+33 b^2 B+54 a b C\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Tan}[c+d x]}{24 d}+$$

$$\frac{a(3 b B+2 a C) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{4 d}+$$

$$\frac{a B(a+b \operatorname{Cos}[c+d x])^{3/2} \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 d}$$

Result (type 4, 639 leaves) :

$$\frac{1}{96\,d}\left(\left(\left(2\left(52\,a\,b^2\,B+24\,a^2\,b\,C+96\,b^3\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\left(2\left(104\,a^2\,b\,B-3\,b^3\,B+48\,a^3\,C+126\,a\,b^2\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(2\,i\left(-16\,a^2\,b\,B-33\,b^3\,B-54\,a\,b^2\,C\right)\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\;\text{Cos}\left[2\left(c+d\,x\right)\right]\left(2\,a\left(a-b\right)\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\frac{a+b}{a},i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\text{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\left(a+b\,\text{Cos}[c+d\,x]\right)+\left(a+b\,\text{Cos}[c+d\,x]\right)^2}{b^2}}\left(2\,a^2-b^2-4\,a\left(a+b\,\text{Cos}[c+d\,x]\right)+2\left(a+b\,\text{Cos}[c+d\,x]\right)^2\right)\right)\right)+\frac{1}{d}$$

$$\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{1}{12}\text{Sec}[c+d\,x]^2\left(13\,a\,b\,B\,\text{Sin}[c+d\,x]+6\,a^2\,C\,\text{Sin}[c+d\,x]\right)+\frac{1}{24}\text{Sec}[c+d\,x]\left(16\,a^2\,B\,\text{Sin}[c+d\,x]+33\,b^2\,B\,\text{Sin}[c+d\,x]+54\,a\,b\,C\,\text{Sin}[c+d\,x]\right)+\frac{1}{3}a^2\,B\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)$$

Problem 834: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^6\,dx$$

Optimal (type 4, 465 leaves, 13 steps):

$$-\left(\left(\left(284 a^2 b B+15 b^3 B+128 a^3 C+264 a b^2 C\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(192 a d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)\right)+$$

$$\left(\left(356 a^2 b B+133 b^3 B+128 a^3 C+472 a b^2 C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(192 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+$$

$$\left(\left(48 a^4 B+120 a^2 b^2 B-5 b^4 B+160 a^3 b C+40 a b^3 C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(64 a d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\frac{1}{192 a d}$$

$$\left(284 a^2 b B+15 b^3 B+128 a^3 C+264 a b^2 C\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Tan}[c+d x]+\frac{1}{96 d}$$

$$\left(36 a^2 B+59 b^2 B+104 a b C\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]+$$

$$\frac{a (11 b B+8 a C) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{24 d}+$$

$$\frac{a B (a+b \operatorname{Cos}[c+d x])^{3/2} \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]}{4 d}$$

Result (type 4, 729 leaves) :

$$\frac{1}{768\, a\, d}\left(\left(2\left(144 a^3 b B + 236 a b^3 B + 416 a^2 b^2 C\right)\sqrt{\frac{a + b \text{Cos}[c + d x]}{a + b}}\ \text{EllipticF}\left[\frac{1}{2}\left(c + d x\right), \frac{2 b}{a + b}\right]\right) \Big/ \left(\sqrt{a + b \text{Cos}[c + d x]}\right) + \left(2\left(288 a^4 B + 436 a^2 b^2 B - 45 b^4 B + 832 a^3 b C - 24 a b^3 C\right) \sqrt{\frac{a + b \text{Cos}[c + d x]}{a + b}}\ \text{EllipticPi}\left[2, \frac{1}{2}\left(c + d x\right), \frac{2 b}{a + b}\right]\right) \Big/ \left(\sqrt{a + b \text{Cos}[c + d x]}\right) - \left(2 \mathbb{i} \left(-284 a^2 b^2 B - 15 b^4 B - 128 a^3 b C - 264 a b^3 C\right)\sqrt{\frac{b - b \text{Cos}[c + d x]}{a + b}}\sqrt{-\frac{b + b \text{Cos}[c + d x]}{a - b}}\ \text{Cos}\left[2\left(c + d x\right)\right]\left(2 a \left(a - b\right) \text{EllipticE}\left[\mathbb{i}\, \text{ArcSinh}\left[\sqrt{-\frac{1}{a + b}}\sqrt{a + b \text{Cos}[c + d x]}\right], \frac{a + b}{a - b}\right] + b\left(2 a\, \text{EllipticF}\left[\mathbb{i}\, \text{ArcSinh}\left[\sqrt{-\frac{1}{a + b}}\sqrt{a + b \text{Cos}[c + d x]}\right], \frac{a + b}{a - b}\right] - b\, \text{EllipticPi}\left[\frac{a + b}{a}, \mathbb{i}\, \text{ArcSinh}\left[\sqrt{-\frac{1}{a + b}}\sqrt{a + b \text{Cos}[c + d x]}\right], \frac{a + b}{a - b}\right]\right)\right) \text{Sin}[c + d x]\right) \Big/ \left(a \sqrt{-\frac{1}{a + b}}\sqrt{1 - \text{Cos}[c + d x]^2}\sqrt{-\frac{a^2 - b^2 - 2 a\left(a + b \text{Cos}[c + d x]\right) + \left(a + b \text{Cos}[c + d x]\right)^2}{b^2}}\left(2 a^2 - b^2 - 4 a\left(a + b \text{Cos}[c + d x]\right) + 2\left(a + b \text{Cos}[c + d x]\right)^2\right)\right)\right) + \frac{1}{d}$$

$$\sqrt{a + b \text{Cos}[c + d x]}\ \left(\frac{1}{24}\text{Sec}[c + d x]^3\left(17 a b B \text{Sin}[c + d x] + 8 a^2 C \text{Sin}[c + d x]\right) + \frac{1}{96}\text{Sec}[c + d x]^2\left(36 a^2 B \text{Sin}[c + d x] + 59 b^2 B \text{Sin}[c + d x] + 104 a b C \text{Sin}[c + d x]\right) + \frac{1}{192 a}\text{Sec}[c + d x]\left(284 a^2 b B \text{Sin}[c + d x] + 15 b^3 B \text{Sin}[c + d x] + 128 a^3 C \text{Sin}[c + d x] + 264 a b^2 C \text{Sin}[c + d x]\right) + \frac{1}{4} a^2 B \text{Sec}[c + d x]^3 \text{Tan}[c + d x]\right)$$

Problem 839: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(B \cos[c+d x]+C \cos[c+d x]^2\right) \sec[c+d x]^3}{\sqrt{a+b \cos[c+d x]}}\, dx$$

Optimal (type 4, 216 leaves, 10 steps):

$$-\frac{B \sqrt{a+b \cos[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{a d \sqrt{\frac{a+b \cos[c+d x]}{a+b}}}+\frac{B \sqrt{\frac{a+b \cos[c+d x]}{a+b}}\ \text{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{d \sqrt{a+b \cos[c+d x]}}-\frac{(b B-2 a C) \sqrt{\frac{a+b \cos[c+d x]}{a+b}}\ \text{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{a d \sqrt{a+b \cos[c+d x]}}+\frac{B \sqrt{a+b \cos[c+d x]}\ \text{Tan}[c+d x]}{a d}$$

Result (type 4, 320 leaves):

$$\frac{1}{4 a d}\left(\frac{2(-3 b B+4 a C) \sqrt{\frac{a+b \cos[c+d x]}{a+b}}\ \text{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{\sqrt{a+b \cos[c+d x]}}-\frac{1}{a b \sqrt{-\frac{1}{a+b}}} 2 i B \sqrt{-\frac{b(-1+\cos[c+d x])}{a+b}} \sqrt{\frac{b(1+\cos[c+d x])}{-a+b}} \csc[c+d x]\left(-2 a(a-b) \text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \cos[c+d x]}\right], \frac{a+b}{a-b}\right]+b\left(-2 a \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \cos[c+d x]}\right], \frac{a+b}{a-b}\right]+b \text{EllipticPi}\left[\frac{a+b}{a}, i \text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \cos[c+d x]}\right], \frac{a+b}{a-b}\right]\right)\right)+4 B \sqrt{a+b \cos[c+d x]}\ \text{Tan}[c+d x]\right)$$

Problem 840: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^4}{\sqrt{a+b \operatorname{Cos}[c+d x]}} \, dx$$

Optimal (type 4, 299 leaves, 11 steps):

$$\frac{(3 b B-4 a C) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{4 a^2 d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}}-\frac{(b B-4 a C) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{4 a d \sqrt{a+b \operatorname{Cos}[c+d x]}}+\left(\left(4 a^2 B+3 b^2 B-4 a b C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(4 a^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\frac{(3 b B-4 a C) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Tan}[c+d x]}{4 a^2 d}+\frac{B \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 a d}$$

Result (type 4, 556 leaves):

$$\frac{1}{16\,a^2\,d}\left(\frac{8\,a\,b\,B\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\left(8\,a^2\,B+9\,b^2\,B-12\,a\,b\,C\right)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,i\,\left(3\,b^2\,B-4\,a\,b\,C\right)\,\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\right.$$

$$\mathrm{Cos}[2\,(c+d\,x)]\,\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\,\left(2\,a\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},\,i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\,\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+2\,(a+b\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(\frac{\mathrm{Sec}[c+d\,x]\,\left(-3\,b\,B\,\mathrm{Sin}[c+d\,x]+4\,a\,C\,\mathrm{Sin}[c+d\,x]\right)}{4\,a^2}+\right.$$

$$\left.\frac{B\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,a}\right)$$

Problem 845: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^2}{(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 190 leaves, 8 steps):

$$-\frac{2\,(b\,B-a\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{a\,\left(a^2-b^2\right)\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{2\,B\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{a\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{2\,b\,(b\,B-a\,C)\,\text{Sin}[c+d\,x]}{a\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 614 leaves) :

$$-\left(\left(2\,\mathrm{Cos}[c+d\,x]\,\left(C+B\,\mathrm{Sec}[c+d\,x]\right)\,\left(-b^2\,B\,\mathrm{Sin}[c+d\,x]+a\,b\,C\,\mathrm{Sin}[c+d\,x]\right)\right)\Big/\left(a\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(B+C\,\mathrm{Cos}[c+d\,x]\right)\right)\right)-$$

$$\frac{1}{2\,a\,\left(-a+b\right)\,\left(a+b\right)\,d\,\left(B+C\,\mathrm{Cos}[c+d\,x]\right)}\,\mathrm{Cos}[c+d\,x]\,\left(C+B\,\mathrm{Sec}[c+d\,x]\right)$$

$$\left(\frac{2\,\left(-2\,a\,b\,B+2\,a^2\,C\right)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\left(2\,a^2\,B-3\,b^2\,B+a\,b\,C\right)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,\left(c+d\,x\right),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,\mathrm{i}\,\left(-b^2\,B+a\,b\,C\right)\,\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\right.$$

$$\mathrm{Cos}\left[2\,\left(c+d\,x\right)\right]\,\left(2\,a\,\left(a-b\right)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\,\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\,\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2}{b^2}}\right.$$

$$\left.\left.\left.\left(2\,a^2-b^2-4\,a\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+2\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2\right)\right)\right)\right)$$

Problem 846: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^3}{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 303 leaves, 11 steps):

$$-\left(\left(\left(a^2 B-3 b^2 B+2 a b C\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(a^2\left(a^2-b^2\right) d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)\right)+\frac{B \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{a d \sqrt{a+b \operatorname{Cos}[c+d x]}}-$$

$$\frac{(3 b B-2 a C) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{a^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}}+$$

$$\frac{b\left(a^2 B-3 b^2 B+2 a b C\right) \operatorname{Sin}[c+d x]}{a^2\left(a^2-b^2\right) d \sqrt{a+b \operatorname{Cos}[c+d x]}}+\frac{B \operatorname{Tan}[c+d x]}{a d \sqrt{a+b \operatorname{Cos}[c+d x]}}$$

Result (type 4, 608 leaves) :

$$\frac{1}{4\,a^2\,(a-b)\,(a+b)\,d}\left(\frac{2\,(4\,a\,b^2\,B-4\,a^2\,b\,C)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,(-7\,a^2\,b\,B+9\,b^3\,B+4\,a^3\,C-6\,a\,b^2\,C)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right.$$

$$\left.\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(2\,\mathrm{i}\,(-a^2\,b\,B+3\,b^3\,B-2\,a\,b^2\,C)\,\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}[2\,(c+d\,x)]\right.$$

$$\left(2\,a\,(a-b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\Bigg)\Big/$$

$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\text{Cos}[c+d\,x])+(a+b\,\text{Cos}[c+d\,x])^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\text{Cos}[c+d\,x])+2\,(a+b\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{2\,(-b^3\,B\,\text{Sin}[c+d\,x]+a\,b^2\,C\,\text{Sin}[c+d\,x])}{a^2\,(a^2-b^2)\,(a+b\,\text{Cos}[c+d\,x])}+\frac{B\,\text{Tan}[c+d\,x]}{a^2}\right)}{d}$$

Problem 851: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2)\,\text{Sec}[c+d\,x]^2}{(a+b\,\text{Cos}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 349 leaves, 11 steps):

$$-\left(\left(2\left(7 a^2 b B-3 b^3 B-4 a^3 C\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(3 a^2\left(a^2-b^2\right)^2 d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)\right)+$$

$$\frac{2(b B-a C) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{3 a\left(a^2-b^2\right) d \sqrt{a+b \operatorname{Cos}[c+d x]}}+$$

$$\frac{2 B \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{a^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}}+$$

$$\frac{2 b(b B-a C) \operatorname{Sin}[c+d x]}{3 a\left(a^2-b^2\right) d(a+b \operatorname{Cos}[c+d x])^{3/2}}+\frac{2 b\left(7 a^2 b B-3 b^3 B-4 a^3 C\right) \operatorname{Sin}[c+d x]}{3 a^2\left(a^2-b^2\right)^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}}$$

Result (type 4, 743 leaves):

$$\frac{1}{6\,a^2\,(a-b)^2\,(a+b)^2\,d\,(B+C\,\mathrm{Cos}[c+d\,x])}\,\mathrm{Cos}[c+d\,x]\,(C+B\,\mathrm{Sec}[c+d\,x])\,\Bigg(\Bigg(2\,\left(-12\,a^3\,b\,B+4\,a\,b^3\,B+6\,a^4\,C+2\,a^2\,b^2\,C\right)\,\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\,\left(6\,a^4\,B-19\,a^2\,b^2\,B+9\,b^4\,B+4\,a^3\,b\,C\right)\,\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\,i\,\left(-7\,a^2\,b^2\,B+3\,b^4\,B+4\,a^3\,b\,C\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)\,\mathrm{EllipticE}\Big[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[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},\,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]}\,(C+B\,\mathrm{Sec}[c+d\,x])\,\Bigg(-\frac{2\,\left(-b^2\,B\,\mathrm{Sin}[c+d\,x]+a\,b\,C\,\mathrm{Sin}[c+d\,x]\right)}{3\,a\,(a^2-b^2)\,(a+b\,\mathrm{Cos}[c+d\,x])^2}-\left(2\,\left(-7\,a^2\,b^2\,B\,\mathrm{Sin}[c+d\,x]+3\,b^4\,B\,\mathrm{Sin}[c+d\,x]+4\,a^3\,b\,C\,\mathrm{Sin}[c+d\,x]\right)\right)\Big/\left(3\,a^2\,(a^2-b^2)^2\,(a+b\,\mathrm{Cos}[c+d\,x])\right)\Bigg)\Bigg)\Big/\left(d\,(B+C\,\mathrm{Cos}[c+d\,x])\right)$$

Problem 852: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^3}{(a+b \operatorname{Cos}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 437 leaves, 12 steps):

$$-\left(\left(\left(3 a^4 B-26 a^2 b^2 B+15 b^4 B+14 a^3 b C-6 a b^3 C\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(3 a^3 \left(a^2-b^2\right)^2 d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)\right)+\frac{\left(3 a^2 B-5 b^2 B+2 a b C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{3 a^2 \left(a^2-b^2\right) d \sqrt{a+b \operatorname{Cos}[c+d x]}}-\frac{(5 b B-2 a C) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{a^3 d \sqrt{a+b \operatorname{Cos}[c+d x]}}+\frac{b\left(3 a^2 B-5 b^2 B+2 a b C\right) \operatorname{Sin}[c+d x]}{3 a^2\left(a^2-b^2\right) d(a+b \operatorname{Cos}[c+d x])^{3/2}}+\frac{b\left(3 a^4 B-26 a^2 b^2 B+15 b^4 B+14 a^3 b C-6 a b^3 C\right) \operatorname{Sin}[c+d x]}{3 a^3\left(a^2-b^2\right)^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}}+\frac{B \operatorname{Tan}[c+d x]}{a d(a+b \operatorname{Cos}[c+d x])^{3/2}}$$

Result (type 4, 750 leaves):

$$\frac{1}{12 a^3 (-a+b)^2 (a+b)^2 d} \left(\left(\left(2\left(36 a^3 b^2 B-20 a b^4 B-24 a^4 b C+8 a^2 b^3 C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\left(2\left(-33 a^4 b B+86 a^2 b^3 B-45 b^5 B+12 a^5 C-38 a^3 b^2 C+18 a b^4 C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right.\right.\right.$$

$$\text{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2b}{a+b}\right]\Bigg)\Bigg/\left(\sqrt{a+b\,\text{Cos}[c+d x]}\right)-$$

$$\Bigg(2\,\mathrm{i}\,\left(-3a^4 b B+26a^2b^3B-15b^5B-14a^3b^2C+6ab^4C\right)\sqrt{\frac{b-b\,\text{Cos}[c+d x]}{a+b}}$$

$$\sqrt{-\frac{b+b\,\text{Cos}[c+d x]}{a-b}}\;\text{Cos}[2(c+d x)]$$

$$\Bigg(2a(a-b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]+$$

$$b\,\Bigg(2a\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\Bigg[$$

$$\frac{a+b}{a},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d x]}\right],\frac{a+b}{a-b}\Bigg]\Bigg)\Bigg)\,\text{Sin}[c+d x]\Bigg)\Bigg/$$

$$\Bigg(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\text{Cos}[c+d x]^2}\sqrt{-\frac{a^2-b^2-2a\,(a+b\,\text{Cos}[c+d x])+(a+b\,\text{Cos}[c+d x])^2}{b^2}}$$

$$\left(2a^2-b^2-4a\,(a+b\,\text{Cos}[c+d x])+2\,(a+b\,\text{Cos}[c+d x])^2\right)\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d x]}\,\Bigg(\frac{2\left(-b^3 B\,\text{Sin}[c+d x]+a b^2 C\,\text{Sin}[c+d x]\right)}{3a^2\left(a^2-b^2\right)(a+b\,\text{Cos}[c+d x])^2}+$$

$$\left(2\left(-10a^2b^3B\,\text{Sin}[c+d x]+6b^5B\,\text{Sin}[c+d x]+7a^3b^2C\,\text{Sin}[c+d x]-3ab^4C\,\text{Sin}[c+d x]\right)\right)\Big/$$

$$\left(3a^3\left(a^2-b^2\right)^2(a+b\,\text{Cos}[c+d x])\right)+\frac{B\,\text{Tan}[c+d x]}{a^3}\Bigg)$$

Problem 881: Result more than twice size of optimal antiderivative.

$$\int\frac{B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2}{\text{Cos}[c+d x]^{5/2}\,(a+b\,\text{Cos}[c+d x])}\,dx$$

Optimal (type 4, 86 leaves, 6 steps):

$$-\frac{2B\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{a d}-\frac{2(bB-aC)\,\text{EllipticPi}\left[\frac{2b}{a+b},\frac{1}{2}(c+d x),2\right]}{a(a+b)d}+\frac{2B\,\text{Sin}[c+d x]}{a d\sqrt{\text{Cos}[c+d x]}}$$

Result (type 4, 210 leaves):

$$\frac{1}{2\,a\,d}\left(\frac{2\,(-3\,b\,B+2\,a\,C)\,\text{EllipticPi}\left[\frac{2\,b}{a+b},\frac{1}{2}\,(c+d\,x),2\right]}{a+b}-\frac{2\,a\,B\left(2\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]-\frac{2\,a\,\text{EllipticPi}\left[\frac{2\,b}{a+b},\frac{1}{2}\,(c+d\,x),2\right]}{a+b}\right)}{b}+\frac{4\,B\,\text{Sin}[c+d\,x]}{\sqrt{\text{Cos}[c+d\,x]}}-\left(2\,B\left(-2\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]+2\,a\,(a+b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]+\left(2\,a^2-b^2\right)\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]\right)\text{Sin}[c+d\,x]\right)\Big/\left(a\,b\,\sqrt{\text{Sin}[c+d\,x]^2}\right)\right)$$

Problem 897: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 560 leaves, 9 steps):

$$-\frac{1}{24\,a\,b^2\,d}(a-b)\sqrt{a+b}\,\left(6\,a\,b\,B-3\,a^2\,C+16\,b^2\,C\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{24\,b^2\,d}\sqrt{a+b}\,(a+2\,b)\,(6\,b\,B-3\,a\,C+8\,b\,C)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{8\,b^3\,d}\sqrt{a+b}\,\left(2\,a^2\,b\,B-8\,b^3\,B-a^3\,C-4\,a\,b^2\,C\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{\left(6\,a\,b\,B-3\,a^2\,C+16\,b^2\,C\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{24\,b^2\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}+\frac{(2\,b\,B-a\,C)\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{4\,b\,d}+\frac{C\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,b\,d}$$

Result (type 4, 1224 leaves):

$$-\frac{1}{48\,b\,d}\left(-\left(\left(\left(4\,a\,\left(-18\,a\,b\,B+a^2\,C-16\,b^2\,C\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\right.\right.\right.\right.$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right/\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a$$

$$\left(-24\,b^2\,B-28\,a\,b\,C\right)\left(\left(\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-6\,a\,b\,B+3\,a^2\,C-16\,b^2\,C\right)\left(\left(\mathrm{i}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{\left(6\,b\,B+a\,C\right)\text{Sin}[c+d\,x]}{12\,b}+\right.$$

$$\frac{1}{6}$$

$$C$$

$$\text{Sin}\Big[$$

$$2\,(c+d\,x)\Big]\Big)$$

Problem 898: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 473 leaves, 8 steps):

$$-\frac{1}{4\,a\,b\,d}(a-b)\,\sqrt{a+b}\,(4\,b\,B+a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\,\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{4\,b\,d}\sqrt{a+b}\,\left(a\,C+2\,b\,(2\,B+C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\,\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,b^2\,d}\sqrt{a+b}\,\left(4\,a\,b\,B-a^2\,C+4\,b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\,\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{(4\,b\,B+a\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 1175 leaves):

$$\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}+\frac{1}{8\,d}\Bigg(-\Bigg(\Bigg(4\,a\,(4\,b\,B+3\,a\,C)\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-4\,a\,(8\,a\,B+4\,b\,C)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\,(4\,b\,B+a\,C)\left(\left(i\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+\right.$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{b\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right)\right)$$

Problem 899: Result more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 385 leaves, 7 steps):

$$-\frac{1}{a\,d}(a-b)\sqrt{a+b}\;C\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{d}\sqrt{a+b}\,(2\,B+C)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{b\,d}\sqrt{a+b}\,(2\,b\,B+a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{C\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 3054 leaves):

$$\Bigg((1+\text{Cos}[c+d\,x])^{3/2}\left(\frac{B\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{\text{Cos}[c+d\,x]}}+C\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg(2\,(a+b)\,C\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-4\,(b\,B+a\,(-B+C))\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-8\,b\,B\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-4\,a\,C\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$b\,C\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]\ \text{Sin}\left[\frac{3}{2}\left(c+d\,x\right)\right]+$$

$$2\,a\,C\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-b\,C\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\Bigg)\Bigg)\Bigg/$$

$$\Bigg(4\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \Bigg(\frac{1}{8\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}\,b\left(1+\text{Cos}[c+d\,x]\right)^{3/2}$$

$$\text{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sin}[c+d\,x]\ \Bigg(2\left(a+b\right)C\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{\left(a+b\right)\left(1+\text{Cos}[c+d\,x]\right)}}$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\ \frac{-a+b}{a+b}\right]-4\left(b\,B+a\left(-B+C\right)\right)$$

$$\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{\left(a+b\right)\left(1+\text{Cos}[c+d\,x]\right)}}\ \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\ \frac{-a+b}{a+b}\right]-$$

$$8\,b\,B\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{\left(a+b\right)\left(1+\text{Cos}[c+d\,x]\right)}}\ \text{EllipticPi}\left[-1,\ -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\ \frac{-a+b}{a+b}\right]-$$

$$4\,a\,C\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{\left(a+b\right)\left(1+\text{Cos}[c+d\,x]\right)}}\ \text{EllipticPi}\left[-1,\ -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\ \frac{-a+b}{a+b}\right]+$$

$$b\,C\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]\ \text{Sin}\left[\frac{3}{2}\left(c+d\,x\right)\right]+$$

$$2\,a\,C\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-b\,C\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\Bigg)-$$

$$\frac{1}{8\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,3\sqrt{1+\text{Cos}[c+d\,x]}\ \text{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sin}[c+d\,x]$$

$$\Bigg(2\left(a+b\right)C\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{\left(a+b\right)\left(1+\text{Cos}[c+d\,x]\right)}}\ \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\ \frac{-a+b}{a+b}\right]-$$

$$4\left(b\,B+a\left(-B+C\right)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{\left(a+b\right)\left(1+\text{Cos}[c+d\,x]\right)}}$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\ \frac{-a+b}{a+b}\right]-$$

$$8\,b\,B\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticPi}\Big[-1,\,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{-a+b}{a+b}\Big]-$$

$$4\,a\,C\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticPi}\Big[-1,\,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{-a+b}{a+b}\Big]+$$

$$b\,C\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]\,\text{Sin}\Big[\frac{3}{2}\,(c+d\,x)\Big]+$$

$$2\,a\,C\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-b\,C\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)+$$

$$\frac{1}{4\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,(1+\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]$$

$$\Bigg(2\,(a+b)\,C\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticE}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{-a+b}{a+b}\Big]-$$

$$4\,(b\,B+a\,(-B+C))\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}$$

$$\text{EllipticF}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{-a+b}{a+b}\Big]-$$

$$8\,b\,B\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticPi}\Big[-1,\,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{-a+b}{a+b}\Big]-$$

$$4\,a\,C\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticPi}\Big[-1,\,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{-a+b}{a+b}\Big]+$$

$$b\,C\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]\,\text{Sin}\Big[\frac{3}{2}\,(c+d\,x)\Big]+$$

$$2\,a\,C\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-b\,C\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)+$$

$$\frac{1}{4\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,(1+\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2$$

$$\Bigg(\frac{3}{2}\,b\,C\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Cos}\Big[\frac{3}{2}\,(c+d\,x)\Big]\,\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]+$$

$$a\,C\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2-\frac{1}{2}b\,C\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2+$$

$$\left((a+b)\,C\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\left(-\frac{b\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}+\right.\right.$$

$$\left.\left.\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])^2}\right)\right)\Big/\left(\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\right)-$$

$$\left(2\,(b\,B+a\,(-B+C))\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\right.$$

$$\left.\left(-\frac{b\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}+\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])^2}\right)\right)\Big/$$

$$\left(\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\right)-\left(4\,b\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\right.\right.$$

$$\left.\left.\frac{-a+b}{a+b}\right]\left(-\frac{b\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}+\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])^2}\right)\right)\Big/$$

$$\left(\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\right)-\left(2\,a\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\right.\right.$$

$$\left.\left.\frac{-a+b}{a+b}\right]\left(-\frac{b\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}+\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])^2}\right)\right)\Big/$$

$$\left(\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\right)+\frac{1}{2\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}b\,C\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+$$

$$\frac{a\,C\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}-$$

$$\frac{b\,C\left(\frac{\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{(1+\text{Cos}[c+d\,x])^2}-\frac{\text{Sin}[c+d\,x]}{1+\text{Cos}[c+d\,x]}\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{2\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}}+$$

$$\frac{1}{2}b\,C\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$\frac{2\left(b B+a\left(-B+C\right)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\,\mathrm{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}}{\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}}\,\sqrt{1-\frac{(-a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^{2}}{a+b}}}+$$

$$\left(4\,b\,B\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\,\mathrm{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}\right)\Big/$$

$$\left(\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}\right)\sqrt{1-\frac{(-a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^{2}}{a+b}}\right)+$$

$$\left(2\,a\,C\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\,\mathrm{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}\right)\Big/$$

$$\left(\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}\right)\sqrt{1-\frac{(-a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^{2}}{a+b}}\right)+$$

$$\left((a+b)\,C\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\,\mathrm{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}\right.$$

$$\left.\left.\left.\left.\sqrt{1-\frac{(-a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^{2}}{a+b}}\right)\Big/\left(\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}}\right)\right)\right)\right)$$

Problem 900: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^{2}\right)}{\mathrm{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 351 leaves, 6 steps):

$$\frac{1}{a\,d}2\,(a-b)\,\sqrt{a+b}\,B\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{a\,d}$$

$$2\,\sqrt{a+b}\,(b\,B-a\,(B-C))\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}$$

$$2\,\sqrt{a+b}\,C\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}$$

Result (type 4, 1161 leaves):

$$-\left(\left(\left(4\,a^2\,C\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$\frac{1}{d}4\,a\,(-a\,B+b\,C)\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{2\,B\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}-$$

$$\frac{1}{d}2\,b\,B\left(\left(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\right.\right.$$

$$\left.\text{Sec}[c+d\,x]\right)\Big/\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\Bigg(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Big/$$

$$\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\Bigg)$$

Problem 901: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 284 leaves, 5 steps):

$$\frac{1}{3\,a^2\,d}2\,(a-b)\,\sqrt{a+b}\,(b\,B+3\,a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{3\,a\,d}$$

$$2\,(a-b)\,\sqrt{a+b}\,(B-3\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,B\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1229 leaves) :

$$\frac{1}{3\,a\,d}\left(-\left(\left(\left(4\,a\,\left(a^2\,B-b^2\,B\right)\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left(\left(a+b\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(-a\,b\,B-3\,a^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[-\frac{a}{b},\ \text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2 a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Bigg/\left(b\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\Bigg)+$$

$$2\left(-b^2 B-3 a b C\right)\left(\left(\text{i}\ \text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\ \text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right],\ -\frac{2 a}{-a-b}\right]\text{Sec}[c+d x]\right)\Bigg/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[-\frac{a}{b},\ \text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2 a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right/\left(b\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{b\sqrt{\text{Cos}[c+d x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}$$

$$\left(\frac{2\,\text{Sec}[c+d x]\ (b\,B\,\text{Sin}[c+d x]+3\,a\,C\,\text{Sin}[c+d x])}{3 a}+\right.$$

$$\left.\frac{2}{3}\ B\ \text{Sec}[c+d x]\ \text{Tan}[c+d x]\right)$$

Problem 902: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+b\,\text{Cos}[c+d x]}\ \left(B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)}{\text{Cos}[c+d x]^{9/2}}\,dx$$

Optimal (type 4, 350 leaves, 6 steps):

$$\frac{1}{15 a^3 d} 2 (a-b) \sqrt{a+b} \left(9 a^2 B - 2 b^2 B + 5 a b C\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{15 a^2 d} 2 (a-b) \sqrt{a+b} (9 a B + 2 b B - 5 a C) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 B \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{5 d \text{Cos}[c+d x]^{5/2}} + \frac{2 (b B + 5 a C) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{15 a d \text{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1315 leaves):

$$-\frac{1}{15 a^2 d} \left(- \left(\left(4 a \left(2 a^2 b B - 2 b^3 B - 5 a^3 C + 5 a b^2 C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4 \right) \middle/ \left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]} \right) \right) - 4 a \left(9 a^3 B - 2 a b^2 B + 5 a^2 b C\right) \left(\left(\sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(9\,a^2\,b\,B-2\,b^3\,B+5\,a\,b^2\,C\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\left.\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right/$$

$$\left.\left.\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{2\,\text{Sec}[c+d\,x]^2\,(b\,B\,\text{Sin}[c+d\,x]+5\,a\,C\,\text{Sin}[c+d\,x])}{15\,a}+\right.$$

$$\frac{1}{15\,a^2}2\,\text{Sec}[c+d\,x]\left(9\,a^2\,B\,\text{Sin}[c+d\,x]-2\,b^2\,B\,\text{Sin}[c+d\,x]+5\,a\,b\,C\,\text{Sin}[c+d\,x]\right)+\frac{2}{5}\,B\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Bigg)$$

Problem 903: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{\mathrm{Cos}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 433 leaves, 7 steps):

$$\frac{1}{105\,a^4\,d}2\,(a-b)\,\sqrt{a+b}\,\left(19\,a^2\,b\,B+8\,b^3\,B+63\,a^3\,C-14\,a\,b^2\,C\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{105\,a^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(8\,b^2\,B+a^2\,(25\,B-63\,C)+2\,a\,b\,(3\,B-7\,C)\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{2\,B\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{7\,d\,\mathrm{Cos}[c+d\,x]^{7/2}}+\frac{2\,(b\,B+7\,a\,C)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{35\,a\,d\,\mathrm{Cos}[c+d\,x]^{5/2}}+\frac{2\,\left(25\,a^2\,B-4\,b^2\,B+7\,a\,b\,C\right)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{105\,a^2\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1408 leaves):

$$\frac{1}{105\,a^3\,d}\left(-\left(\left(4\,a\,\left(25\,a^4\,B-17\,a^2\,b^2\,B-8\,b^4\,B-14\,a^3\,b\,C+14\,a\,b^3\,C\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-\right.$$

$$4\,a\,\left(-19\,a^3\,b\,B-8\,a\,b^3\,B-63\,a^4\,C+14\,a^2\,b^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-19\,a^2\,b^2\,B-8\,b^4\,B-63\,a^3\,b\,C+14\,a\,b^3\,C\right)\left(\left(\mathrm{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Bigg/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b} 2 a \left(\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Bigg/$$

$$\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right) - \left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right]$$

$$\left.\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Bigg/ \left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right) +$$

$$\left.\left.\frac{\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{b \sqrt{\operatorname{Cos}[c+d x]}}\right)\right) + \frac{1}{d} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}$$

$$\left(\frac{2 \operatorname{Sec}[c+d x]^3 (b B \operatorname{Sin}[c+d x] + 7 a C \operatorname{Sin}[c+d x])}{35 a} + \right.$$

$$\frac{1}{105 a^2}$$

$$2$$

$$\operatorname{Sec}[c+d x]^2$$

$$\left(25 a^2 B \operatorname{Sin}[c+d x] - 4 b^2 B \operatorname{Sin}[c+d x] + 7 a b C \operatorname{Sin}[c+d x]\right) + \frac{1}{105 a^3} 2$$

$$\operatorname{Sec}[c+d x]$$

$$\left(19 a^2 b B \operatorname{Sin}[c+d x]+8 b^3 B \operatorname{Sin}[c+d x]+63 a^3 C \operatorname{Sin}[c+d x]-14 a b^2 C \operatorname{Sin}[c+d x]\right)+\frac{2}{7} B \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]\Bigg)$$

Problem 904: Result unnecessarily involves imaginary or complex numbers.

$$\int \sqrt{\operatorname{Cos}[c+d x]}\,(a+b \operatorname{Cos}[c+d x])^{3/2}\left(B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) dx$$

Optimal (type 4, 670 leaves, 10 steps):

$$-\frac{1}{192 a b^2 d}(a-b)\sqrt{a+b}\left(24 a^2 b B+128 b^3 B-9 a^3 C+156 a b^2 C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}-\frac{1}{192 b^2 d}\sqrt{a+b}\left(9 a^3 C-6 a^2 b(4 B+C)-8 b^3(16 B+9 C)-4 a b^2(28 B+39 C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{1}{64 b^3 d}\sqrt{a+b}\left(8 a^3 b B-96 a b^3 B-3 a^4 C-24 a^2 b^2 C-48 b^4 C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{b},\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}+\left(\left(24 a^2 b B+128 b^3 B-9 a^3 C+156 a b^2 C\right)\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]\right)\Big/\left(192 b^2 d \sqrt{\operatorname{Cos}[c+d x]}\right)+\frac{1}{32 b d}\left(8 a b B-3 a^2 C+12 b^2 C\right)\sqrt{\operatorname{Cos}[c+d x]}\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]+\frac{(8 b B-3 a C)\sqrt{\operatorname{Cos}[c+d x]}\,(a+b \operatorname{Cos}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{24 b d}+\frac{C \sqrt{\operatorname{Cos}[c+d x]}\,(a+b \operatorname{Cos}[c+d x])^{5/2} \operatorname{Sin}[c+d x]}{4 b d}$$

Result (type 4, 1284 leaves):

$$-\frac{1}{384\,b\,d}\left(-\left(\left(\left(4\,a\,\left(-136\,a^2\,b\,B-128\,b^3\,B+3\,a^3\,C-228\,a\,b^2\,C\right)\right.\right.\right.\right.$$

$$\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(-416\,a\,b^2\,B-228\,a^2\,b\,C-144\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)+$$

$$2\left(-24 a^2 b B-128 b^3 B+9 a^3 C-156 a b^2 C\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\text{Sec}[c+d x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\text{Csc}[c+d x]\,\text{EllipticF}\Big[$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\Bigg)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\text{Csc}[c+d x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{\left(56\,a\,b\,B+3\,a^2\,C+42\,b^2\,C\right)\,\text{Sin}[c+d\,x]}{96\,b}+\right.$$

$$\frac{1}{48}\left(8\,b\,B+9\,a\,C\right)\,\text{Sin}\left[2\,(c+d\,x)\right]+\frac{1}{16}\,b\,C\,\text{Sin}\left[3\,(c+d\,x)\right]\Bigg)$$

Problem 905: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 566 leaves, 9 steps):

$$-\frac{1}{24\,a\,b\,d}(a-b)\sqrt{a+b}\,\left(30\,a\,b\,B+3\,a^2\,C+16\,b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[$$
$$\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\,+$$
$$\frac{1}{24\,b\,d}\sqrt{a+b}\,\left(30\,a\,b\,B+12\,b^2\,B+3\,a^2\,C+14\,a\,b\,C+16\,b^2\,C\right)\,\text{Cot}[c+d\,x]$$
$$\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}$$
$$\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-\frac{1}{8\,b^2\,d}\sqrt{a+b}\,\left(6\,a^2\,b\,B+8\,b^3\,B-a^3\,C+12\,a\,b^2\,C\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\,\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\,+$$
$$\frac{\left(30\,a\,b\,B+3\,a^2\,C+16\,b^2\,C\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}}\,+$$
$$\frac{(6\,b\,B+7\,a\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{12\,d}\,+$$
$$\frac{b\,C\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 1227 leaves):

$$\frac{1}{48\,d}\left(-\left(\left(4\,a\,\left(42\,a\,b\,B+17\,a^2\,C+16\,b^2\,C\right)\right.\right.\right.$$
$$\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$
$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$
$$\left.\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-4\,a\,\left(48\,a^2\,B+24\,b^2\,B+52\,a\,b\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(30\,a\,b\,B+3\,a^2\,C+16\,b^2\,C\right)\left(\left(\mathrm{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{1}{12}(6\,b\,B+7\,a\,C)\,\text{Sin}[c+d\,x]+\frac{1}{6}\,b\,C\,\text{Sin}[2\,(c+d\,x)]\right)$$

Problem 906: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 472 leaves, 8 steps):

$$-\frac{1}{4\,a\,d}(a-b)\,\sqrt{a+b}\,(4\,b\,B+5\,a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{4\,d}\sqrt{a+b}\,(8\,a\,B+4\,b\,B+5\,a\,C+2\,b\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,b\,d}\sqrt{a+b}\,\left(12\,a\,b\,B+3\,a^2\,C+4\,b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{(4\,b\,B+5\,a\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{b\,C\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 1198 leaves):

$$\frac{b\,C\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}+\frac{1}{8\,d}\left(-\left(\left(4\,a\,\left(8\,a^2\,B+4\,b^2\,B+7\,a\,b\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\right.\right.\right.$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\left(16\,a\,b\,B+8\,a^2\,C+4\,b^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(4 b^2 B+5 a b C\right)\left(\left(i \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] \sqrt{a+b \operatorname{Cos}[c+d x]}\right.\right.$$
$$\left.\operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\frac{\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right] \operatorname{Sec}[c+d x]\right) \Big/$$
$$\left(b \sqrt{\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Sec}[c+d x]} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Sec}[c+d x]}{a+b}}\right)+$$
$$\frac{1}{b} 2 a\left(\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$
$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$
$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$
$$\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-$$
$$\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.$$
$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b},\right.$$
$$\left.\left.\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$
$$\left.\left.\left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\frac{\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{b \sqrt{\operatorname{Cos}[c+d x]}}\right)\right)$$

Problem 907: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d\,x])^{3/2}\,(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 449 leaves, 8 steps):

$$\frac{1}{a\,d}(a-b)\sqrt{a+b}\,(2\,a\,B-b\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}\sqrt{a+b}\,(2\,a\,(B-C)-b\,(4\,B+C))\,\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}\sqrt{a+b}\,(2\,b\,B+3\,a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,B\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\sqrt{\text{Cos}[c+d\,x]}}-\frac{(2\,a\,B-b\,C)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 1196 leaves):

$$\frac{2\,a\,B\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\sqrt{\text{Cos}[c+d\,x]}}+\frac{1}{2\,d}\Bigg(\Bigg(4\,a\,(-2\,a\,b\,B-2\,a^2\,C-b^2\,C)\sqrt{\frac{(a+b)\,\text{Cot}[\frac{1}{2}(c+d\,x)]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}[\frac{1}{2}(c+d\,x)]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}[\frac{1}{2}(c+d\,x)]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}[\frac{1}{2}(c+d\,x)]^2}{a}}}{\sqrt{2}}\Big],-\frac{2\,a}{-a+b}\Big]\,\text{Sin}[\frac{1}{2}(c+d\,x)]^4\Bigg)\Big/\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+4\,a\,(2\,a^2\,B-2\,b^2\,B-4\,a\,b\,C)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-$$

$$2\,(2\,a\,b\,B-b^2\,C)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\right.\right.\right.$$

$$\left.\left.\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+dx]}\,\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\mathrm{Cos}[c+dx]}\,\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}\;\mathrm{Sin}[c+dx]}{b\sqrt{\mathrm{Cos}[c+dx]}}\right)$$

Problem 908: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\mathrm{Cos}[c+dx])^{3/2}\left(B\,\mathrm{Cos}[c+dx]+C\,\mathrm{Cos}[c+dx]^2\right)}{\mathrm{Cos}[c+dx]^{7/2}}\,dx$$

Optimal (type 4, 418 leaves, 7 steps):

$$\frac{1}{3\,a\,d}2\,(a-b)\,\sqrt{a+b}\,(4\,b\,B+3\,a\,C)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{3\,a\,d}$$

$$2\,\sqrt{a+b}\,\left(3\,b^2\,B-a\,b\,(4\,B-6\,C)+a^2\,(B-3\,C)\right)\,\mathrm{Cot}[c+d\,x]$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}$$

$$2\,b\,\sqrt{a+b}\,C\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,B\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{3\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1236 leaves):

$$\frac{1}{3\,d}\left(-\left(\left(4\,a\,(a^2\,B-b^2\,B+3\,a\,b\,C)\right.\right.\right.$$

$$\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left(\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(-4\,a\,b\,B-3\,a^2\,C+3\,b^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-4\,b^2\,B-3\,a\,b\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b} 2 a \left(\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{b \sqrt{\operatorname{Cos}[c+d x]}}\right)\right)+\frac{1}{d} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}$$

$$\left(\frac{2}{3} \operatorname{Sec}[c+d x] (4 b B \operatorname{Sin}[c+d x]+3 a C \operatorname{Sin}[c+d x])+\frac{2}{3} a B \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]\right)$$

Problem 909: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a + b \,\text{Cos}[c + d\, x])^{3/2} \left(B \,\text{Cos}[c + d\, x] + C \,\text{Cos}[c + d\, x]^2\right)}{\text{Cos}[c + d\, x]^{9/2}} \, dx$$

Optimal (type 4, 353 leaves, 6 steps):

$$\frac{1}{15 a^2 d} 2 (a - b) \sqrt{a + b} \left(9 a^2 B + 3 b^2 B + 20 a b C\right) \text{Cot}[c + d x] \,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a + b \,\text{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\text{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \text{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \text{Sec}[c + d x])}{a - b}} - \frac{1}{15 a d} 2 (a - b) \sqrt{a + b} (9 a B - 3 b B - 5 a C + 15 b C) \text{Cot}[c + d x] \,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a + b \,\text{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\text{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \text{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \text{Sec}[c + d x])}{a - b}} + \frac{2 a B \sqrt{a + b \,\text{Cos}[c + d x]} \,\text{Sin}[c + d x]}{5 d \,\text{Cos}[c + d x]^{5/2}} + \frac{2 (6 b B + 5 a C) \sqrt{a + b \,\text{Cos}[c + d x]} \,\text{Sin}[c + d x]}{15 d \,\text{Cos}[c + d x]^{3/2}}$$

Result (type 4, 1314 leaves):

$$-\frac{1}{15 a d} \left(-\left(\left(4 a \left(-3 a^2 b B + 3 b^3 B - 5 a^3 C + 5 a b^2 C\right) \sqrt{\frac{(a + b) \,\text{Cot}\left[\frac{1}{2} (c + d x)\right]^2}{-a + b}} \sqrt{-\frac{(a + b) \,\text{Cos}[c + d x] \,\text{Csc}\left[\frac{1}{2} (c + d x)\right]^2}{a}} \sqrt{\frac{(a + b \,\text{Cos}[c + d x]) \,\text{Csc}\left[\frac{1}{2} (c + d x)\right]^2}{a}} \,\text{Csc}[c + d x] \,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \,\text{Cos}[c+d x]) \,\text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a + b}\right] \text{Sin}\left[\frac{1}{2} (c + d x)\right]^4\right) \middle/ \right.\right.$$

$$\left.\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right) - 4\,a\,\left(9\,a^3\,B + 3\,a\,b^2\,B + 20\,a^2\,b\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right) - \left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right) +$$

$$2\,\left(9\,a^2\,b\,B + 3\,b^3\,B + 20\,a\,b^2\,C\right)\,\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\Big[$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\Big]\;\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\Big]\;\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{2}{15}\text{Sec}[c+d\,x]^2\right.$$

$$(6\,b\,B\,\text{Sin}[c+d\,x]+5\,a\,C\,\text{Sin}[c+d\,x])+$$

$$\frac{1}{15\,a}$$

$$2$$

$$\text{Sec}[$$

$$c+d\,x]$$

$\left(9\, a^2\, B\, \text{Sin}[c+d\, x]+3\, b^2\, B\, \text{Sin}[c+d\, x]+20\, a\, b\, C\, \text{Sin}[c+d\, x]\right)+\frac{2}{5}$

a

B

$\text{Sec}[c+d\, x]^2$

$\text{Tan}[c+d\, x]\Big)$

Problem 910: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(a+b\, \text{Cos}[c+d\, x]\right)^{3/2}\left(B\, \text{Cos}[c+d\, x]+C\, \text{Cos}[c+d\, x]^2\right)}{\text{Cos}[c+d\, x]^{11/2}}\, dx$$

Optimal (type 4, 433 leaves, 7 steps):

$$\frac{1}{105\, a^3\, d}2\, (a-b)\, \sqrt{a+b}\, \left(82\, a^2\, b\, B-6\, b^3\, B+63\, a^3\, C+21\, a\, b^2\, C\right)\, \text{Cot}[c+d\, x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Cos}[c+d\, x]}}{\sqrt{a+b}\, \sqrt{\text{Cos}[c+d\, x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\, (1-\text{Sec}[c+d\, x])}{a+b}}\, \sqrt{\frac{a\, (1+\text{Sec}[c+d\, x])}{a-b}}-\frac{1}{105\, a^2\, d}2\, (a-b)\, \sqrt{a+b}\, \left(6\, b^2\, B-a^2\, (25\, B-63\, C)+3\, a\, b\, (19\, B-7\, C)\right)\, \text{Cot}[c+d\, x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Cos}[c+d\, x]}}{\sqrt{a+b}\, \sqrt{\text{Cos}[c+d\, x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\, (1-\text{Sec}[c+d\, x])}{a+b}}\, \sqrt{\frac{a\, (1+\text{Sec}[c+d\, x])}{a-b}}+\frac{2\, a\, B\, \sqrt{a+b\, \text{Cos}[c+d\, x]}\, \text{Sin}[c+d\, x]}{7\, d\, \text{Cos}[c+d\, x]^{7/2}}+\frac{2\, (8\, b\, B+7\, a\, C)\, \sqrt{a+b\, \text{Cos}[c+d\, x]}\, \text{Sin}[c+d\, x]}{35\, d\, \text{Cos}[c+d\, x]^{5/2}}+\frac{2\, \left(25\, a^2\, B+3\, b^2\, B+42\, a\, b\, C\right)\, \sqrt{a+b\, \text{Cos}[c+d\, x]}\, \text{Sin}[c+d\, x]}{105\, a\, d\, \text{Cos}[c+d\, x]^{3/2}}$$

Result (type 4, 1407 leaves):

$$\frac{1}{105\, a^2\, d}\left(-\left(\left(4\, a\, \left(25\, a^4\, B-31\, a^2\, b^2\, B+6\, b^4\, B+21\, a^3\, b\, C-21\, a\, b^3\, C\right)\, \sqrt{\frac{(a+b)\, \text{Cot}\left[\frac{1}{2}\, (c+d\, x)\right]^2}{-a+b}}\, \sqrt{-\frac{(a+b)\, \text{Cos}[c+d\, x]\, \text{Csc}\left[\frac{1}{2}\, (c+d\, x)\right]^2}{a}}\, \sqrt{\frac{(a+b\, \text{Cos}[c+d\, x])\, \text{Csc}\left[\frac{1}{2}\, (c+d\, x)\right]^2}{a}}\right.\right.\right.$$

$$\text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left((a+b)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\Bigg)-$$

$$4 a\left(-82 a^3 b B+6 a b^3 B-63 a^4 C-21 a^2 b^2 C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)-\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\Bigg)+$$

$$2\left(-82 a^2 b^2 B+6 b^4 B-63 a^3 b C-21 a b^3 C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\mathrm{Sec}[c+d x]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]^2\mathrm{Sec}[c+d x]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\mathrm{Csc}[c+d x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)-\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\ \mathrm{Sin}[c+d\,x]}{b\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\mathrm{Cos}[c+d\,x]}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}$$

$$\left(\frac{2}{35}\mathrm{Sec}[c+d\,x]^3\ (8\,b\,B\,\mathrm{Sin}[c+d\,x]+7\,a\,C\,\mathrm{Sin}[c+d\,x])+\right.$$

$$\frac{1}{105\,a}$$

$$2$$

$$\mathrm{Sec}[c+d\,x]^2$$

$$(25\,a^2\,B\,\mathrm{Sin}[c+d\,x]+3\,b^2\,B\,\mathrm{Sin}[c+d\,x]+42\,a\,b\,C\,\mathrm{Sin}[c+d\,x])+\frac{1}{105\,a^2}2$$

$$\mathrm{Sec}[c+d\,x]$$

$$(82\,a^2\,b\,B\,\mathrm{Sin}[c+d\,x]-6\,b^3\,B\,\mathrm{Sin}[c+d\,x]+63\,a^3\,C\,\mathrm{Sin}[c+d\,x]+$$

$$\left.21\,a\,b^2\,C\,\mathrm{Sin}[c+d\,x])+\frac{2}{7}a\,B\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 911: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{\mathrm{Cos}[c+d\,x]}\ (a+b\,\mathrm{Cos}[c+d\,x])^{5/2}\ (B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2)\,dx$$

Optimal (type 4, 779 leaves, 11 steps):

$$-\frac{1}{1920\,a\,b^2\,d}(a-b)\sqrt{a+b}\left(150\,a^3\,b\,B+2840\,a\,b^3\,B-45\,a^4\,C+1692\,a^2\,b^2\,C+1024\,b^4\,C\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{1920\,b^2\,d}$$
$$\sqrt{a+b}\left(45\,a^4\,C-30\,a^3\,b\,(5\,B+C)-16\,b^4\,(45\,B+64\,C)-8\,a\,b^3\,(355\,B+193\,C)-4\,a^2\,b^2\,(295\,B+423\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{128\,b^3\,d}$$
$$\sqrt{a+b}\left(10\,a^4\,b\,B-240\,a^2\,b^3\,B-96\,b^5\,B-3\,a^5\,C-40\,a^3\,b^2\,C-240\,a\,b^4\,C\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\left(\left(150\,a^3\,b\,B+2840\,a\,b^3\,B-45\,a^4\,C+1692\,a^2\,b^2\,C+1024\,b^4\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(1920\,b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\right)+\frac{1}{320\,b\,d}$$
$$\left(50\,a^2\,b\,B+120\,b^3\,B-15\,a^3\,C+172\,a\,b^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]+$$
$$\frac{1}{240\,b\,d}\left(50\,a\,b\,B-15\,a^2\,C+64\,b^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\text{Sin}[c+d\,x]+$$
$$\frac{\left(10\,b\,B-3\,a\,C\right)\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\text{Sin}[c+d\,x]}{40\,b\,d}+$$
$$\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{7/2}\text{Sin}[c+d\,x]}{5\,b\,d}$$

Result (type 4, 1353 leaves) :

$$-\frac{1}{3840\,b\,d}$$
$$\left(-\left(\left(4\,a\,\left(-1330\,a^3\,b\,B-3560\,a\,b^3\,B+15\,a^4\,C-3236\,a^2\,b^2\,C-1024\,b^4\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.$$
$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\operatorname{Csc}[c+d x]\,\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right) -$$

$$4 a \left(-6440 a^2 b^2 B-1440 b^4 B-2292 a^3 b C-4624 a b^3 C\right)$$

$$\left(\left(\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right)+$$

$$2 \left(-150 a^3 b B-2840 a b^3 B+45 a^4 C-1692 a^2 b^2 C-1024 b^4 C\right)$$

$$\Bigg(\Bigg(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}$$

$$\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\Bigg)\Bigg/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\Bigg[$$

$$\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left.\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{b\,\sqrt{\mathrm{Cos}[c+d\,x]}}\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\ \left(\frac{\left(590\,a^2\,b\,B+420\,b^3\,B+15\,a^3\,C+898\,a\,b^2\,C\right)\,\text{Sin}[c+d\,x]}{960\,b}+\frac{1}{480}\left(170\,a\,b\,B+93\,a^2\,C+88\,b^2\,C\right)\,\text{Sin}[2\,(c+d\,x)]+\frac{1}{160}\,b\,\left(10\,b\,B+21\,a\,C\right)\,\text{Sin}[3\,(c+d\,x)]+\frac{1}{40}\,b^2\,C\,\text{Sin}[4\,(c+d\,x)]\right)$$

Problem 912: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 664 leaves, 10 steps):

$$-\frac{1}{192\,a\,b\,d}(a-b)\sqrt{a+b}\,\left(264\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+284\,a\,b^2\,C\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{192\,b\,d}$$
$$\sqrt{a+b}\,\left(15\,a^3\,C+8\,b^3\,(16\,B+9\,C)+2\,a^2\,b\,(132\,B+59\,C)+4\,a\,b^2\,(52\,B+71\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{64\,b^2\,d}$$
$$\sqrt{a+b}\,\left(40\,a^3\,b\,B+160\,a\,b^3\,B-5\,a^4\,C+120\,a^2\,b^2\,C+48\,b^4\,C\right)\,\text{Cot}[c+d\,x]$$
$$\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\left(\left(264\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+284\,a\,b^2\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(192\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}\right)+\frac{1}{32\,d}$$
$$\left(24\,a\,b\,B+5\,a^2\,C+12\,b^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]+$$
$$\frac{(8\,b\,B+11\,a\,C)\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{24\,d}+$$
$$\frac{b\,C\,\text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 4, 1287 leaves):

$$\frac{1}{384\,d}\left(-\left(\left(4\,a\,\left(472\,a^2\,b\,B+128\,b^3\,B+133\,a^3\,C+356\,a\,b^2\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.$$
$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$
$$\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right/\left(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\left(384\,a^3\,B+608\,a\,b^2\,B+644\,a^2\,b\,C+144\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right/$$

$$\left(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\left.\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right/\left(b\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)\right)+$$

$$2\left(264\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+284\,a\,b^2\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{1}{96}\,\left(104\,a\,b\,B+59\,a^2\,C+42\,b^2\,C\right)\right.$$

$$\text{Sin}[c+d\,x]+\frac{1}{48}$$

$$b$$

$$(8\,b\,B+17\,a\,C)$$

$$\text{Sin}[2\,(c+d\,x)]+\frac{1}{16}$$

b^2
C
$\text{Sin}[3(c+dx)]\Big)$

Problem 913: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 563 leaves, 9 steps):

$$-\frac{1}{24\,a\,d}(a-b)\sqrt{a+b}\,\left(54\,a\,b\,B+33\,a^2\,C+16\,b^2\,C\right)\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{24\,d}\sqrt{a+b}\,\left(4\,b^2\,(3\,B+4\,C)+a\,b\,(54\,B+26\,C)+a^2\,(48\,B+33\,C)\right)\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{8\,b\,d}\sqrt{a+b}\,\left(30\,a^2\,b\,B+8\,b^3\,B+5\,a^3\,C+20\,a\,b^2\,C\right)\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{\left(54\,a\,b\,B+33\,a^2\,C+16\,b^2\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{b\,(2\,b\,B+3\,a\,C)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}+\frac{b\,C\,\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 1251 leaves):

$$\frac{1}{48\,d}\Bigg(-\Bigg(\Bigg(4\,a\,\left(48\,a^3\,B+66\,a\,b^2\,B+59\,a^2\,b\,C+16\,b^3\,C\right)$$

$$\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(144\,a^2\,b\,B+24\,b^3\,B+48\,a^3\,C+76\,a\,b^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(54\,a\,b^2\,B+33\,a^2\,b\,C+16\,b^3\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\,\left(\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{b\sqrt{\text{Cos}[c+d x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\ \left(\frac{1}{12}\,b\,(6\,b\,B+13\,a\,C)\ \text{Sin}[c+d x]+\frac{1}{6}\,b^2\,C\ \text{Sin}[2\,(c+d x)]\right)$$

Problem 914: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d x])^{5/2}\,\left(B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)}{\text{Cos}[c+d x]^{5/2}}\,dx$$

Optimal (type 4, 547 leaves, 9 steps):

$$\frac{1}{4\,a\,d}\left(a-b\right)\sqrt{a+b}\,\left(8\,a^2\,B-4\,b^2\,B-9\,a\,b\,C\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1-\mathrm{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\mathrm{Sec}[c+d\,x]\right)}{a-b}}-\frac{1}{4\,d}\sqrt{a+b}\,\left(8\,a^2\,\left(B-C\right)-2\,b^2\,\left(2\,B+C\right)-3\,a\,b\,\left(8\,B+3\,C\right)\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1-\mathrm{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\mathrm{Sec}[c+d\,x]\right)}{a-b}}-\frac{1}{4\,d}\sqrt{a+b}\,\left(20\,a\,b\,B+15\,a^2\,C+4\,b^2\,C\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1-\mathrm{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\mathrm{Sec}[c+d\,x]\right)}{a-b}}-\frac{\left(8\,a^2\,B-4\,b^2\,B-9\,a\,b\,C\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{4\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}-\frac{b\,\left(4\,a\,B-b\,C\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{2\,d}+\frac{2\,a\,B\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\,\mathrm{Sin}[c+d\,x]}{d\,\sqrt{\mathrm{Cos}[c+d\,x]}}$$

Result (type 4, 1241 leaves):

$$\frac{1}{8\,d}\left(\left(4\,a\,\left(-16\,a^2\,b\,B-4\,b^3\,B-8\,a^3\,C-11\,a\,b^2\,C\right)\sqrt{\frac{\left(a+b\right)\,\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/\left(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+4\,a\,\left(8\,a^3\,B-24\,a\,b^2\,B-24\,a^2\,b\,C-4\,b^3\,C\right)\right.$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$2\,\left(8\,a^2\,b\,B-4\,b^3\,B-9\,a\,b^2\,C\right)\,\left(\left(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\Bigg)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{1}{2}b^2\,C\,\text{Sin}[c+d\,x]+\right.$$

$$\left.2\,a^2\,B\,\text{Tan}[c+d\,x]\right)$$

Problem 915: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\mathrm{Cos}[c+d\,x])^{5/2}\,(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2)}{\mathrm{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 536 leaves, 9 steps):

$$\frac{1}{3\,a\,d}(a-b)\sqrt{a+b}\,(14\,a\,b\,B+6\,a^2\,C-3\,b^2\,C)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{3\,d}\sqrt{a+b}\,(2\,a\,b\,(7\,B-9\,C)-2\,a^2\,(B-3\,C)-3\,b^2\,(6\,B+C))\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}b\sqrt{a+b}\,(2\,b\,B+5\,a\,C)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\Big[\frac{a+b}{b},\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,(2\,b\,B+a\,C)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{d\sqrt{\mathrm{Cos}[c+d\,x]}}-\frac{(14\,a\,b\,B+6\,a^2\,C-3\,b^2\,C)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{3\,d\sqrt{\mathrm{Cos}[c+d\,x]}}+\frac{2\,a\,B\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1269 leaves):

$$\frac{1}{6\,d}\Bigg(-\Bigg(\Bigg(4\,a\,(2\,a^3\,B+4\,a\,b^2\,B+12\,a^2\,b\,C+3\,b^3\,C)\sqrt{\frac{(a+b)\,\mathrm{Cot}[\frac{1}{2}(c+d\,x)]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}[\frac{1}{2}(c+d\,x)]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}[\frac{1}{2}(c+d\,x)]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}[\frac{1}{2}(c+d\,x)]^2}{a}}}{\sqrt{2}}\Big],-\frac{2\,a}{-a+b}\Big]\,\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]^4\Bigg)\Bigg/$$

$$\left.\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\left(-14\,a^2\,b\,B+6\,b^3\,B-6\,a^3\,C+18\,a\,b^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\ \sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\ \text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-14\,a\,b^2\,B-6\,a^2\,b\,C+3\,b^3\,C\right)\left(\left(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2}{3}\text{Sec}[c+d\,x]\left(7\,a\,b\,B\,\text{Sin}[c+d\,x]+3\,a^2\,C\,\text{Sin}[c+d\,x]\right)+\right.$$

$$\frac{2}{3}$$

$$a^2$$

$$B$$

$$\text{Sec}[c+d x]\ \text{Tan}[c+d x]\Big)$$

Problem 916: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d x])^{5/2}\left(B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)}{\text{Cos}[c+d x]^{9/2}}\,dx$$

Optimal (type 4, 493 leaves, 8 steps):

$$\frac{1}{15 a d}2(a-b)\sqrt{a+b}\left(9 a^2 B+23 b^2 B+35 a b C\right)\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{15 a d}2\sqrt{a+b}\left(15 b^3 B-a b^2(23 B-45 C)+a^2 b(17 B-35 C)-a^3(9 B-5 C)\right)\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{d}2 b^2\sqrt{a+b}\,C\,\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\text{Sec}[c+d x])}{a-b}}+\frac{2 a(8 b B+5 a C)\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{15 d\,\text{Cos}[c+d x]^{3/2}}+\frac{2 a B(a+b\,\text{Cos}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{5 d\,\text{Cos}[c+d x]^{5/2}}$$

Result (type 4, 1319 leaves):

$$\frac{1}{15 d}\Bigg(\Bigg(4 a\left(-8 a^2 b B+8 b^3 B-5 a^3 C-10 a b^2 C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\text{Csc}[$$

$$c + d\,x]\ \text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\ -\frac{2\,a}{-a+b}\Big]\ \text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4\Bigg)\Big/$$

$$\Big((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\Big) + 4\,a\,\left(9\,a^3\,B + 23\,a\,b^2\,B + 35\,a^2\,b\,C - 15\,b^3\,C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]$$

$$\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\ -\frac{2\,a}{-a+b}\Big]\ \text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4\Bigg)\Big/$$

$$\Big((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\Big) - \Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\ \text{EllipticPi}\Big[-\frac{a}{b},\ \text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\ -\frac{2\,a}{-a+b}\Big]$$

$$\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4\Bigg)\Big/\Big(b\,\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\Big)\Bigg) -$$

$$2\,\left(9\,a^2\,b\,B + 23\,b^3\,B + 35\,a\,b^2\,C\right)\ \Bigg(\Bigg(i\,\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]\ \sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{EllipticE}\left[i \,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right], -\frac{2 a}{-a-b}\right] \text{Sec}[c+d x]\Bigg) \Bigg/$$

$$\left(b \sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \text{Sec}[c+d x]} \sqrt{\frac{(a+b \,\text{Cos}[c+d x]) \,\text{Sec}[c+d x]}{a+b}}\right) +$$

$$\frac{1}{b} 2 a \left(\left(a \sqrt{\frac{(a+b) \,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \,\text{Cos}[c+d x] \,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b \,\text{Cos}[c+d x]) \,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \,\text{Csc}[c+d x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \,\text{Cos}[c+d x]) \,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\Bigg) \Bigg/$$

$$\left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \,\text{Cos}[c+d x]}\right) - \left(a \sqrt{\frac{(a+b) \,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b) \,\text{Cos}[c+d x] \,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \,\text{Cos}[c+d x]) \,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\text{Csc}[c+d x] \,\text{EllipticPi}\left[-\frac{a}{b}, \text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \,\text{Cos}[c+d x]) \,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Bigg/ \left(b \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \,\text{Cos}[c+d x]}\right)\Bigg) +$$

$$\left.\left.\frac{\sqrt{a+b \,\text{Cos}[c+d x]} \,\text{Sin}[c+d x]}{b \sqrt{\text{Cos}[c+d x]}}\right)\right) + \frac{1}{d}\sqrt{\text{Cos}[c+d x]} \sqrt{a+b \,\text{Cos}[c+d x]}$$

$$\left(\frac{2}{15} \text{Sec}[c+d x]^2 \left(11 a b B \,\text{Sin}[c+d x] + 5 a^2 C \,\text{Sin}[c+d x]\right) +\right.$$

$$\frac{2}{15} \text{Sec}[c+d x] \left(9 a^2 B \text{Sin}[c+d x]+23 b^2 B \text{Sin}[c+d x]+35 a b C \text{Sin}[c+d x]\right)+\frac{2}{5} a^2 B \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\Big)$$

Problem 917: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b \text{Cos}[c+d x])^{5/2} \left(B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right)}{\text{Cos}[c+d x]^{11/2}} \, dx$$

Optimal (type 4, 434 leaves, 7 steps):

$$\frac{1}{105 a^2 d}2 (a-b) \sqrt{a+b} \left(145 a^2 b B+15 b^3 B+63 a^3 C+161 a b^2 C\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{105 a d} 2 (a-b) \sqrt{a+b} \left(a^2 (25 B-63 C)+15 b^2 (B-7 C)-8 a b (15 B-7 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 a (10 b B+7 a C) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{35 d \text{Cos}[c+d x]^{5/2}}+\frac{2 \left(25 a^2 B+45 b^2 B+77 a b C\right) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{105 d \text{Cos}[c+d x]^{3/2}}+\frac{2 a B (a+b \text{Cos}[c+d x])^{3/2} \text{Sin}[c+d x]}{7 d \text{Cos}[c+d x]^{7/2}}$$

Result (type 4, 1409 leaves):

$$\frac{1}{105 a d}\left(-\left(\left(4 a \left(25 a^4 B-10 a^2 b^2 B-15 b^4 B+56 a^3 b C-56 a b^3 C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}}\right.\right.\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\left(-145\,a^3\,b\,B-15\,a\,b^3\,B-63\,a^4\,C-161\,a^2\,b^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-145 a^2 b^2 B-15 b^4 B-63 a^3 b C-161 a b^3 C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\mathrm{Sec}[c+d x]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]^2\mathrm{Sec}[c+d x]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\mathrm{Csc}[c+d x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)-\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{b\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}$$

$$\left(\frac{2}{35}\,\mathrm{Sec}[c+d\,x]^3\,\left(15\,a\,b\,B\,\mathrm{Sin}[c+d\,x]+7\,a^2\,C\,\mathrm{Sin}[c+d\,x]\right)+\frac{2}{105}\,\mathrm{Sec}[c+d\,x]^2\,\left(25\,a^2\,B\,\mathrm{Sin}[c+d\,x]+45\,b^2\,B\,\mathrm{Sin}[c+d\,x]+77\,a\,b\,C\,\mathrm{Sin}[c+d\,x]\right)+\frac{1}{105\,a}2\,\mathrm{Sec}[c+d\,x]\,\left(145\,a^2\,b\,B\,\mathrm{Sin}[c+d\,x]+15\,b^3\,B\,\mathrm{Sin}[c+d\,x]+63\,a^3\,C\,\mathrm{Sin}[c+d\,x]+161\,a\,b^2\,C\,\mathrm{Sin}[c+d\,x]\right)+\frac{2}{7}\,a^2\,B\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 918: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{5/2}\,\left(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{\mathrm{Cos}[c+d\,x]^{13/2}}\,dx$$

Optimal (type 4, 522 leaves, 8 steps):

$$\frac{1}{315\,a^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(147\,a^4\,B+279\,a^2\,b^2\,B-10\,b^4\,B+435\,a^3\,b\,C+45\,a\,b^3\,C\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{315\,a^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(10\,b^3\,B-6\,a^2\,b\,(19\,B-60\,C)+3\,a^3\,(49\,B-25\,C)+15\,a\,b^2\,(11\,B-3\,C)\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,(4\,b\,B+3\,a\,C)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{21\,d\,\mathrm{Cos}[c+d\,x]^{7/2}}+\frac{2\,\left(49\,a^2\,B+75\,b^2\,B+135\,a\,b\,C\right)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{315\,d\,\mathrm{Cos}[c+d\,x]^{5/2}}+\left(2\,\left(163\,a^2\,b\,B+5\,b^3\,B+75\,a^3\,C+135\,a\,b^2\,C\right)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]\right)\Big/\left(315\,a\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\right)+\frac{2\,a\,B\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\,\mathrm{Sin}[c+d\,x]}{9\,d\,\mathrm{Cos}[c+d\,x]^{9/2}}$$

Result (type 4, 1517 leaves) :

$$-\frac{1}{315\,a^2\,d}\Bigg(-\Bigg(\Bigg(4\,a\,\big(-114\,a^4\,b\,B+124\,a^2\,b^3\,B-10\,b^5\,B-75\,a^5\,C+30\,a^3\,b^2\,C+45\,a\,b^4\,C\big)$$

$$\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\Big((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\Big)\Bigg)-$$

$$4\,a\,\big(147\,a^5\,B+279\,a^3\,b^2\,B-10\,a\,b^4\,B+435\,a^4\,b\,C+45\,a^2\,b^3\,C\big)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\Big((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\Big)-\Bigg(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(147\,a^4\,b\,B+279\,a^2\,b^3\,B-10\,b^5\,B+435\,a^3\,b^2\,C+45\,a\,b^4\,C\right)$$

$$\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\,\left(\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\,\text{EllipticF}\Bigg[$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]^4\Bigg)\Big/$$

$$\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\Bigg(\frac{2}{63}\,\text{Sec}[c+d\,x]^4$$
$$\left(19\,a\,b\,B\,\text{Sin}[c+d\,x]+9\,a^2\,C\,\text{Sin}[c+d\,x]\right)+\frac{2}{315}$$
$$\text{Sec}[c+d\,x]^3$$
$$\left(49\,a^2\,B\,\text{Sin}[c+d\,x]+75\,b^2\,B\,\text{Sin}[c+d\,x]+135\,a\,b\,C\,\text{Sin}[c+d\,x]\right)+$$
$$\frac{1}{315\,a}2\,\text{Sec}[c+d\,x]^2\,\Big(163\,a^2\,b\,B\,\text{Sin}[c+d\,x]+5\,b^3\,B\,\text{Sin}[c+d\,x]+$$
$$75\,a^3\,C\,\text{Sin}[c+d\,x]+135\,a\,b^2\,C\,\text{Sin}[c+d\,x]\Big)+\frac{1}{315\,a^2}$$
$$2\,\text{Sec}[c+d\,x]\,\Big(147\,a^4\,B\,\text{Sin}[c+d\,x]+279\,a^2\,b^2\,B\,\text{Sin}[c+d\,x]-10\,b^4\,B\,\text{Sin}[c+d\,x]+$$
$$435\,a^3\,b\,C\,\text{Sin}[c+d\,x]+45\,a\,b^3\,C\,\text{Sin}[c+d\,x]\Big)+\frac{2}{9}\,a^2\,B\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]\Bigg)$$

Problem 919: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{15/2}}\,dx$$

Optimal (type 4, 622 leaves, 9 steps):

$$\frac{1}{3465 a^4 d} 2 (a-b) \sqrt{a+b} \left(3705 a^4 b B + 255 a^2 b^3 B + 40 b^5 B + 1617 a^5 C + 3069 a^3 b^2 C - 110 a b^4 C\right) \text{Cot}[c+d x] \, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{3465 a^3 d} 2 (a-b) \sqrt{a+b} \left(40 b^4 B + 3 a^4 (225 B - 539 C) - 6 a^3 b (505 B - 209 C) + 15 a^2 b^2 (19 B - 121 C) + 10 a b^3 (3 B - 11 C)\right) \text{Cot}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 a (14 b B + 11 a C) \sqrt{a+b \text{Cos}[c+d x]} \, \text{Sin}[c+d x]}{99 d \text{Cos}[c+d x]^{9/2}} + \frac{2 \left(81 a^2 B + 113 b^2 B + 209 a b C\right) \sqrt{a+b \text{Cos}[c+d x]} \, \text{Sin}[c+d x]}{693 d \text{Cos}[c+d x]^{7/2}} + \left(2 \left(1145 a^2 b B + 15 b^3 B + 539 a^3 C + 825 a b^2 C\right) \sqrt{a+b \text{Cos}[c+d x]} \, \text{Sin}[c+d x]\right) \Big/ \left(3465 a d \text{Cos}[c+d x]^{5/2}\right) + \left(2 \left(675 a^4 B + 1025 a^2 b^2 B - 20 b^4 B + 1793 a^3 b C + 55 a b^3 C\right) \sqrt{a+b \text{Cos}[c+d x]} \, \text{Sin}[c+d x]\right) \Big/ \left(3465 a^2 d \text{Cos}[c+d x]^{3/2}\right) + \frac{2 a B (a+b \text{Cos}[c+d x])^{3/2} \text{Sin}[c+d x]}{11 d \text{Cos}[c+d x]^{11/2}}$$

Result (type 4, 1640 leaves):

$$\frac{1}{3465 a^3 d} \left(-\left(\left(4 a \left(675 a^6 B - 390 a^4 b^2 B - 245 a^2 b^4 B - 40 b^6 B + 1254 a^5 b C - 1364 a^3 b^3 C + 110 a b^5 C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \right.\right.$$

$$\left.\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\,\left(-3705\,a^5\,b\,B-255\,a^3\,b^3\,B-40\,a\,b^5\,B-1617\,a^6\,C-3069\,a^4\,b^2\,C+110\,a^2\,b^4\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(-3705\,a^4\,b^2\,B-255\,a^2\,b^4\,B-40\,b^6\,B-1617\,a^5\,b\,C-3069\,a^3\,b^3\,C+110\,a\,b^5\,C\right)$$

$$\left(\left(\mathrm{i}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\Bigg)\Bigg/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2}{99}\text{Sec}[c+d\,x]^5\left(23\,a\,b\,B\,\text{Sin}[c+d\,x]+11\,a^2\,C\,\text{Sin}[c+d\,x]\right)+\right.$$

$$\frac{2}{693}\text{Sec}[c+d x]^4 \left(81 a^2 B \text{Sin}[c+d x]+113 b^2 B \text{Sin}[c+d x]+209 a b C \text{Sin}[c+d x]\right)+$$
$$\frac{1}{3465 a}2 \text{Sec}[c+d x]^3 \left(1145 a^2 b B \text{Sin}[c+d x]+15 b^3 B \text{Sin}[c+d x]+539 a^3 C \text{Sin}[c+d x]+825 a b^2 C \text{Sin}[c+d x]\right)+$$
$$\frac{1}{3465 a^2}2 \text{Sec}[c+d x]^2 \left(675 a^4 B \text{Sin}[c+d x]+1025 a^2 b^2 B \text{Sin}[c+d x]-20 b^4 B \text{Sin}[c+d x]+1793 a^3 b C \text{Sin}[c+d x]+55 a b^3 C \text{Sin}[c+d x]\right)+$$
$$\frac{1}{3465 a^3}2 \text{Sec}[c+d x] \left(3705 a^4 b B \text{Sin}[c+d x]+255 a^2 b^3 B \text{Sin}[c+d x]+40 b^5 B \text{Sin}[c+d x]+1617 a^5 C \text{Sin}[c+d x]+3069 a^3 b^2 C \text{Sin}[c+d x]-110 a b^4 C \text{Sin}[c+d x]\right)+\frac{2}{11} a^2 B \text{Sec}[c+d x]^5 \text{Tan}[c+d x]\Bigg)$$

Problem 920: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^{3/2} \left(B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right)}{\sqrt{a+b \text{Cos}[c+d x]}}\, dx$$

Optimal (type 4, 571 leaves, 9 steps):

$$\frac{1}{24\,a\,b^3\,d}(a-b)\,\sqrt{a+b}\,\left(18\,a\,b\,B-15\,a^2\,C-16\,b^2\,C\right)\,\mathrm{Cot}[c+d\,x]$$
$$\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}$$
$$\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{24\,b^3\,d}\sqrt{a+b}\,\left(18\,a\,b\,B-12\,b^2\,B-15\,a^2\,C+10\,a\,b\,C-16\,b^2\,C\right)$$
$$\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}$$
$$\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{8\,b^4\,d}\sqrt{a+b}\,\left(6\,a^2\,b\,B+8\,b^3\,B-5\,a^3\,C-4\,a\,b^2\,C\right)\,\mathrm{Cot}[c+d\,x]$$
$$\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}$$
$$\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{\left(18\,a\,b\,B-15\,a^2\,C-16\,b^2\,C\right)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{24\,b^3\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}+$$
$$\frac{(6\,b\,B-5\,a\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{12\,b^2\,d}+$$
$$\frac{C\,\mathrm{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{3\,b\,d}$$

Result (type 4, 1229 leaves):

$$\frac{1}{48\,b^2\,d}\left(-\left(\left(4\,a\,\left(-6\,a\,b\,B+5\,a^2\,C+16\,b^2\,C\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.$$
$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$
$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$
$$\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\,\left(24\,b^2\,B+4\,a\,b\,C\right)\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-18\,a\,b\,B+15\,a^2\,C+16\,b^2\,C\right)\left(\left(i\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\operatorname{Cos}[c+dx]\operatorname{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\operatorname{Cos}[c+dx])\operatorname{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\operatorname{Csc}[c+dx]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+dx])\operatorname{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\operatorname{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\operatorname{Cos}[c+dx]}\sqrt{a+b\operatorname{Cos}[c+dx]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\operatorname{Cos}[c+dx]\operatorname{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\operatorname{Cos}[c+dx])\operatorname{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\operatorname{Csc}[c+dx]\operatorname{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+dx])\operatorname{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\operatorname{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left.\left(b\sqrt{\operatorname{Cos}[c+dx]}\sqrt{a+b\operatorname{Cos}[c+dx]}\right)+\frac{\sqrt{a+b\operatorname{Cos}[c+dx]}\operatorname{Sin}[c+dx]}{b\sqrt{\operatorname{Cos}[c+dx]}}\right)+$$

$$\frac{\sqrt{\operatorname{Cos}[c+dx]}\sqrt{a+b\operatorname{Cos}[c+dx]}\left(\frac{(6bB-5aC)\operatorname{Sin}[c+dx]}{12b^2}+\frac{C\operatorname{Sin}[2(c+dx)]}{6b}\right)}{d}$$

Problem 921: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{\operatorname{Cos}[c+dx]}\left(B\operatorname{Cos}[c+dx]+C\operatorname{Cos}[c+dx]^2\right)}{\sqrt{a+b\operatorname{Cos}[c+dx]}}\,dx$$

Optimal (type 4, 479 leaves, 8 steps):

$$-\frac{1}{4\,a\,b^2\,d}\left(a-b\right)\sqrt{a+b}\,\left(4\,b\,B-3\,a\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,b^2\,d}\sqrt{a+b}\,\left(3\,a\,C-2\,b\,(2\,B+C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{4\,b^3\,d}\sqrt{a+b}\,\left(4\,a\,b\,B-3\,a^2\,C-4\,b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{\left(4\,b\,B-3\,a\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,b\,d}$$

Result (type 4, 1175 leaves):

$$\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,b\,d}+\frac{1}{8\,b\,d}\Bigg(-\Bigg(\Bigg(4\,a\,\left(4\,b\,B-a\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4\Bigg)\Bigg/\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-$$

$$16\,a\,b\,C\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\,(4\,b\,B-3\,a\,C)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\right[\right.\right.$$

$$\left.\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)$$

Problem 922: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 391 leaves, 8 steps):

$$-\frac{1}{a\,b\,d}(a-b)\sqrt{a+b}\;C\,\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{b\,d}$$
$$\sqrt{a+b}\;C\,\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{b^2\,d}$$
$$\sqrt{a+b}\;(2\,b\,B-a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\,\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{C\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 4017 leaves):

$$\Bigg((1+\text{Cos}[c+d\,x])^{3/2}\left(\frac{B\sqrt{\text{Cos}[c+d\,x]}}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{C\,\text{Cos}[c+d\,x]^{3/2}}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}\right)$$
$$\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]^2\Bigg(2\,i\,(a-b)\,C\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}$$
$$\text{EllipticE}\Big[i\,\text{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],\,-\frac{a+b}{a-b}\Big]+4\,i\,(b\,B-a\,C)$$
$$\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticF}\Big[i\,\text{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],\,-\frac{a+b}{a-b}\Big]-$$
$$8\,i\,b\,B\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\,\text{EllipticPi}\Big[\frac{a+b}{a-b},$$
$$i\,\text{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],\,-\frac{a+b}{a-b}\Big]+4\,i\,a\,C\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}$$
$$\text{EllipticPi}\Big[\frac{a+b}{a-b},\,i\,\text{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],\,-\frac{a+b}{a-b}\Big]+$$
$$b\sqrt{\frac{a-b}{a+b}}\,C\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\,\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]\,\text{Sin}\Big[\frac{3}{2}(c+d\,x)\Big]+$$

$$2\,a\,\sqrt{\frac{a-b}{a+b}}\;C\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-$$

$$b\,\sqrt{\frac{a-b}{a+b}}\;C\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)\Bigg)\Bigg/$$

$$\left(4\,b\,\sqrt{\frac{a-b}{a+b}}\;d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\left(\frac{1}{8\,\sqrt{\frac{a-b}{a+b}}\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}\right.$$

$$(1+\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\mathrm{Sin}[c+d\,x]\,\Bigg(2\,i\,(a-b)\,C\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}$$

$$\mathrm{EllipticE}\Big[i\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,-\frac{a+b}{a-b}\Big]+4\,i\,(b\,B-a\,C)$$

$$\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticF}\Big[i\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],$$

$$-\frac{a+b}{a-b}\Big]-8\,i\,b\,B\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticPi}\Big[\frac{a+b}{a-b},$$

$$i\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,-\frac{a+b}{a-b}\Big]+4\,i\,a\,C\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}$$

$$\mathrm{EllipticPi}\Big[\frac{a+b}{a-b},\,i\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,-\frac{a+b}{a-b}\Big]+$$

$$b\,\sqrt{\frac{a-b}{a+b}}\;C\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]\,\mathrm{Sin}\Big[\frac{3}{2}\,(c+d\,x)\Big]+2\,a\,\sqrt{\frac{a-b}{a+b}}\;C$$

$$\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-b\,\sqrt{\frac{a-b}{a+b}}\;C\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)-$$

$$\frac{1}{8\,b\,\sqrt{\frac{a-b}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}\,3\,\sqrt{1+\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\mathrm{Sin}[c+d\,x]$$

$$\Bigg(2\,i\,(a-b)\,C\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticE}\Big[i\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],$$

$$-\frac{a+b}{a-b}\Big] + 4\,\mathrm{i}\,(b\,B - a\,C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}$$

$$\mathrm{EllipticF}\Big[\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,-\frac{a+b}{a-b}\Big] -$$

$$8\,\mathrm{i}\,b\,B\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\,\mathrm{EllipticPi}\Big[\frac{a+b}{a-b},$$

$$\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,-\frac{a+b}{a-b}\Big] + 4\,\mathrm{i}\,a\,C\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}$$

$$\mathrm{EllipticPi}\Big[\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,-\frac{a+b}{a-b}\Big] +$$

$$b\,\sqrt{\frac{a-b}{a+b}}\,C\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\mathrm{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]\,\mathrm{Sin}\Big[\frac{3}{2}\,(c+d\,x)\Big] + 2\,a\,\sqrt{\frac{a-b}{a+b}}\,C$$

$$\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big] - b\,\sqrt{\frac{a-b}{a+b}}\,C\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg) +$$

$$\frac{1}{4\,b\,\sqrt{\frac{a-b}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}\,(1+\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]$$

$$\Bigg(2\,\mathrm{i}\,(a-b)\,C\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\,\mathrm{EllipticE}\Big[\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],$$

$$-\frac{a+b}{a-b}\Big] + 4\,\mathrm{i}\,(b\,B - a\,C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}$$

$$\mathrm{EllipticF}\Big[\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,-\frac{a+b}{a-b}\Big] -$$

$$8\,\mathrm{i}\,b\,B\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\,\mathrm{EllipticPi}\Big[\frac{a+b}{a-b},$$

$$\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,-\frac{a+b}{a-b}\Big] + 4\,\mathrm{i}\,a\,C\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}$$

$$\text{EllipticPi}\left[\frac{a+b}{a-b}, i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], -\frac{a+b}{a-b}\right] +$$

$$b\sqrt{\frac{a-b}{a+b}}\,C\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]\text{Sin}\left[\frac{3}{2}(c+d x)\right] + 2a\sqrt{\frac{a-b}{a+b}}\,C$$

$$\left.\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right] - b\sqrt{\frac{a-b}{a+b}}\,C\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right) +$$

$$\frac{1}{4b\sqrt{\frac{a-b}{a+b}}\sqrt{a+b\,\text{Cos}[c+d x]}}\left(1+\text{Cos}[c+d x]\right)^{3/2}\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\left(\frac{3}{2}b\sqrt{\frac{a-b}{a+b}}\,C\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\text{Cos}\left[\frac{3}{2}(c+d x)\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right] +\right.$$

$$a\sqrt{\frac{a-b}{a+b}}\,C\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 -$$

$$\frac{1}{2}b\sqrt{\frac{a-b}{a+b}}\,C\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 + \Bigg(i\,(a-b)\,C\,\text{EllipticE}\Bigg[$$

$$i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], -\frac{a+b}{a-b}\Bigg]\left(-\frac{b\,\text{Sin}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])} +\right.$$

$$\left.\left.\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])^2}\right)\right)\Bigg/\left(\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}\right) +$$

$$\Bigg(2i\,(b B-a C)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], -\frac{a+b}{a-b}\right]$$

$$\left.\left(-\frac{b\,\text{Sin}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])} + \frac{(a+b\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])^2}\right)\right)\Bigg/$$

$$\left(\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}\right) - \Bigg(4\,i\,b\,B\,\text{EllipticPi}\Bigg[\frac{a+b}{a-b},$$

$$\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],-\frac{a+b}{a-b}\Big]\left(-\frac{b\,\text{Sin}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])}+\right.$$

$$\left.\left.\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])^2}\right)\right)\Bigg/\left(\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])}}\right)+$$

$$\left(2\,\mathrm{i}\,a\,C\,\text{EllipticPi}\left[\frac{a+b}{a-b},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],-\frac{a+b}{a-b}\right]\right.$$

$$\left.\left(-\frac{b\,\text{Sin}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])}+\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sin}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])^2}\right)\right)\Bigg/$$

$$\left(\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])}}\right)+\frac{1}{2\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}b\sqrt{\frac{a-b}{a+b}}\,C\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]$$

$$\left(\frac{\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}-\frac{\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}\right)\text{Sin}\left[\frac{3}{2}(c+d x)\right]+$$

$$\frac{a\sqrt{\frac{a-b}{a+b}}\,C\left(\frac{\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}-\frac{\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}-$$

$$\frac{b\sqrt{\frac{a-b}{a+b}}\,C\left(\frac{\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}-\frac{\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}\right)\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{2\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}}+$$

$$\frac{1}{2}b\sqrt{\frac{a-b}{a+b}}\,C\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]\text{Sin}\left[\frac{3}{2}(c+d x)\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]-$$

$$\frac{2\sqrt{\frac{a-b}{a+b}}\,(b B-a C)\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])}}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{1+\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}}-$$

$$\left((a-b)\sqrt{\frac{a-b}{a+b}}\,C\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])}}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right.$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\Bigg/\left(\sqrt{1+\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)+$$

$$\left(4\,b\sqrt{\frac{a-b}{a+b}}\;B\sqrt{\frac{a+b\,\mathrm{Cos}[c+d x]}{(a+b)\,(1+\mathrm{Cos}[c+d x])}}\;\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\Bigg/$$

$$\left(\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{1+\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)-$$

$$\left(2\,a\sqrt{\frac{a-b}{a+b}}\;C\sqrt{\frac{a+b\,\mathrm{Cos}[c+d x]}{(a+b)\,(1+\mathrm{Cos}[c+d x])}}\;\mathrm{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\Bigg/$$

$$\left.\left.\left.\left(\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{1+\frac{(a-b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\right)\right)$$

Problem 924: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{B\,\mathrm{Cos}[c+d x]+C\,\mathrm{Cos}[c+d x]^2}{\mathrm{Cos}[c+d x]^{5/2}\sqrt{a+b\,\mathrm{Cos}[c+d x]}}\,dx$$

Optimal (type 4, 230 leaves, 4 steps):

$$\frac{1}{a^2 d}2\,(a-b)\sqrt{a+b}\;B\,\mathrm{Cot}[c+d x]\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d x])}{a+b}}\;\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d x])}{a-b}}-\frac{1}{a\,d}$$

$$2\sqrt{a+b}\;(B-C)\;\mathrm{Cot}[c+d x]\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d x])}{a+b}}\;\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d x])}{a-b}}$$

Result (type 4, 1164 leaves):

$$\frac{2\,B\sqrt{a+b\,\mathrm{Cos}[c+d x]}\;\mathrm{Sin}[c+d x]}{a\,d\sqrt{\mathrm{Cos}[c+d x]}}-$$

$$\frac{1}{a\,d}\left(-\left(\left(4\,a\,(b\,B-a\,C)\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a^2\,B\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\,b\,B\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],\right.\right.\right.$$

$$\left.\left.-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\mathrm{Sec}[c+d\,x]}\;\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{\left(a+b\right)\,\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\;\sqrt{-\frac{\left(a+b\right)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{\left(a+b\right)\,\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\;\sqrt{-\frac{\left(a+b\right)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 925: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{7/2}\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 290 leaves, 5 steps):

$$-\frac{1}{3\,a^3\,d}2\,(a-b)\,\sqrt{a+b}\,\,(2\,b\,B-3\,a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{3\,a^2\,d}2\,\sqrt{a+b}\,\,(2\,b\,B+a\,(B-3\,C))\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,B\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{3\,a\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1238 leaves):

$$\frac{1}{3\,a^2\,d}\left(-\left(\left(4\,a\,(a^2\,B+2\,b^2\,B-3\,a\,b\,C)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-\right.$$

$$4\,a\,\left(2\,a\,b\,B-3\,a^2\,C\right)\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(2\,b^2\,B-3\,a\,b\,C\right)\left(\left(\mathbb{i}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathbb{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\ \text{Csc}[c+dx]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}$$

$$\text{Csc}[c+dx]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Bigg/\left(b\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+dx]}\ \text{Sin}[c+dx]}{b\sqrt{\text{Cos}[c+dx]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}$$

$$\left(\frac{2\,\text{Sec}[c+dx]\,(-2\,b\,B\,\text{Sin}[c+dx]+3\,a\,C\,\text{Sin}[c+dx])}{3a^2}+\right.$$

$$\left.\frac{2\,B\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{3a}\right)$$

Problem 926: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2}{\mathrm{Cos}[c+d\,x]^{9/2}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 363 leaves, 6 steps):

$$\frac{1}{15\,a^4\,d}2\,(a-b)\,\sqrt{a+b}\,\left(9\,a^2\,B+8\,b^2\,B-10\,a\,b\,C\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{15\,a^3\,d}2\,\sqrt{a+b}\,\left(8\,b^2\,B+a^2\,(9\,B-5\,C)-2\,a\,b\,(B+5\,C)\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{2\,B\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{5\,a\,d\,\mathrm{Cos}[c+d\,x]^{5/2}}-\frac{2\,(4\,b\,B-5\,a\,C)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{15\,a^2\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1319 leaves):

$$-\frac{1}{15\,a^3\,d}\left(-\left(\left(4\,a\,\left(7\,a^2\,b\,B+8\,b^3\,B-5\,a^3\,C-10\,a\,b^2\,C\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(9\,a^3\,B+8\,a\,b^2\,B-10\,a^2\,b\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(9\,a^2\,b\,B+8\,b^3\,B-10\,a\,b^2\,C\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\,\text{Csc}[c+dx]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/\left((a+b)\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\,\text{Csc}[c+dx]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{b\sqrt{\text{Cos}[c+dx]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\left(\frac{2\,\text{Sec}[c+dx]^2\left(-4\,b\,B\,\text{Sin}[c+dx]+5\,a\,C\,\text{Sin}[c+dx]\right)}{15\,a^2}+\frac{1}{15\,a^3}2\,\text{Sec}[c+dx]\left(9\,a^2\,B\,\text{Sin}[c+dx]+8\,b^2\,B\,\text{Sin}[c+dx]-10\,a\,b\,C\,\text{Sin}[c+dx]\right)+\frac{2\,B\,\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]}{5\,a}\right)$$

Problem 927: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^{3/2} \left(B \,\text{Cos}[c+d x]+C \,\text{Cos}[c+d x]^2\right)}{\left(a+b \,\text{Cos}[c+d x]\right)^{3/2}} \, dx$$

Optimal (type 4, 620 leaves, 9 steps):

$$-\frac{1}{4 a b^3 \sqrt{a+b}\, d}\left(12 a^2 b B-4 b^3 B-15 a^3 C+7 a b^2 C\right) \text{Cot}[c+d x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{4 b^3 \sqrt{a+b}\, d}\left(a b (12 B-5 C)-15 a^2 C+2 b^2 (2 B+C)\right) \text{Cot}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{4 b^4 d}\sqrt{a+b} \left(12 a b B-15 a^2 C-4 b^2 C\right) \text{Cot}[c+d x]\, \text{EllipticPi}\left[\frac{a+b}{b}, \text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 a (b B-a C) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{b \left(a^2-b^2\right) d \sqrt{a+b \,\text{Cos}[c+d x]}} + \frac{\left(12 a^2 b B-4 b^3 B-15 a^3 C+7 a b^2 C\right) \sqrt{a+b \,\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{4 b^3 \left(a^2-b^2\right) d \sqrt{\text{Cos}[c+d x]}} - \frac{\left(4 a b B-5 a^2 C+b^2 C\right) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \,\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{2 b^2 \left(a^2-b^2\right) d}$$

Result (type 4, 1297 leaves):

$$\frac{1}{d}\sqrt{\text{Cos}[c+d x]} \sqrt{a+b \,\text{Cos}[c+d x]} \left(\frac{C \,\text{Sin}[c+d x]}{2 b^2} - \frac{2 \left(-a^2 b B \,\text{Sin}[c+d x]+a^3 C \,\text{Sin}[c+d x]\right)}{b^2 \left(-a^2+b^2\right) \left(a+b \,\text{Cos}[c+d x]\right)}\right) -$$

$$\frac{1}{8 (a-b) b^2 (a+b) d}\left(-\left(\left(4 a \left(-4 a^2 b B+4 b^3 B+5 a^3 C-5 a b^2 C\right)\right.\right.\right.$$

$$\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(-8\,a\,b^2\,B+4\,a^2\,b\,C+4\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-12\,a^2\,b\,B+4\,b^3\,B+15\,a^3\,C-7\,a\,b^2\,C\right)\left(\left(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left.\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]}{a+b}}\right)\right.+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{b\sqrt{\mathrm{Cos}[c+d\,x]}}\right)\right)$$

Problem 928: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 500 leaves, 8 steps):

$$\frac{1}{a\,b^2\sqrt{a+b}\,d}\left(2\,a\,b\,B-3\,a^2\,C+b^2\,C\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{b^2\sqrt{a+b}\,d}\left(2\,b\,B-3\,a\,C-b\,C\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{b^3\,d}\sqrt{a+b}\,\left(2\,b\,B-3\,a\,C\right)\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,(b\,B-a\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{b\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}-\frac{\left(2\,a\,b\,B-3\,a^2\,C+b^2\,C\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{b^2\,\left(a^2-b^2\right)\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}$$

Result (type 4, 1234 leaves):

$$\frac{2\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(-a\,b\,B\,\mathrm{Sin}[c+d\,x]+a^2\,C\,\mathrm{Sin}[c+d\,x]\right)}{b\,\left(-a^2+b^2\right)\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\frac{1}{2\,(a-b)\,b\,(a+b)\,d}$$

$$\left(-\left(\left(4\,a\,\left(a^2\,C-b^2\,C\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-4\,a\left(-2\,b^2\,B+2\,a\,b\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left.\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-2abB+3a^2C-b^2C\right)\left(\left(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\sqrt{a+b\,\text{Cos}[c+dx]}\;\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{\text{Cos}[c+dx]}}\right],-\frac{2a}{-a-b}\right]\text{Sec}[c+dx]\right)\Big/\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2\text{Sec}[c+dx]}\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Sec}[c+dx]}{a+b}}\right)+\right.$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\text{Csc}[c+dx]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\text{Csc}[c+dx]\;\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+dx]}\;\text{Sin}[c+dx]}{b\sqrt{\text{Cos}[c+dx]}}\right)\right)$$

Problem 929: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 416 leaves, 7 steps):

$$-\frac{1}{a\,b\,\sqrt{a+b}\,d}2\,\left(b\,B-a\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}+\frac{1}{a\,b\,\sqrt{a+b}\,d}2\,\left(b\,B-a\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}-\frac{1}{b^2\,d}2\,\sqrt{a+b}\,C\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}+\frac{2\,a\,\left(b\,B-a\,C\right)\,\text{Sin}[c+d\,x]}{b\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 1012 leaves):

$$\frac{2\,\sqrt{\text{Cos}[c+d\,x]}\,\left(-b\,B\,\text{Sin}[c+d\,x]+a\,C\,\text{Sin}[c+d\,x]\right)}{\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-\frac{1}{\left(-a+b\right)\,\left(a+b\right)\,d}\left(-4\,a\,\left(a\,B-b\,C\right)\left(\left(\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^4\right)\middle/\right.\right.$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\,\left(b\,B-a\,C\right)\left(\left(i\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\right.\right.\right.$$

$$\left.\left.i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]\ \text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 930: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 284 leaves, 5 steps):

$$\frac{1}{a^2\sqrt{a+b}\ d}2\,(b\,B-a\,C)\,\text{Cot}[c+d\,x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{a\sqrt{a+b}\ d}$$

$$2\,(B+C)\,\text{Cot}[c+d\,x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{2\,(b\,B-a\,C)\,\text{Sin}[c+d\,x]}{(a^2-b^2)\,d\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 1223 leaves):

$$-\frac{2\sqrt{\text{Cos}[c+d\,x]}\ \left(-b^2\,B\,\text{Sin}[c+d\,x]+a\,b\,C\,\text{Sin}[c+d\,x]\right)}{a\,(a^2-b^2)\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{1}{a\,(a-b)\,(a+b)\,d}$$

$$\left(-\left(\left(4\,a\,\left(a^2\,B-b^2\,B\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(-a\,b\,B+a^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-b^2\,B+a\,b\,C\right)\left(\left(i\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\right.\right.\right.$$

$$\left.\left.i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(b \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\Bigg) + \frac{\sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{b \sqrt{\text{Cos}[c+d x]}}\Bigg)\Bigg)$$

Problem 931: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2}{\text{Cos}[c+d x]^{5/2} (a+b \text{Cos}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 305 leaves, 5 steps):

$$\frac{1}{a^3 \sqrt{a+b}\, d} 2 \left(a^2 B-2 b^2 B+a b C\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{a^2 \sqrt{a+b}\, d} 2 (2 b B+a (B-C)) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 b (b B-a C) \text{Sin}[c+d x]}{a \left(a^2-b^2\right) d \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}}$$

Result (type 4, 1281 leaves):

$$\frac{1}{a^2 (-a+b) (a+b) d}\Bigg(-\Bigg(\Bigg(4 a \left(2 a^2 b B-2 b^3 B-a^3 C+a b^2 C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\Bigg) \Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg) - 4\,a\,\left(a^3\,B-2\,a\,b^2\,B+a^2\,b\,C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right) - \Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg) +$$

$$2\,\left(a^2\,b\,B-2\,b^3\,B+a\,b^2\,C\right)\Bigg(\Bigg(i\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\Bigg)\Bigg/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2\left(-b^3\,B\,\text{Sin}[c+d\,x]+a\,b^2\,C\,\text{Sin}[c+d\,x]\right)}{a^2\left(a^2-b^2\right)(a+b\,\text{Cos}[c+d\,x])}+\right.$$

$$\left.\frac{2\,B\,\text{Tan}[c+d\,x]}{a^2}\right)$$

Problem 932: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2}{\operatorname{Cos}[c+d x]^{7/2}\left(a+b \operatorname{Cos}[c+d x]\right)^{3/2}} \, dx$$

Optimal (type 4, 393 leaves, 6 steps):

$$-\frac{1}{3 a^4 \sqrt{a+b}\, d} 2 \left(5 a^2 b B-8 b^3 B-3 a^3 C+6 a b^2 C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a \left(1-\operatorname{Sec}[c+d x]\right)}{a+b}} \sqrt{\frac{a \left(1+\operatorname{Sec}[c+d x]\right)}{a-b}}+\frac{1}{3 a^3 \sqrt{a+b}\, d} 2 (a+2 b) \left(4 b B+a (B-3 C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a \left(1-\operatorname{Sec}[c+d x]\right)}{a+b}} \sqrt{\frac{a \left(1+\operatorname{Sec}[c+d x]\right)}{a-b}}+\frac{2 b (b B-a C) \operatorname{Sin}[c+d x]}{a \left(a^2-b^2\right) d \operatorname{Cos}[c+d x]^{3/2} \sqrt{a+b \operatorname{Cos}[c+d x]}}+\frac{2 \left(a^2 B-4 b^2 B+3 a b C\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{3 a^2 \left(a^2-b^2\right) d \operatorname{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1357 leaves):

$$\frac{1}{3 a^3 (a-b) (a+b) d} \left(-\left(\left(4 a \left(a^4 B+7 a^2 b^2 B-8 b^4 B-6 a^3 b C+6 a b^3 C\right) \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{\left(a+b \operatorname{Cos}[c+d x]\right) \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b \operatorname{Cos}[c+d x]\right) \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \middle/\right.\right.$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\Bigg) - 4\,a\,\left(5\,a^3\,b\,B - 8\,a\,b^3\,B - 3\,a^4\,C + 6\,a^2\,b^2\,C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d x]\right)\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \text{Csc}[c+d x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\Bigg) \Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right) - \Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \sqrt{\frac{\left(a+b\,\text{Cos}[c+d x]\right)\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[-\frac{a}{b}, \text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\Bigg) \Big/ \left(b\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\Bigg) +$$

$$2\,\left(5\,a^2\,b^2\,B - 8\,b^4\,B - 3\,a^3\,b\,C + 6\,a\,b^3\,C\right)\ \Bigg(\Bigg(i\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right], -\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d x]\Bigg) \Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2\,\text{Sec}[c+d\,x]\,(-5\,b\,B\,\text{Sin}[c+d\,x]+3\,a\,C\,\text{Sin}[c+d\,x])}{3\,a^3}-\right.$$

$$\frac{2\left(-b^4\,B\,\text{Sin}[c+d\,x]+a\,b^3\,C\,\text{Sin}[c+d\,x]\right)}{a^3\left(a^2-b^2\right)(a+b\,\text{Cos}[c+d\,x])}+$$

$$\left.\frac{2\,B\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{3\,a^2}\right)$$

Problem 933: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+d\,x]^{3/2}\left(B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 674 leaves, 9 steps):

$$\left(\left(6\,a^3\,b\,B-14\,a\,b^3\,B-15\,a^4\,C+26\,a^2\,b^2\,C-3\,b^4\,C\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,a\,(a-b)\,b^3\,(a+b)^{3/2}\,d\right)-$$

$$\left(\left(a^2\,b\,(6\,B-5\,C)-3\,b^3\,(4\,B-C)-15\,a^3\,C+a\,b^2\,(2\,B+21\,C)\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,b^3\,\sqrt{a+b}\,\left(a^2-b^2\right)\,d\right)-\frac{1}{b^4\,d}$$

$$\sqrt{a+b}\,(2\,b\,B-5\,a\,C)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{2\,a\,(b\,B-a\,C)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}+$$

$$\frac{2\,a\,\left(2\,a^2\,b\,B-6\,b^3\,B-5\,a^3\,C+9\,a\,b^2\,C\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{3\,b^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}-$$

$$\left(\left(6\,a^3\,b\,B-14\,a\,b^3\,B-15\,a^4\,C+26\,a^2\,b^2\,C-3\,b^4\,C\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]\right)\Big/\left(3\,b^3\,\left(a^2-b^2\right)^2\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\right)$$

Result (type 4, 1396 leaves):

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(-\frac{2\left(-a^2\,b\,B\,\text{Sin}[c+d\,x]+a^3\,C\,\text{Sin}[c+d\,x]\right)}{3\,b^2\left(-a^2+b^2\right)\left(a+b\,\text{Cos}[c+d\,x]\right)^2}-\left(2\left(-3\,a^3\,b\,B\,\text{Sin}[c+d\,x]+7\,a\,b^3\,B\,\text{Sin}[c+d\,x]+6\,a^4\,C\,\text{Sin}[c+d\,x]-10\,a^2\,b^2\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/\left(3\,b^2\left(-a^2+b^2\right)^2\left(a+b\,\text{Cos}[c+d\,x]\right)\right)\right)+$$

$$\frac{1}{6\,(a-b)^2\,b^2\,(a+b)^2\,d}\left(-\left(\left(4\,a\left(-2\,a^3\,b\,B+2\,a\,b^3\,B+5\,a^4\,C-8\,a^2\,b^2\,C+3\,b^4\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\left(2\,a^2\,b^2\,B+6\,b^4\,B+4\,a^3\,b\,C-12\,a\,b^3\,C\right)\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\right.\right.$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\left(-6\,a^3\,b\,B+14\,a\,b^3\,B+15\,a^4\,C-26\,a^2\,b^2\,C+3\,b^4\,C\right)\left(\left(i\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]\ \text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 934: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\ \left(B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{(a+b\,\text{Cos}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 545 leaves, 8 steps):

$$\left(2\left(4 b^3 B+3 a^3 C-7 a b^2 C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a(a-b) b^2(a+b)^{3/2} d\right)+$$

$$\left(2\left(a b^2 B-3 b^3 B-3 a^3 C-a^2 b C+6 a b^2 C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a(a-b) b^2(a+b)^{3/2} d\right)-$$

$$\frac{1}{b^3 d} 2 \sqrt{a+b}\, C \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}+$$

$$\frac{2 a(b B-a C) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{3 b\left(a^2-b^2\right) d(a+b \operatorname{Cos}[c+d x])^{3/2}}-\frac{2 a\left(4 b^3 B+3 a^3 C-7 a b^2 C\right) \operatorname{Sin}[c+d x]}{3 b^2\left(a^2-b^2\right)^2 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}}$$

Result (type 4, 1342 leaves):

$$\frac{1}{d} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\left(\frac{2\left(-a b B \operatorname{Sin}[c+d x]+a^2 C \operatorname{Sin}[c+d x]\right)}{3 b\left(-a^2+b^2\right)(a+b \operatorname{Cos}[c+d x])^2}+\frac{2\left(4 b^3 B \operatorname{Sin}[c+d x]+3 a^3 C \operatorname{Sin}[c+d x]-7 a b^2 C \operatorname{Sin}[c+d x]\right)}{3 b\left(-a^2+b^2\right)^2(a+b \operatorname{Cos}[c+d x])}\right)-$$

$$\frac{1}{3(a-b)^2 b(a+b)^2 d}\left(-\left(\left(\left(4 a\left(-a^2 b B+b^3 B+a^3 C-a b^2 C\right) \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]\right.\right.\right.\right.$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(4\,a\,b^2\,B-a^2\,b\,C-3\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(4 b^3 B+3 a^3 C-7 a b^2 C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\mathrm{Sec}[c+d x]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]^2\mathrm{Sec}[c+d x]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\mathrm{Csc}[c+d x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\mathrm{Csc}[c+d x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}\,\mathrm{Sin}[c+d x]}{b\sqrt{\mathrm{Cos}[c+d x]}}\right)\right)$$

Problem 935: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2}{\sqrt{\operatorname{Cos}[c+d x]}\,(a+b \operatorname{Cos}[c+d x])^{5/2}}\,dx$$

Optimal (type 4, 391 leaves, 6 steps):

$$-\left(\left(2\left(3 a^2 B+b^2 B-4 a b C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a^2 (a-b)(a+b)^{3/2} d\right)\right)+$$

$$\left(2(3 a B-b B+a C-3 b C) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a (a-b)(a+b)^{3/2} d\right)-$$

$$\frac{2(b B-a C) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{3\left(a^2-b^2\right) d(a+b \operatorname{Cos}[c+d x])^{3/2}}+\frac{2\left(3 a^2 B+b^2 B-4 a b C\right) \operatorname{Sin}[c+d x]}{3\left(a^2-b^2\right)^2 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}}$$

Result (type 4, 1335 leaves):

$$\frac{1}{d}\sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\left(\frac{2(-b B \operatorname{Sin}[c+d x]+a C \operatorname{Sin}[c+d x])}{3\left(a^2-b^2\right)(a+b \operatorname{Cos}[c+d x])^2}-\right.$$

$$\left.\frac{2\left(3 a^2 b B \operatorname{Sin}[c+d x]+b^3 B \operatorname{Sin}[c+d x]-4 a b^2 C \operatorname{Sin}[c+d x]\right)}{3 a\left(a^2-b^2\right)^2(a+b \operatorname{Cos}[c+d x])}\right)+$$

$$\frac{1}{3 a (a-b)^2 (a+b)^2 d}\left(-\left(\left(4 a\left(-a^2 b B+b^3 B+a^3 C-a b^2 C\right)\right.\right.\right.$$

$$\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-4\,a\,\left(3\,a^3\,B+a\,b^2\,B-4\,a^2\,b\,C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\left(3a^2 b B+b^3 B-4 a b^2 C\right)\left(\left(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\text{Sec}[c+d x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\text{Csc}[c+d x]\;\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d x]}\;\text{Sin}[c+d x]}{b\sqrt{\text{Cos}[c+d x]}}\right)\right)$$

Problem 936: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2}{\operatorname{Cos}[c+d x]^{3/2} (a+b \operatorname{Cos}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 429 leaves, 6 steps):

$$\left(2 \left(6 a^2 b B-2 b^3 B-3 a^3 C-a b^2 C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a^3 (a-b) (a+b)^{3/2} d\right) - \left(2 \left(2 b^2 B-3 a^2 (B+C)+a b (3 B+C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a^2 \sqrt{a+b} \left(a^2-b^2\right) d\right) + \frac{2 b (b B-a C) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{3 a \left(a^2-b^2\right) d (a+b \operatorname{Cos}[c+d x])^{3/2}} - \frac{2 \left(6 a^2 b B-2 b^3 B-3 a^3 C-a b^2 C\right) \operatorname{Sin}[c+d x]}{3 a \left(a^2-b^2\right)^2 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}}$$

Result (type 4, 1384 leaves):

$$\frac{1}{d}\sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]} \left(-\frac{2 \left(-b^2 B \operatorname{Sin}[c+d x]+a b C \operatorname{Sin}[c+d x]\right)}{3 a \left(a^2-b^2\right) (a+b \operatorname{Cos}[c+d x])^2} - \left(2 \left(-6 a^2 b^2 B \operatorname{Sin}[c+d x]+2 b^4 B \operatorname{Sin}[c+d x]+3 a^3 b C \operatorname{Sin}[c+d x]+a b^3 C \operatorname{Sin}[c+d x]\right)\right) \Big/ \left(3 a^2 \left(a^2-b^2\right)^2 (a+b \operatorname{Cos}[c+d x])\right)\right) +$$

$$\frac{1}{3 a^2 (a-b)^2 (a+b)^2 d} \left(-\left(\left(4 a \left(3 a^4 B-5 a^2 b^2 B+2 b^4 B-a^3 b C+a b^3 C\right) \right.\right.\right.$$

$$\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-4\,a\left(-6\,a^3\,b\,B+2\,a\,b^3\,B+3\,a^4\,C+a^2\,b^2\,C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\left(-6a^2b^2B+2b^4B+3a^3bC+ab^3C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{\mathrm{Cos}[c+dx]}}\right],-\frac{2a}{-a-b}\right]\mathrm{Sec}[c+dx]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]^2\mathrm{Sec}[c+dx]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Sec}[c+dx]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}\;\mathrm{Sin}[c+dx]}{b\sqrt{\mathrm{Cos}[c+dx]}}\right)\right)$$

Problem 937: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{5/2}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 456 leaves, 6 steps):

$$\left(2\,\left(3\,a^4\,B-15\,a^2\,b^2\,B+8\,b^4\,B+6\,a^3\,b\,C-2\,a\,b^3\,C\right)\right.$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\right)\Big/\left(3\,a^4\,\left(a-b\right)\,\left(a+b\right)^{3/2}\,d\right)+$$
$$\left(2\,\left(8\,b^3\,B-3\,a^3\,\left(B-C\right)+2\,a\,b^2\,\left(3\,B-C\right)-3\,a^2\,b\,\left(3\,B+C\right)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\right.\right.$$
$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\right)\Big/$$
$$\left(3\,a^3\,\sqrt{a+b}\,\left(a^2-b^2\right)\,d\right)+\frac{2\,b\,\left(b\,B-a\,C\right)\,\text{Sin}[c+d\,x]}{3\,a\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}+$$
$$\frac{2\,b\,\left(8\,a^2\,b\,B-4\,b^3\,B-5\,a^3\,C+a\,b^2\,C\right)\,\text{Sin}[c+d\,x]}{3\,a^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 1431 leaves):

$$-\frac{1}{3\,a^3\,\left(a-b\right)^2\,\left(a+b\right)^2\,d}$$
$$\left(-\left(\left(4\,a\,\left(9\,a^4\,b\,B-17\,a^2\,b^3\,B+8\,b^5\,B-3\,a^5\,C+5\,a^3\,b^2\,C-2\,a\,b^4\,C\right)\,\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{-a+b}}\right.\right.\right.$$
$$\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-$$

$$4\,a\left(3\,a^5\,B-15\,a^3\,b^2\,B+8\,a\,b^4\,B+6\,a^4\,b\,C-2\,a^2\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\ \text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\left(3a^4bB-15a^2b^3B+8b^5B+6a^3b^2C-2ab^4C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{\mathrm{Cos}[c+dx]}}\right],-\frac{2a}{-a-b}\right]\mathrm{Sec}[c+dx]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]^2\mathrm{Sec}[c+dx]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Sec}[c+dx]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\,\mathrm{Csc}[c+dx]\,\mathrm{EllipticF}\Bigg[$$

$$\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\Bigg)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\,\mathrm{Csc}[c+dx]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\Bigg)\Big/$$

$$\left.\left.\left(b\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}\,\mathrm{Sin}[c+dx]}{b\sqrt{\mathrm{Cos}[c+dx]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{2\left(-b^3\,B\,\text{Sin}[c+d\,x]+a\,b^2\,C\,\text{Sin}[c+d\,x]\right)}{3\,a^2\,\left(a^2-b^2\right)\,\left(a+b\,\text{Cos}[c+d\,x]\right)^2}+\left(2\left(-9\,a^2\,b^3\,B\,\text{Sin}[c+d\,x]+5\,b^5\,B\,\text{Sin}[c+d\,x]+6\,a^3\,b^2\,C\,\text{Sin}[c+d\,x]-2\,a\,b^4\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/\left(3\,a^3\,\left(a^2-b^2\right)^2\,\left(a+b\,\text{Cos}[c+d\,x]\right)\right)+\frac{2\,B\,\text{Tan}[c+d\,x]}{a^3}\right)$$

Problem 942: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^2\,dx$$

Optimal (type 3, 52 leaves, 4 steps):

$$(b\,B+a\,C)\,x+\frac{(A\,b+a\,B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}+\frac{b\,C\,\text{Sin}[c+d\,x]}{d}+\frac{a\,A\,\text{Tan}[c+d\,x]}{d}$$

Result (type 3, 187 leaves):

$$b\,B\,x+a\,C\,x-\frac{A\,b\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}-\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{A\,b\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{a\,B\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d}+\frac{b\,C\,\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+\frac{b\,C\,\text{Cos}[c]\,\text{Sin}[d\,x]}{d}+\frac{a\,A\,\text{Tan}[c+d\,x]}{d}$$

Problem 945: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 3, 137 leaves, 7 steps):

$$\frac{(3\,a\,A+4\,b\,B+4\,a\,C)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{(2\,A\,b+2\,a\,B+3\,b\,C)\,\text{Tan}[c+d\,x]}{3\,d}+\frac{(3\,a\,A+4\,b\,B+4\,a\,C)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{(A\,b+a\,B)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,A\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 545 leaves):

$$-\frac{3 a A \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}-\frac{b 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]}{2 d}-\frac{a C \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 d}+\frac{3 a A \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{8 d}+\frac{b 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]}{2 d}+\frac{a C \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 d}+\frac{a 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{3 a 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)^2}+\frac{b B}{4 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 C}{4 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 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{3 a 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)^2}-\frac{b B}{4 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 C}{4 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{2 A b \operatorname{Tan}[c+d x]}{3 d}+\frac{2 a B \operatorname{Tan}[c+d x]}{3 d}+\frac{b C \operatorname{Tan}[c+d x]}{d}+\frac{A b \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 d}+\frac{a B \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 d}$$

Problem 946: Result more than twice size of optimal antiderivative.

$$\int (a+b \operatorname{Cos}[c+d x])\left(A+B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^6\, dx$$

Optimal (type 3, 165 leaves, 7 steps):

$$\frac{(3 A b+3 a B+4 b C) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{8 d}+\frac{(4 a A+5 b B+5 a C) \operatorname{Tan}[c+d x]}{5 d}+\frac{(3 A b+3 a B+4 b C) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{8 d}+\frac{(A b+a B) \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]}{4 d}+\frac{a A \operatorname{Sec}[c+d x]^4 \operatorname{Tan}[c+d x]}{5 d}+\frac{(4 a A+5 b B+5 a C) \operatorname{Tan}[c+d x]^3}{15 d}$$

Result (type 3, 660 leaves):

$$-\frac{3\,A\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}-\frac{3\,a\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}-$$
$$\frac{b\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+\frac{3\,A\,b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+$$
$$\frac{3\,a\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{b\,C\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{2\,d}+$$
$$\frac{A\,b}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{a\,B}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+$$
$$\frac{3\,A\,b}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{3\,a\,B}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{b\,C}{4\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{A\,b}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}-$$
$$\frac{a\,B}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}-\frac{3\,A\,b}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-$$
$$\frac{3\,a\,B}{16\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{b\,C}{4\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{8\,a\,A\,\text{Tan}[c+d\,x]}{15\,d}+\frac{2\,b\,B\,\text{Tan}[c+d\,x]}{3\,d}+\frac{2\,a\,C\,\text{Tan}[c+d\,x]}{3\,d}+\frac{4\,a\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{15\,d}+$$
$$\frac{b\,B\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,C\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}+\frac{a\,A\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]}{5\,d}$$

Problem 951: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])^2\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 3, 118 leaves, 5 steps):

$$b\,(b\,B+2\,a\,C)\,x+\frac{\left(2\,A\,b^2+4\,a\,b\,B+a^2\,(A+2\,C)\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}-\frac{b^2\,(A-2\,C)\,\text{Sin}[c+d\,x]}{2\,d}+$$
$$\frac{a\,(A\,b+a\,B)\,\text{Tan}[c+d\,x]}{d}+\frac{A\,(a+b\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 277 leaves):

$$\frac{1}{4d}\left(4b(bB+2aC)(c+dx)-2\left(2Ab^2+4abB+a^2(A+2C)\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]+2\left(2Ab^2+4abB+a^2(A+2C)\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]+\frac{a^2A}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+\frac{4a(2Ab+aB)\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]}-\frac{a^2A}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+\frac{4a(2Ab+aB)\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]}+4b^2C\,\text{Sin}[c+dx]\right)$$

Problem 952: Result more than twice size of optimal antiderivative.

$$\int(a+b\,\text{Cos}[c+dx])^2\left(A+B\,\text{Cos}[c+dx]+C\,\text{Cos}[c+dx]^2\right)\text{Sec}[c+dx]^4\,dx$$

Optimal (type 3, 141 leaves, 5 steps):

$$b^2Cx+\frac{\left(a^2B+2b^2B+2ab(A+2C)\right)\text{ArcTanh}[\text{Sin}[c+dx]]}{2d}+\frac{\left(2Ab^2+6abB+a^2(2A+3C)\right)\text{Tan}[c+dx]}{3d}+\frac{a(2Ab+3aB)\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{6d}+\frac{A(a+b\,\text{Cos}[c+dx])^2\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]}{3d}$$

Result (type 3, 386 leaves):

$$\frac{1}{12d}\left(12b^2C(c+dx)-6\left(a^2B+2b^2B+2ab(A+2C)\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]+6\left(a^2B+2b^2B+2ab(A+2C)\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]+\frac{a(6Ab+a(A+3B))}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+\frac{2a^2A\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}+\frac{4\left(3Ab^2+6abB+a^2(2A+3C)\right)\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]}+\frac{2a^2A\,\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3}-\frac{a(6Ab+a(A+3B))}{\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2}+\frac{4\left(3Ab^2+6abB+a^2(2A+3C)\right)\text{Sin}\left[\frac{1}{2}(c+dx)\right]}{\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]}\right)$$

Problem 960: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])^3\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 3, 196 leaves, 6 steps):

$$b^2\,(b\,B+3\,a\,C)\,x+\frac{\left(2\,A\,b^3+a^3\,B+6\,a\,b^2\,B+3\,a^2\,b\,(A+2\,C)\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}-\frac{b^2\,(5\,A\,b+3\,a\,B-6\,b\,C)\,\text{Sin}[c+d\,x]}{6\,d}+\frac{a\,\left(3\,A\,b^2+6\,a\,b\,B+a^2\,(2\,A+3\,C)\right)\,\text{Tan}[c+d\,x]}{3\,d}+\frac{(A\,b+a\,B)\,(a+b\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}+\frac{A\,(a+b\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 549 leaves):

$$\frac{b^2\,(b\,B+3\,a\,C)\,(c+d\,x)}{d}+\frac{1}{2\,d}\left(-3\,a^2\,A\,b-2\,A\,b^3-a^3\,B-6\,a\,b^2\,B-6\,a^2\,b\,C\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\frac{1}{2\,d}\left(3\,a^2\,A\,b+2\,A\,b^3+a^3\,B+6\,a\,b^2\,B+6\,a^2\,b\,C\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\frac{a^3\,A+9\,a^2\,A\,b+3\,a^3\,B}{12\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{a^3\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{6\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+\frac{a^3\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{6\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+\frac{-a^3\,A-9\,a^2\,A\,b-3\,a^3\,B}{12\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\left(2\,a^3\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+9\,a\,A\,b^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+9\,a^2\,b\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a^3\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Big/\left(3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+\left(2\,a^3\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+9\,a\,A\,b^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+9\,a^2\,b\,B\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a^3\,C\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Big/\left(3\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)+\frac{b^3\,C\,\text{Sin}[c+d\,x]}{d}$$

Problem 981: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]}{a+b\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 94 leaves, 4 steps):

$$\frac{C x}{b}-\frac{2\left(A b^2-a\left(b B-a C\right)\right)\text{ArcTan}\left[\frac{\sqrt{a-b}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]}{a\sqrt{a-b}\ b\sqrt{a+b}\ d}+\frac{A\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a d}$$

Result (type 3, 256 leaves):

$$\Bigg(2\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\Bigg(\Bigg(a C d x-A b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+A b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\Bigg)\sqrt{-\left(a^2-b^2\right)\left(\text{Cos}[c]-i\,\text{Sin}[c]\right)^2}+2\left(A b^2+a\left(-b B+a C\right)\right)\text{ArcTan}\left[\frac{\left(i\,\text{Cos}[c]+\text{Sin}[c]\right)\left(b\,\text{Sin}[c]+\left(-a+b\,\text{Cos}[c]\right)\text{Tan}\left[\frac{d x}{2}\right]\right)}{\sqrt{-\left(a^2-b^2\right)\left(\text{Cos}[c]-i\,\text{Sin}[c]\right)^2}}\right]\left(i\,\text{Cos}[c]+\text{Sin}[c]\right)\Bigg)\Bigg)\Bigg/\left(a b d\left(2 A+C+2 B\,\text{Cos}[c+d x]+C\,\text{Cos}[2(c+d x)]\right)\sqrt{\left(-a^2+b^2\right)\left(\text{Cos}[2 c]-i\,\text{Sin}[2 c]\right)}\right)$$

Problem 982: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]^2}{a+b\,\text{Cos}[c+d x]}\,dx$$

Optimal (type 3, 107 leaves, 5 steps):

$$\frac{2\left(A b^2-a\left(b B-a C\right)\right)\text{ArcTan}\left[\frac{\sqrt{a-b}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]}{a^2\sqrt{a-b}\ \sqrt{a+b}\ d}-\frac{\left(A b-a B\right)\text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}+\frac{A\,\text{Tan}[c+d x]}{a d}$$

Result (type 3, 339 leaves):

$$\frac{1}{a^2 d \left(2 A+C+2 B \text{Cos}[c+d x]+C \text{Cos}\left[2 (c+d x)\right]\right)} 2 \text{Cos}[c+d x]^2 \left(C+B \text{Sec}[c+d x]+A \text{Sec}[c+d x]^2\right) \left((A b-a B) \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\right.$$
$$(-A b+a B) \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-$$
$$\left(2 i \left(A b^2+a (-b B+a C)\right) \text{ArcTan}\left[\frac{(i \text{Cos}[c]+\text{Sin}[c]) \left(b \text{Sin}[c]+(-a+b \text{Cos}[c]) \text{Tan}\left[\frac{d x}{2}\right]\right)}{\sqrt{-\left(a^2-b^2\right) (\text{Cos}[c]-i \text{Sin}[c])^2}}\right]\right.$$
$$\left.(\text{Cos}[c]-i \text{Sin}[c])\right) \Big/ \left(\sqrt{\left(-a^2+b^2\right) (\text{Cos}[c]-i \text{Sin}[c])^2}\right)+$$
$$\frac{a A \text{Sin}\left[\frac{d x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+$$
$$\left.\frac{a A \text{Sin}\left[\frac{d x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}\right)$$

Problem 983: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]^3}{a+b \text{Cos}[c+d x]} \, dx$$

Optimal (type 3, 154 leaves, 6 steps):

$$-\frac{2 b \left(A b^2-a (b B-a C)\right) \text{ArcTan}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]}{a^3 \sqrt{a-b} \sqrt{a+b} d}+\frac{\left(2 A b^2-2 a b B+a^2 (A+2 C)\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 a^3 d}-\frac{(A b-a B) \text{Tan}[c+d x]}{a^2 d}+\frac{A \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 a d}$$

Result (type 3, 314 leaves):

$$\frac{1}{4 a^3 d}\left(\frac{8 b \left(A b^2+a \left(-b B+a C\right)\right) \text{ArcTanh}\left[\frac{(a-b) \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{-a^2+b^2}}\right]}{\sqrt{-a^2+b^2}}-\right.$$

$$2 \left(2 A b^2-2 a b B+a^2 (A+2 C)\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+$$

$$2 \left(2 A b^2-2 a b B+a^2 (A+2 C)\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+$$

$$\frac{a^2 A}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{4 a (-A b+a B) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]}-$$

$$\left.\frac{a^2 A}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{4 a (-A b+a B) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]}\right)$$

Problem 984: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]^4}{a+b \text{Cos}[c+d x]} \, dx$$

Optimal (type 3, 214 leaves, 7 steps):

$$\frac{2 b^2 \left(A b^2-a (b B-a C)\right) \text{ArcTan}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a^4 \sqrt{a-b} \sqrt{a+b} d}-$$

$$\frac{\left(2 A b^3-a^3 B-2 a b^2 B+a^2 b (A+2 C)\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 a^4 d}+$$

$$\frac{\left(3 A b^2-3 a b B+a^2 (2 A+3 C)\right) \text{Tan}[c+d x]}{3 a^3 d}-$$

$$\frac{(A b-a B) \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 a^2 d}+\frac{A \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 a d}$$

Result (type 3, 466 leaves):

$$\frac{1}{12 a^4 d}\left(-\frac{24 b^2 \left(A b^2+a \left(-b B+a C\right)\right) \text{ArcTanh}\left[\frac{(a-b) \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{-a^2+b^2}}\right]}{\sqrt{-a^2+b^2}}+\right.$$

$$6 \left(2 A b^3-a^3 B-2 a b^2 B+a^2 b \left(A+2 C\right)\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+$$

$$6 \left(-2 A b^3+a^3 B+2 a b^2 B-a^2 b \left(A+2 C\right)\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+$$

$$\frac{a^2 \left(-3 A b+a \left(A+3 B\right)\right)}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{2 a^3 A \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+$$

$$\frac{4 a \left(3 A b^2-3 a b B+a^2 \left(2 A+3 C\right)\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]}+\frac{2 a^3 A \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}-$$

$$\left.\frac{a^2 \left(-3 A b+a \left(A+3 B\right)\right)}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{4 a \left(3 A b^2-3 a b B+a^2 \left(2 A+3 C\right)\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]}\right)$$

Problem 990: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]}{\left(a+b \text{Cos}[c+d x]\right)^2} \, dx$$

Optimal (type 3, 147 leaves, 5 steps):

$$-\frac{2 \left(2 a^2 A b-A b^3-a^3 B+a^2 b C\right) \text{ArcTan}\left[\frac{\sqrt{a-b} \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]}{a^2 (a-b)^{3/2} (a+b)^{3/2} d}+$$

$$\frac{A \text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}+\frac{\left(A b^2-a \left(b B-a C\right)\right) \text{Sin}[c+d x]}{a \left(a^2-b^2\right) d \left(a+b \text{Cos}[c+d x]\right)}$$

Result (type 3, 319 leaves):

$$\left(2\,\text{Cos}[c+d\,x]\,\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\,\left(-A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\right.\right.$$
$$A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\left(2\,i\,\left(A\,b^3+a^3\,B-a^2\,b\,(2\,A+C)\right)\,\text{ArcTan}\left[\right.\right.$$
$$\left.\frac{(i\,\text{Cos}[c]+\text{Sin}[c])\,\left(b\,\text{Sin}[c]+(-a+b\,\text{Cos}[c])\,\text{Tan}\left[\frac{d\,x}{2}\right]\right)}{\sqrt{-(a^2-b^2)\,(\text{Cos}[c]-i\,\text{Sin}[c])^2}}\right]\,(\text{Cos}[c]-i\,\text{Sin}[c])^3\Bigg)\Big/$$
$$\left(\left(-a^2+b^2\right)\,(\text{Cos}[c]-i\,\text{Sin}[c])^2\right)^{3/2}+\left(a\,\left(A\,b^2+a\,(-b\,B+a\,C)\right)\,(-a\,\text{Sin}[c]+b\,\text{Sin}[d\,x])\right)\Big/$$
$$\left.\left.\left((a-b)\,b\,(a+b)\,(a+b\,\text{Cos}[c+d\,x])\,\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\,\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\right)\right)\right)\Big/$$
$$\left(a^2\,d\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,(c+d\,x)]\right)\right)$$

Problem 994: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^3\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{(a+b\,\text{Cos}[c+d\,x])^3}\,dx$$

Optimal (type 3, 456 leaves, 7 steps):

$$\frac{\left(2\,A\,b^2-6\,a\,b\,B+12\,a^2\,C+b^2\,C\right)\,x}{2\,b^5}-$$
$$\left(a\,\left(6\,A\,b^6-6\,a^5\,b\,B+15\,a^3\,b^3\,B-12\,a\,b^5\,B+a^4\,b^2\,(2\,A-29\,C)-5\,a^2\,b^4\,(A-4\,C)+12\,a^6\,C\right)\right.$$
$$\left.\text{ArcTan}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]\right)\Big/\left((a-b)^{5/2}\,b^5\,(a+b)^{5/2}\,d\right)+\frac{1}{2\,b^4\,\left(a^2-b^2\right)^2\,d}$$
$$\left(6\,a^4\,b\,B-11\,a^2\,b^3\,B+2\,b^5\,B-a^3\,b^2\,(2\,A-21\,C)+a\,b^4\,(5\,A-6\,C)-12\,a^5\,C\right)\,\text{Sin}[c+d\,x]-$$
$$\frac{1}{2\,b^3\,\left(a^2-b^2\right)^2\,d}\left(3\,a^3\,b\,B-6\,a\,b^3\,B-a^2\,b^2\,(A-10\,C)+b^4\,(4\,A-C)-6\,a^4\,C\right)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]-$$
$$\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{2\,b\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Cos}[c+d\,x])^2}+$$
$$\left(\left(3\,A\,b^4+a\,\left(2\,a^2\,b\,B-5\,b^3\,B-4\,a^3\,C+7\,a\,b^2\,C\right)\right)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(2\,b^2\,\left(a^2-b^2\right)^2\,d\,(a+b\,\text{Cos}[c+d\,x])\right)$$

Result (type 3, 1150 leaves):

$$\left(a\left(2 a^4 A b^2-5 a^2 A b^4+6 A b^6-6 a^5 b B+15 a^3 b^3 B-12 a b^5 B+12 a^6 C-29 a^4 b^2 C+20 a^2 b^4 C\right)\right.$$
$$\left.\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{-a^2+b^2}}\right]\right)\Big/\left(b^5\left(a^2-b^2\right)^2\sqrt{-a^2+b^2}\;d\right)+$$
$$\frac{1}{16 b^5\left(-a^2+b^2\right)^2 d\,(a+b\,\text{Cos}[c+d x])^2}\left(16 a^6 A b^2 (c+d x)-24 a^4 A b^4 (c+d x)+\right.$$
$$8 A b^8 (c+d x)-48 a^7 b B (c+d x)+72 a^5 b^3 B (c+d x)-24 a b^7 B (c+d x)+96 a^8 C (c+d x)-$$
$$136 a^6 b^2 C (c+d x)-12 a^4 b^4 C (c+d x)+48 a^2 b^6 C (c+d x)+4 b^8 C (c+d x)+$$
$$32 a^5 A b^3 (c+d x)\,\text{Cos}[c+d x]-64 a^3 A b^5 (c+d x)\,\text{Cos}[c+d x]+32 a A b^7 (c+d x)\,\text{Cos}[c+d x]-$$
$$96 a^6 b^2 B (c+d x)\,\text{Cos}[c+d x]+192 a^4 b^4 B (c+d x)\,\text{Cos}[c+d x]-$$
$$96 a^2 b^6 B (c+d x)\,\text{Cos}[c+d x]+192 a^7 b C (c+d x)\,\text{Cos}[c+d x]-$$
$$368 a^5 b^3 C (c+d x)\,\text{Cos}[c+d x]+160 a^3 b^5 C (c+d x)\,\text{Cos}[c+d x]+$$
$$16 a b^7 C (c+d x)\,\text{Cos}[c+d x]+8 a^4 A b^4 (c+d x)\,\text{Cos}[2 (c+d x)]-$$
$$16 a^2 A b^6 (c+d x)\,\text{Cos}[2 (c+d x)]+8 A b^8 (c+d x)\,\text{Cos}[2 (c+d x)]-$$
$$24 a^5 b^3 B (c+d x)\,\text{Cos}[2 (c+d x)]+48 a^3 b^5 B (c+d x)\,\text{Cos}[2 (c+d x)]-$$
$$24 a b^7 B (c+d x)\,\text{Cos}[2 (c+d x)]+48 a^6 b^2 C (c+d x)\,\text{Cos}[2 (c+d x)]-$$
$$92 a^4 b^4 C (c+d x)\,\text{Cos}[2 (c+d x)]+40 a^2 b^6 C (c+d x)\,\text{Cos}[2 (c+d x)]+$$
$$4 b^8 C (c+d x)\,\text{Cos}[2 (c+d x)]-16 a^5 A b^3\,\text{Sin}[c+d x]+40 a^3 A b^5\,\text{Sin}[c+d x]+$$
$$48 a^6 b^2 B\,\text{Sin}[c+d x]-84 a^4 b^4 B\,\text{Sin}[c+d x]+8 a^2 b^6 B\,\text{Sin}[c+d x]+4 b^8 B\,\text{Sin}[c+d x]-$$
$$96 a^7 b C\,\text{Sin}[c+d x]+160 a^5 b^3 C\,\text{Sin}[c+d x]-32 a^3 b^5 C\,\text{Sin}[c+d x]-8 a b^7 C\,\text{Sin}[c+d x]-$$
$$12 a^4 A b^4\,\text{Sin}[2 (c+d x)]+24 a^2 A b^6\,\text{Sin}[2 (c+d x)]+36 a^5 b^3 B\,\text{Sin}[2 (c+d x)]-$$
$$64 a^3 b^5 B\,\text{Sin}[2 (c+d x)]+16 a b^7 B\,\text{Sin}[2 (c+d x)]-72 a^6 b^2 C\,\text{Sin}[2 (c+d x)]+$$
$$130 a^4 b^4 C\,\text{Sin}[2 (c+d x)]-48 a^2 b^6 C\,\text{Sin}[2 (c+d x)]+2 b^8 C\,\text{Sin}[2 (c+d x)]+$$
$$4 a^4 b^4 B\,\text{Sin}[3 (c+d x)]-8 a^2 b^6 B\,\text{Sin}[3 (c+d x)]+4 b^8 B\,\text{Sin}[3 (c+d x)]-$$
$$8 a^5 b^3 C\,\text{Sin}[3 (c+d x)]+16 a^3 b^5 C\,\text{Sin}[3 (c+d x)]-8 a b^7 C\,\text{Sin}[3 (c+d x)]+$$
$$\left.a^4 b^4 C\,\text{Sin}[4 (c+d x)]-2 a^2 b^6 C\,\text{Sin}[4 (c+d x)]+b^8 C\,\text{Sin}[4 (c+d x)]\right)$$

Problem 998: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]}{(a+b\,\text{Cos}[c+d x])^3}\,dx$$

Optimal (type 3, 238 leaves, 6 steps):

$$\left(\left(5 a^2 A b^3-2 A b^5+2 a^5 B+a^3 b^2 B-3 a^4 b (2 A+C)\right)\text{ArcTan}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]\right)\Big/$$
$$\left(a^3 (a-b)^{5/2} (a+b)^{5/2} d\right)+\frac{A\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a^3 d}+$$
$$\frac{\left(A b^2-a (b B-a C)\right)\text{Sin}[c+d x]}{2 a \left(a^2-b^2\right) d\,(a+b\,\text{Cos}[c+d x])^2}-\frac{\left(2 A b^4+3 a^3 b B-a^4 C-a^2 b^2 (5 A+2 C)\right)\text{Sin}[c+d x]}{2 a^2 \left(a^2-b^2\right)^2 d\,(a+b\,\text{Cos}[c+d x])}$$

Result (type 3, 1065 leaves):

$$
\begin{aligned}
&-\left(\left(2\,A\,\text{Cos}[c+d\,x]\,\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]\,\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\right)\Big/\right.\\
&\quad\left.\left(a^3\,d\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)\right)+\\
&\left(2\,A\,\text{Cos}[c+d\,x]\,\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]\,\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\right)\Big/\\
&\quad\left(a^3\,d\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+\\
&\frac{1}{\left(a^2-b^2\right)^2\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)}\\
&\quad\left(-6\,a^4\,A\,b+5\,a^2\,A\,b^3-2\,A\,b^5+2\,a^5\,B+a^3\,b^2\,B-3\,a^4\,b\,C\right)\\
&\quad\text{Cos}[c+d\,x]\,\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\\
&\quad\left(-\left(\left(2\,ⅈ\,\text{ArcTan}\left[\text{Sec}\left[\frac{d\,x}{2}\right]\,\left(\text{Cos}[c]\Big/\left(\sqrt{\left(-a^2\,\text{Cos}[2\,c]+b^2\,\text{Cos}[2\,c]+ⅈ\,a^2\,\text{Sin}[2\,c]-\right.}\right.\right.\right.\right.\right.\right.\\
&\qquad\qquad\left.\left.ⅈ\,b^2\,\text{Sin}[2\,c]\right)\right)-\left(ⅈ\,\text{Sin}[c]\right)\Big/\left(\sqrt{\left(-a^2\,\text{Cos}[2\,c]+b^2\,\text{Cos}[2\,c]+ⅈ\,a^2\,\text{Sin}[2\,c]-\right.}\right.\\
&\qquad\qquad\left.\left.\left.ⅈ\,b^2\,\text{Sin}[2\,c]\right)\right)\right)\,\left(-ⅈ\,a\,\text{Sin}\left[\frac{d\,x}{2}\right]+ⅈ\,b\,\text{Sin}\left[c+\frac{d\,x}{2}\right]\right)\Big]\,\text{Cos}[c]\Big)\Big/\\
&\qquad\left(a^3\,d\,\sqrt{-a^2\,\text{Cos}[2\,c]+b^2\,\text{Cos}[2\,c]+ⅈ\,a^2\,\text{Sin}[2\,c]-ⅈ\,b^2\,\text{Sin}[2\,c]}\right)\Big)-\\
&\qquad\left(2\,\text{ArcTan}\left[\text{Sec}\left[\frac{d\,x}{2}\right]\,\left(\text{Cos}[c]\Big/\left(\sqrt{\left(-a^2\,\text{Cos}[2\,c]+b^2\,\text{Cos}[2\,c]+ⅈ\,a^2\,\text{Sin}[2\,c]-ⅈ\,b^2\,\text{Sin}[2\,c]\right)}\right)-\right.\right.\right.\\
&\qquad\qquad\left.\left(ⅈ\,\text{Sin}[c]\right)\Big/\left(\sqrt{\left(-a^2\,\text{Cos}[2\,c]+b^2\,\text{Cos}[2\,c]+ⅈ\,a^2\,\text{Sin}[2\,c]-ⅈ\,b^2\,\text{Sin}[2\,c]\right)}\right)\right)\\
&\qquad\quad\left.\left.\left(-ⅈ\,a\,\text{Sin}\left[\frac{d\,x}{2}\right]+ⅈ\,b\,\text{Sin}\left[c+\frac{d\,x}{2}\right]\right)\right]\,\text{Sin}[c]\right)\Big/\\
&\qquad\left.\left(a^3\,d\,\sqrt{-a^2\,\text{Cos}[2\,c]+b^2\,\text{Cos}[2\,c]+ⅈ\,a^2\,\text{Sin}[2\,c]-ⅈ\,b^2\,\text{Sin}[2\,c]}\right)\right)+\\
&\left(\text{Cos}[c+d\,x]\,\text{Sec}[c]\,\left(B+C\,\text{Cos}[c+d\,x]+A\,\text{Sec}[c+d\,x]\right)\right.\\
&\quad\left(-10\,a^4\,A\,b^2\,\text{Sin}[c]-a^2\,A\,b^4\,\text{Sin}[c]+2\,A\,b^6\,\text{Sin}[c]+6\,a^5\,b\,B\,\text{Sin}[c]+3\,a^3\,b^3\,B\,\text{Sin}[c]-\right.\\
&\qquad 2\,a^6\,C\,\text{Sin}[c]-5\,a^4\,b^2\,C\,\text{Sin}[c]-2\,a^2\,b^4\,C\,\text{Sin}[c]+16\,a^3\,A\,b^3\,\text{Sin}[d\,x]-7\,a\,A\,b^5\,\text{Sin}[d\,x]-\\
&\qquad 10\,a^4\,b^2\,B\,\text{Sin}[d\,x]+a^2\,b^4\,B\,\text{Sin}[d\,x]+4\,a^5\,b\,C\,\text{Sin}[d\,x]+5\,a^3\,b^3\,C\,\text{Sin}[d\,x]-\\
&\qquad 4\,a^3\,A\,b^3\,\text{Sin}[2\,c+d\,x]+a\,A\,b^5\,\text{Sin}[2\,c+d\,x]+2\,a^4\,b^2\,B\,\text{Sin}[2\,c+d\,x]+a^2\,b^4\,B\,\text{Sin}[2\,c+d\,x]-\\
&\qquad 3\,a^3\,b^3\,C\,\text{Sin}[2\,c+d\,x]+5\,a^2\,A\,b^4\,\text{Sin}[c+2\,d\,x]-2\,A\,b^6\,\text{Sin}[c+2\,d\,x]-\\
&\qquad\left.\left.3\,a^3\,b^3\,B\,\text{Sin}[c+2\,d\,x]+a^4\,b^2\,C\,\text{Sin}[c+2\,d\,x]+2\,a^2\,b^4\,C\,\text{Sin}[c+2\,d\,x]\right)\right)\Big/\\
&\left(2\,a^2\,b\,\left(a^2-b^2\right)^2\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)^2\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)
\end{aligned}
$$

Problem 1001: Result unnecessarily involves imaginary or complex numbers.

$$
\int\frac{\text{Cos}[c+d\,x]^4\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\left(a+b\,\text{Cos}[c+d\,x]\right)^4}\,dx
$$

Optimal (type 3, 649 leaves, 8 steps):

$$\frac{\left(2 A b^2-8 a b B+20 a^2 C+b^2 C\right) x}{2 b^6}+\left(a \left(8 A b^8+8 a^7 b B-28 a^5 b^3 B+35 a^3 b^5 B-20 a b^7 B-a^6 b^2 (2 A-69 C)+7 a^4 b^4 (A-12 C)-8 a^2 b^6 (A-5 C)-20 a^8 C\right) \text{ArcTan}\left[\frac{\sqrt{a-b} \,\text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a+b}}\right]\right) \Big/ \left(\sqrt{a-b}\, b^6 \sqrt{a+b} \left(a^2-b^2\right)^3 d\right)+\frac{1}{6 b^5 \left(a^2-b^2\right)^3 d}\left(24 a^6 b B-68 a^4 b^3 B+65 a^2 b^5 B-6 b^7 B-a^5 b^2 (6 A-167 C)+a^3 b^4 (17 A-146 C)-2 a b^6 (13 A-12 C)-60 a^7 C\right) \text{Sin}[c+d x]-\frac{1}{2 b^4 \left(a^2-b^2\right)^3 d}\left(4 a^5 b B-11 a^3 b^3 B+12 a b^5 B-a^4 b^2 (A-27 C)+a^2 b^4 (2 A-23 C)-b^6 (6 A-C)-10 a^6 C\right) \text{Cos}[c+d x] \,\text{Sin}[c+d x]-\frac{\left(A b^2-a (b B-a C)\right) \text{Cos}[c+d x]^4 \,\text{Sin}[c+d x]}{3 b \left(a^2-b^2\right) d \,(a+b \,\text{Cos}[c+d x])^3}+\left(\left(4 A b^4+2 a^3 b B-7 a b^3 B-5 a^4 C+a^2 b^2 (A+10 C)\right) \text{Cos}[c+d x]^3 \,\text{Sin}[c+d x]\right) \Big/ \left(6 b^2 \left(a^2-b^2\right)^2 d \,(a+b \,\text{Cos}[c+d x])^2\right)-\left(\left(12 A b^6-8 a^5 b B+20 a^3 b^3 B-27 a b^5 B+a^4 b^2 (2 A-53 C)+20 a^6 C+a^2 b^4 (A+48 C)\right) \text{Cos}[c+d x]^2 \,\text{Sin}[c+d x]\right) \Big/ \left(6 b^3 \left(a^2-b^2\right)^3 d \,(a+b \,\text{Cos}[c+d x])\right)$$

Result (type 3, 658 leaves) :

$$\frac{\left(2 A b^2-8 a b B+20 a^2 C+b^2 C\right)(c+d x)}{2 b^6 d}+$$
$$\left(a\left(2 a^6 A b^2-7 a^4 A b^4+8 a^2 A b^6-8 A b^8-8 a^7 b B+28 a^5 b^3 B-35 a^3 b^5 B+20 a b^7 B+\right.\right.$$
$$\left.\left.20 a^8 C-69 a^6 b^2 C+84 a^4 b^4 C-40 a^2 b^6 C\right) \operatorname{ArcTanh}\left[\frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{-a^2+b^2}}\right]\right) \Big/$$
$$\left(b^6\left(a^2-b^2\right)^3 \sqrt{-a^2+b^2}\, d\right)+\frac{(-b B+4 a C)\left(-\frac{i \operatorname{Cos}[c+d x]}{2 b^5}-\frac{\operatorname{Sin}[c+d x]}{2 b^5}\right)}{d}+$$
$$\frac{(-b B+4 a C)\left(\frac{i \operatorname{Cos}[c+d x]}{2 b^5}-\frac{\operatorname{Sin}[c+d x]}{2 b^5}\right)}{d}+$$
$$\frac{a^4 A b^2 \operatorname{Sin}[c+d x]-a^5 b B \operatorname{Sin}[c+d x]+a^6 C \operatorname{Sin}[c+d x]}{3 b^5\left(-a^2+b^2\right) d\,(a+b \operatorname{Cos}[c+d x])^3}+$$
$$\left(7 a^5 A b^2 \operatorname{Sin}[c+d x]-12 a^3 A b^4 \operatorname{Sin}[c+d x]-10 a^6 b B \operatorname{Sin}[c+d x]+15 a^4 b^3 B \operatorname{Sin}[c+d x]+\right.$$
$$\left.13 a^7 C \operatorname{Sin}[c+d x]-18 a^5 b^2 C \operatorname{Sin}[c+d x]\right) \Big/\left(6 b^5\left(-a^2+b^2\right)^2 d\,(a+b \operatorname{Cos}[c+d x])^2\right)+$$
$$\left(11 a^6 A b^2 \operatorname{Sin}[c+d x]-32 a^4 A b^4 \operatorname{Sin}[c+d x]+36 a^2 A b^6 \operatorname{Sin}[c+d x]-26 a^7 b B \operatorname{Sin}[c+d x]+\right.$$
$$71 a^5 b^3 B \operatorname{Sin}[c+d x]-60 a^3 b^5 B \operatorname{Sin}[c+d x]+47 a^8 C \operatorname{Sin}[c+d x]-122 a^6 b^2 C \operatorname{Sin}[c+d x]+$$
$$\left.90 a^4 b^4 C \operatorname{Sin}[c+d x]\right) \Big/\left(6 b^5\left(-a^2+b^2\right)^3 d\,(a+b \operatorname{Cos}[c+d x])\right)+\frac{C \operatorname{Sin}[2(c+d x)]}{4 b^4 d}$$

Problem 1003: Result more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Cos}[c+d x]^2\left(A+B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right)}{(a+b \operatorname{Cos}[c+d x])^4}\, dx$$

Optimal (type 3, 349 leaves, 6 steps):

$$\frac{C x}{b^4}-\left(\left(3 a^2 b^5 B+2 b^7 B-a^3 b^4(A-8 C)+2 a^7 C-7 a^5 b^2 C-4 a b^6(A+2 C)\right)\right.$$
$$\left.\operatorname{ArcTan}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]\right) \Big/\left((a-b)^{7/2} b^4 (a+b)^{7/2} d\right)-$$
$$\frac{\left(A b^2-a(b B-a C)\right) \operatorname{Cos}[c+d x]^2 \operatorname{Sin}[c+d x]}{3 b\left(a^2-b^2\right) d\,(a+b \operatorname{Cos}[c+d x])^3}-$$
$$\frac{a\left(2 A b^4-5 a b^3 B-3 a^4 C+a^2 b^2(3 A+8 C)\right) \operatorname{Sin}[c+d x]}{6 b^3\left(a^2-b^2\right)^2 d\,(a+b \operatorname{Cos}[c+d x])^2}-$$
$$\left(\left(4 A b^6+a^3 b^3 B-16 a b^5 B+9 a^6 C+2 a^2 b^4(7 A+17 C)-a^4 b^2(3 A+28 C)\right) \operatorname{Sin}[c+d x]\right) \Big/$$
$$\left(6 b^3\left(a^2-b^2\right)^3 d\,(a+b \operatorname{Cos}[c+d x])\right)$$

Result (type 3, 915 leaves):

$$\left(\left(-a^3 A b^4-4 a A b^6+3 a^2 b^5 B+2 b^7 B+2 a^7 C-7 a^5 b^2 C+8 a^3 b^4 C-8 a b^6 C\right)\right.$$
$$\left.\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{-a^2+b^2}}\right]\right)\Big/$$
$$\left(b^4\left(a^2-b^2\right)^3\sqrt{-a^2+b^2}\,d\right)+\frac{1}{24 b^4\left(-a^2+b^2\right)^3 d\,(a+b\,\text{Cos}[c+d x])^3}$$
$$\left(-24 a^9 C (c+d x)+36 a^7 b^2 C (c+d x)+36 a^5 b^4 C (c+d x)-84 a^3 b^6 C (c+d x)+\right.$$
$$36 a b^8 C (c+d x)-72 a^8 b C (c+d x)\,\text{Cos}[c+d x]+198 a^6 b^3 C (c+d x)\,\text{Cos}[c+d x]-$$
$$162 a^4 b^5 C (c+d x)\,\text{Cos}[c+d x]+18 a^2 b^7 C (c+d x)\,\text{Cos}[c+d x]+18 b^9 C (c+d x)\,\text{Cos}[c+d x]-$$
$$36 a^7 b^2 C (c+d x)\,\text{Cos}[2 (c+d x)]+108 a^5 b^4 C (c+d x)\,\text{Cos}[2 (c+d x)]-$$
$$108 a^3 b^6 C (c+d x)\,\text{Cos}[2 (c+d x)]+36 a b^8 C (c+d x)\,\text{Cos}[2 (c+d x)]-$$
$$6 a^6 b^3 C (c+d x)\,\text{Cos}[3 (c+d x)]+18 a^4 b^5 C (c+d x)\,\text{Cos}[3 (c+d x)]-$$
$$18 a^2 b^7 C (c+d x)\,\text{Cos}[3 (c+d x)]+6 b^9 C (c+d x)\,\text{Cos}[3 (c+d x)]+51 a^4 A b^5\,\text{Sin}[c+d x]+$$
$$18 a^2 A b^7\,\text{Sin}[c+d x]+6 A b^9\,\text{Sin}[c+d x]-18 a^5 b^4 B\,\text{Sin}[c+d x]-39 a^3 b^6 B\,\text{Sin}[c+d x]-$$
$$18 a b^8 B\,\text{Sin}[c+d x]+24 a^8 b C\,\text{Sin}[c+d x]-57 a^6 b^3 C\,\text{Sin}[c+d x]+72 a^4 b^5 C\,\text{Sin}[c+d x]+$$
$$36 a^2 b^7 C\,\text{Sin}[c+d x]-6 a^5 A b^4\,\text{Sin}[2 (c+d x)]+54 a^3 A b^6\,\text{Sin}[2 (c+d x)]+$$
$$12 a A b^8\,\text{Sin}[2 (c+d x)]-6 a^4 b^5 B\,\text{Sin}[2 (c+d x)]-54 a^2 b^7 B\,\text{Sin}[2 (c+d x)]+$$
$$30 a^7 b^2 C\,\text{Sin}[2 (c+d x)]-90 a^5 b^4 C\,\text{Sin}[2 (c+d x)]+120 a^3 b^6 C\,\text{Sin}[2 (c+d x)]-$$
$$a^4 A b^5\,\text{Sin}[3 (c+d x)]+10 a^2 A b^7\,\text{Sin}[3 (c+d x)]+6 A b^9\,\text{Sin}[3 (c+d x)]-$$
$$2 a^5 b^4 B\,\text{Sin}[3 (c+d x)]+5 a^3 b^6 B\,\text{Sin}[3 (c+d x)]-18 a b^8 B\,\text{Sin}[3 (c+d x)]+$$
$$\left.11 a^6 b^3 C\,\text{Sin}[3 (c+d x)]-32 a^4 b^5 C\,\text{Sin}[3 (c+d x)]+36 a^2 b^7 C\,\text{Sin}[3 (c+d x)]\right)$$

Problem 1006: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]}{(a+b\,\text{Cos}[c+d x])^4}\,dx$$

Optimal (type 3, 345 leaves, 7 steps):

$$-\left(\left(\left(7 a^2 A b^5-2 A b^7-2 a^7 B-3 a^5 b^2 B-a^4 b^3 (8 A-C)+4 a^6 b (2 A+C)\right)\right.\right.$$
$$\left.\left.\text{ArcTan}\left[\frac{\sqrt{a-b}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]\right)\Big/\left(a^4 (a-b)^{7/2} (a+b)^{7/2} d\right)\right)+$$
$$\frac{A\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a^4 d}+\frac{\left(A b^2-a (b B-a C)\right)\text{Sin}[c+d x]}{3 a \left(a^2-b^2\right) d\,(a+b\,\text{Cos}[c+d x])^3}-$$
$$\frac{\left(3 A b^4+5 a^3 b B-2 a^4 C-a^2 b^2 (8 A+3 C)\right)\text{Sin}[c+d x]}{6 a^2\left(a^2-b^2\right)^2 d\,(a+b\,\text{Cos}[c+d x])^2}-$$
$$\left(\left(17 a^2 A b^4-6 A b^6+11 a^5 b B+4 a^3 b^3 B-2 a^6 C-13 a^4 b^2 (2 A+C)\right)\text{Sin}[c+d x]\right)\Big/$$
$$\left(6 a^3\left(a^2-b^2\right)^3 d\,(a+b\,\text{Cos}[c+d x])\right)$$

Result (type 3, 1256 leaves):

$$-\left(\left(2 A \cos[c+d x] \log\left[\cos\left[\frac{c}{2}+\frac{d x}{2}\right]-\sin\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \left(B+C \cos[c+d x]+A \sec[c+d x]\right)\right)\Big/ \left(a^4 d \left(2 A+C+2 B \cos[c+d x]+C \cos[2 c+2 d x]\right)\right)\right)+$$

$$\left(2 A \cos[c+d x] \log\left[\cos\left[\frac{c}{2}+\frac{d x}{2}\right]+\sin\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \left(B+C \cos[c+d x]+A \sec[c+d x]\right)\right)\Big/ \left(a^4 d \left(2 A+C+2 B \cos[c+d x]+C \cos[2 c+2 d x]\right)\right)+$$

$$\frac{1}{\left(a^2-b^2\right)^3 \left(2 A+C+2 B \cos[c+d x]+C \cos[2 c+2 d x]\right)}\left(-8 a^6 A b+8 a^4 A b^3-7 a^2 A b^5+2 A b^7+2 a^7 B+3 a^5 b^2 B-4 a^6 b C-a^4 b^3 C\right) \cos[c+d x] \left(B+C \cos[c+d x]+A \sec[c+d x]\right)$$

$$\left(-\left(\left(2 i \operatorname{ArcTan}\left[\sec\left[\frac{d x}{2}\right] \left(\cos[c]\Big/\left(\sqrt{\left(-a^2 \cos[2 c]+b^2 \cos[2 c]+i a^2 \sin[2 c]-i b^2 \sin[2 c]\right)}\right)-\left(i \sin[c]\right)\Big/\left(\sqrt{\left(-a^2 \cos[2 c]+b^2 \cos[2 c]+i a^2 \sin[2 c]-i b^2 \sin[2 c]\right)}\right)\right) \left(-i a \sin\left[\frac{d x}{2}\right]+i b \sin\left[c+\frac{d x}{2}\right]\right)\right] \cos[c]\right)\Big/ \left(a^4 d \sqrt{-a^2 \cos[2 c]+b^2 \cos[2 c]+i a^2 \sin[2 c]-i b^2 \sin[2 c]}\right)\right)-\right.$$

$$\left(2 \operatorname{ArcTan}\left[\sec\left[\frac{d x}{2}\right] \left(\cos[c]\Big/\left(\sqrt{\left(-a^2 \cos[2 c]+b^2 \cos[2 c]+i a^2 \sin[2 c]-i b^2 \sin[2 c]\right)}\right)-\left(i \sin[c]\right)\Big/\left(\sqrt{\left(-a^2 \cos[2 c]+b^2 \cos[2 c]+i a^2 \sin[2 c]-i b^2 \sin[2 c]\right)}\right)\right) \left(-i a \sin\left[\frac{d x}{2}\right]+i b \sin\left[c+\frac{d x}{2}\right]\right)\right] \sin[c]\right)\Big/ \left.\left(a^4 d \sqrt{-a^2 \cos[2 c]+b^2 \cos[2 c]+i a^2 \sin[2 c]-i b^2 \sin[2 c]}\right)\right)-$$

$$\left(2 \cos[c+d x] \sec[c] \left(B+C \cos[c+d x]+A \sec[c+d x]\right) \left(a A b^2 \sin[c]-a^2 b B \sin[c]+a^3 C \sin[c]-A b^3 \sin[d x]+a b^2 B \sin[d x]-a^2 b C \sin[d x]\right)\right)\Big/ \left(3 a b \left(a^2-b^2\right) d \left(a+b \cos[c+d x]\right)^3 \left(2 A+C+2 B \cos[c+d x]+C \cos[2 c+2 d x]\right)\right)+$$

$$\left(\cos[c+d x] \sec[c] \left(B+C \cos[c+d x]+A \sec[c+d x]\right) \left(-6 a^3 A b \sin[c]+a A b^3 \sin[c]+3 a^4 B \sin[c]+2 a^2 b^2 B \sin[c]-5 a^3 b C \sin[c]+8 a^2 A b^2 \sin[d x]-3 A b^4 \sin[d x]-5 a^3 b B \sin[d x]+2 a^4 C \sin[d x]+3 a^2 b^2 C \sin[d x]\right)\right)\Big/ \left(3 a^2 \left(a^2-b^2\right)^2 d \left(a+b \cos[c+d x]\right)^2 \left(2 A+C+2 B \cos[c+d x]+C \cos[2 c+2 d x]\right)\right)+$$

$$\left(\cos[c+d x] \sec[c] \left(B+C \cos[c+d x]+A \sec[c+d x]\right) \left(-18 a^5 A b \sin[c]+6 a^3 A b^3 \sin[c]-3 a A b^5 \sin[c]+6 a^6 B \sin[c]+9 a^4 b^2 B \sin[c]-12 a^5 b C \sin[c]-3 a^3 b^3 C \sin[c]+26 a^4 A b^2 \sin[d x]-17 a^2 A b^4 \sin[d x]+6 A b^6 \sin[d x]-11 a^5 b B \sin[d x]-4 a^3 b^3 B \sin[d x]+2 a^6 C \sin[d x]+13 a^4 b^2 C \sin[d x]\right)\right)\Big/ \left(3 a^3 \left(a^2-b^2\right)^3 d \left(a+b \cos[c+d x]\right) \left(2 A+C+2 B \cos[c+d x]+C \cos[2 c+2 d x]\right)\right)\Big)$$

Problem 1007: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B \cos[c+d x]+C \cos[c+d x]^2\right) \sec[c+d x]^2}{\left(a+b \cos[c+d x]\right)^4} \, dx$$

Optimal (type 3, 480 leaves, 8 steps):

$$-\left(\left(\left(35 a^4 A b^4-28 a^2 A b^6+8 A b^8+8 a^7 b B-8 a^5 b^3 B+7 a^3 b^5 B-2 a b^7 B-2 a^8 C-a^6 b^2 (20 A+3 C)\right)\right.\right.$$
$$\left.\left.\text{ArcTan}\left[\frac{\sqrt{a-b}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]\right)\Big/\left(a^5 (a-b)^{7/2} (a+b)^{7/2} d\right)\right)-$$
$$\frac{(4 A b-a B)\ \text{ArcTanh}[\text{Sin}[c+d x]]}{a^5 d}+\frac{1}{6 a^4 \left(a^2-b^2\right)^3 d}$$
$$\left(68 a^2 A b^4-24 A b^6+26 a^5 b B-17 a^3 b^3 B+6 a b^5 B+a^6 (6 A-11 C)-a^4 b^2 (65 A+4 C)\right) \text{Tan}[c+d x]+$$
$$\frac{\left(A b^2-a (b B-a C)\right) \text{Tan}[c+d x]}{3 a \left(a^2-b^2\right) d (a+b \text{Cos}[c+d x])^3}-$$
$$\frac{\left(4 A b^4+6 a^3 b B-a b^3 B-3 a^4 C-a^2 b^2 (9 A+2 C)\right) \text{Tan}[c+d x]}{6 a^2 \left(a^2-b^2\right)^2 d (a+b \text{Cos}[c+d x])^2}-$$
$$\left(\left(11 a^2 A b^4-4 A b^6+6 a^5 b B-2 a^3 b^3 B+a b^5 B-2 a^6 C-3 a^4 b^2 (4 A+C)\right) \text{Tan}[c+d x]\right)\Big/$$
$$\left(2 a^3 \left(a^2-b^2\right)^3 d (a+b \text{Cos}[c+d x])\right)$$

Result (type 3, 1113 leaves):

$$-\left(\left(2\left(20 a^6 A b^2-35 a^4 A b^4+28 a^2 A b^6-8 A b^8-8 a^7 b B+8 a^5 b^3 B-7 a^3 b^5 B+2 a b^7 B+2 a^8 C+3 a^6 b^2 C\right) \text{ArcTanh}\left[\frac{(a-b) \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{-a^2+b^2}}\right] \text{Cos}[c+d x]^2 \left(C+B \text{Sec}[c+d x]+A \text{Sec}[c+d x]^2\right)\right) \Big/ \left(a^5 \left(a^2-b^2\right)^3 \sqrt{-a^2+b^2}\, d\, (2 A+C+2 B \text{Cos}[c+d x]+C \text{Cos}[2 c+2 d x])\right)\right)-$$
$$\left(2(-4 A b+a B) \text{Cos}[c+d x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \left(C+B \text{Sec}[c+d x]+A \text{Sec}[c+d x]^2\right)\right) \Big/ \left(a^5 d\, (2 A+C+2 B \text{Cos}[c+d x]+C \text{Cos}[2 c+2 d x])\right)+$$
$$\left(2(-4 A b+a B) \text{Cos}[c+d x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right] \left(C+B \text{Sec}[c+d x]+A \text{Sec}[c+d x]^2\right)\right) \Big/ \left(a^5 d\, (2 A+C+2 B \text{Cos}[c+d x]+C \text{Cos}[2 c+2 d x])\right)+$$
$$\Big(\text{Cos}[c+d x] \left(C+B \text{Sec}[c+d x]+A \text{Sec}[c+d x]^2\right) \big(48 a^9 A \text{Sin}[c+d x]-108 a^7 A b^2 \text{Sin}[c+d x]-174 a^5 A b^4 \text{Sin}[c+d x]+294 a^3 A b^6 \text{Sin}[c+d x]-120 a A b^8 \text{Sin}[c+d x]+120 a^6 b^3 B \text{Sin}[c+d x]-90 a^4 b^5 B \text{Sin}[c+d x]+30 a^2 b^7 B \text{Sin}[c+d x]-54 a^7 b^2 C \text{Sin}[c+d x]-6 a^5 b^4 C \text{Sin}[c+d x]+72 a^8 A b \text{Sin}[2(c+d x)]-444 a^6 A b^3 \text{Sin}[2(c+d x)]+370 a^4 A b^5 \text{Sin}[2(c+d x)]-40 a^2 A b^7 \text{Sin}[2(c+d x)]-48 A b^9 \text{Sin}[2(c+d x)]+144 a^7 b^2 B \text{Sin}[2(c+d x)]-76 a^5 b^4 B \text{Sin}[2(c+d x)]+10 a^3 b^6 B \text{Sin}[2(c+d x)]+12 a b^8 B \text{Sin}[2(c+d x)]-72 a^8 b C \text{Sin}[2(c+d x)]-2 a^6 b^3 C \text{Sin}[2(c+d x)]-16 a^4 b^5 C \text{Sin}[2(c+d x)]+36 a^7 A b^2 \text{Sin}[3(c+d x)]-318 a^5 A b^4 \text{Sin}[3(c+d x)]+342 a^3 A b^6 \text{Sin}[3(c+d x)]-120 a A b^8 \text{Sin}[3(c+d x)]+120 a^6 b^3 B \text{Sin}[3(c+d x)]-90 a^4 b^5 B \text{Sin}[3(c+d x)]+30 a^2 b^7 B \text{Sin}[3(c+d x)]-54 a^7 b^2 C \text{Sin}[3(c+d x)]-6 a^5 b^4 C \text{Sin}[3(c+d x)]+6 a^6 A b^3 \text{Sin}[4(c+d x)]-65 a^4 A b^5 \text{Sin}[4(c+d x)]+68 a^2 A b^7 \text{Sin}[4(c+d x)]-24 A b^9 \text{Sin}[4(c+d x)]+26 a^5 b^4 B \text{Sin}[4(c+d x)]-17 a^3 b^6 B \text{Sin}[4(c+d x)]+6 a b^8 B \text{Sin}[4(c+d x)]-11 a^6 b^3 C \text{Sin}[4(c+d x)]-4 a^4 b^5 C \text{Sin}[4(c+d x)]\big)\Big) \Big/ \left(24 a^4 \left(a^2-b^2\right)^3 d\, (a+b \text{Cos}[c+d x])^3 (2 A+C+2 B \text{Cos}[c+d x]+C \text{Cos}[2 c+2 d x])\right)$$

Problem 1017: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \sqrt{a+b \text{Cos}[c+d x]} \left(A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right) \text{Sec}[c+d x] \, dx$$

Optimal (type 4, 240 leaves, 9 steps):

$$\frac{2\,(3\,b\,B+a\,C)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{3\,b\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{2\,\left(3\,A\,b^2-\left(a^2-b^2\right)\,C\right)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{3\,b\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+$$

$$\frac{2\,a\,A\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\frac{2\,C\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 508 leaves) :

$$\frac{2\,C\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\,\mathrm{Sin}[c+d\,x]}{3\,d}+\frac{1}{6\,d}\left(\frac{2\,(6\,A\,b+6\,a\,B+2\,b\,C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,(6\,a\,A+3\,b\,B+a\,C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\,\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,\mathrm{i}\,(3\,b\,B+a\,C)\,\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\right.$$

$$\mathrm{Cos}[2\,(c+d\,x)]\,\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\,\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\right],\,\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\right],\,\frac{a+b}{a-b}\right]\right)\right)\,\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+2\,(a+b\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)$$

Problem 1018: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^2\,dx$$

Optimal (type 4, 217 leaves, 9 steps):

$$-\frac{(A-2C)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2b}{a+b}\right]}{d\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{(a\,A+2\,b\,B)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2b}{a+b}\right]}{d\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{(A\,b+2\,a\,B)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2b}{a+b}\right]}{d\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{A\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Tan}[c+d\,x]}{d}$$

Result (type 4, 385 leaves):

$$\frac{1}{4d}\left(\frac{8(b\,B+a\,C)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{2(A\,b+4\,a\,B+2\,b\,C)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}-\frac{1}{a\,b\sqrt{-\frac{1}{a+b}}}2\,i\,(A-2C)\sqrt{-\frac{b(-1+\text{Cos}[c+d\,x])}{a+b}}\sqrt{\frac{b(1+\text{Cos}[c+d\,x])}{-a+b}}\;\text{Csc}[c+d\,x]\left(-2a(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(-2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\,\text{EllipticPi}\left[\frac{a+b}{a},i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)+4\,A\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Tan}[c+d\,x]\right)$$

Problem 1019: Result unnecessarily involves imaginary or complex numbers.

$$\int \sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 4, 299 leaves, 10 steps):

$$-\frac{(A\,b+4\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{4\,a\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}}+\frac{(3\,A\,b+4\,a\,B+8\,b\,C)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{4\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-\left(\left(A\,b^2-4\,a\,b\,B-4\,a^2\,(A+2\,C)\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(4\,a\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{(A\,b+4\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Tan}[c+d\,x]}{4\,a\,d}+\frac{A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 4, 566 leaves):

$$\frac{1}{16\,a\,d}\left(\frac{2\,(4\,a\,A\,b+16\,a\,b\,C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\left(2\,(8\,a^2\,A-3\,A\,b^2+4\,a\,b\,B+16\,a^2\,C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,\mathrm{i}\,(-A\,b^2-4\,a\,b\,B)\,\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\,\mathrm{Cos}[2\,(c+d\,x)]\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+b\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}\,\left(2\,a^2-b^2-4\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+2\,(a+b\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(\frac{\mathrm{Sec}[c+d\,x]\,(A\,b\,\mathrm{Sin}[c+d\,x]+4\,a\,B\,\mathrm{Sin}[c+d\,x])}{4\,a}+\frac{1}{2}\,A\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 1020: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^4\,dx$$

Optimal (type 4, 399 leaves, 11 steps):

$$\left(\left(3\,A\,b^2-6\,a\,b\,B-8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Bigg/$$
$$\left(24\,a^2\,d\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)-$$
$$\left(\left(A\,b^2-18\,a\,b\,B-8\,a^2\,(2\,A+3\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Bigg/$$
$$\left(24\,a\,d\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+$$
$$\left(\left(A\,b^3+8\,a^3\,B-2\,a\,b^2\,B+4\,a^2\,b\,(A+2\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Bigg/$$
$$\left(8\,a^2\,d\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\frac{\left(3\,A\,b^2-6\,a\,b\,B-8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Tan}[c+d\,x]}{24\,a^2\,d}+$$
$$\frac{(A\,b+6\,a\,B)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]\;\mathrm{Tan}[c+d\,x]}{12\,a\,d}+$$
$$\frac{A\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]^2\;\mathrm{Tan}[c+d\,x]}{3\,d}$$

Result (type 4, 661 leaves) :

$$\frac{1}{96\,a^2\,d}\left(\frac{2\,\left(4\,a\,A\,b^2+24\,a^2\,b\,B\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\left(8\,a^2\,A\,b+9\,A\,b^3+48\,a^3\,B-18\,a\,b^2\,B+24\,a^2\,b\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right.$$

$$\left.\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(2\,\mathrm{i}\,\left(-16\,a^2\,A\,b+3\,A\,b^3-6\,a\,b^2\,B-24\,a^2\,b\,C\right)\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\right.$$

$$\mathrm{Cos}[2\,(c+d\,x)]\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\,\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\left.\frac{a+b}{a},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+2\,(a+b\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+\frac{1}{d}$$

$$\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(\frac{\mathrm{Sec}[c+d\,x]^2\,\left(A\,b\,\mathrm{Sin}[c+d\,x]+6\,a\,B\,\mathrm{Sin}[c+d\,x]\right)}{12\,a}+\frac{1}{24\,a^2}\right.$$

$$\mathrm{Sec}[c+d\,x]\,\left(16\,a^2\,A\,\mathrm{Sin}[c+d\,x]-3\,A\,b^2\,\mathrm{Sin}[c+d\,x]+6\,a\,b\,B\,\mathrm{Sin}[c+d\,x]+24\,a^2\,C\,\mathrm{Sin}[c+d\,x]\right)+$$

$$\left.\frac{1}{3}\,A\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 1024: Result unnecessarily involves imaginary or complex numbers.

$$\int (a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]\,dx$$

Optimal (type 4, 306 leaves, 10 steps):

$$\left(2\left(15\,A\,b^2+20\,a\,b\,B+3\,a^2\,C+9\,b^2\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(15\,b\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)-\left(2\left(5\,a^2\,b\,B-5\,b^3\,B+3\,a^3\,C-3\,a\,b^2\,(5\,A+C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(15\,b\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{2\,a^2\,A\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{2\,(5\,b\,B+3\,a\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{15\,d}+\frac{2\,C\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 4, 455 leaves):

$$\frac{1}{30 d}\left(\left(4\left(15 a^2 B+5 b^2 B+6 a b(5 A+2 C)\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right)\Big/\left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\left(2\left(20 a b B+3 a^2(10 A+C)+3 b^2(5 A+3 C)\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right)\Big/\left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\frac{1}{a b^2\sqrt{-\frac{1}{a+b}}}2 i\left(15 A b^2+20 a b B+3 a^2 C+9 b^2 C\right)\sqrt{-\frac{b(-1+\operatorname{Cos}[c+d x])}{a+b}}\sqrt{\frac{b(1+\operatorname{Cos}[c+d x])}{-a+b}}\operatorname{Csc}[c+d x]\left(-2 a(a-b)\operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]+b\left(-2 a \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]+b \operatorname{EllipticPi}\left[\frac{a+b}{a}, i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]\right)\right)+4\sqrt{a+b \operatorname{Cos}[c+d x]}\left(5 b B+6 a C+3 b C \operatorname{Cos}[c+d x]\right)\operatorname{Sin}[c+d x]\right)$$

Problem 1025: Result unnecessarily involves imaginary or complex numbers.

$$\int(a+b \operatorname{Cos}[c+d x])^{3/2}\left(A+B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right)\operatorname{Sec}[c+d x]^2\, dx$$

Optimal (type 4, 286 leaves, 10 steps):

$$-\left(\left(\left(3\,a\,A-6\,b\,B-8\,a\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(3\,d\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)\right)+$$

$$\left(\left(6\,a\,b\,B+a^2\left(3\,A-2\,C\right)+2\,b^2\left(3\,A+C\right)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(3\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+$$

$$\frac{a\left(3\,A\,b+2\,a\,B\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{d\sqrt{a+b\,\text{Cos}[c+d\,x]}}-$$

$$\frac{b\left(3\,A-2\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d}+$$

$$\frac{A\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\text{Tan}[c+d\,x]}{d}$$

Result (type 4, 551 leaves) :

$$\frac{1}{12 d}\left(\left(2\left(12 A b^2+24 a b B+12 a^2 C+4 b^2 C\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\operatorname{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 b}{a+b}\right]\right)\Big/\left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\left(2\left(15 a A b+12 a^2 B+6 b^2 B+8 a b C\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\operatorname{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2 b}{a+b}\right]\right)\Big/\left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(2 i\left(-3 a A b+6 b^2 B+8 a b C\right)\sqrt{\frac{b-b \operatorname{Cos}[c+d x]}{a+b}}\sqrt{-\frac{b+b \operatorname{Cos}[c+d x]}{a-b}}\operatorname{Cos}[2(c+d x)]\left(2 a(a-b)\operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]+b\left(2 a \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]-b \operatorname{EllipticPi}\left[\frac{a+b}{a}, i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]\right)\right)\operatorname{Sin}[c+d x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\operatorname{Cos}[c+d x]^2}\sqrt{-\frac{a^2-b^2-2 a(a+b \operatorname{Cos}[c+d x])+(a+b \operatorname{Cos}[c+d x])^2}{b^2}}\left(2 a^2-b^2-4 a(a+b \operatorname{Cos}[c+d x])+2(a+b \operatorname{Cos}[c+d x])^2\right)\right)\right)+\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}\left(\frac{2}{3} b C \operatorname{Sin}[c+d x]+a A \operatorname{Tan}[c+d x]\right)}{d}$$

Problem 1026: Result unnecessarily involves imaginary or complex numbers.

$$\int(a+b \operatorname{Cos}[c+d x])^{3/2}\left(A+B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right)\operatorname{Sec}[c+d x]^3\, dx$$

Optimal (type 4, 307 leaves, 10 steps) :

$$-\left(\left((5\,A\,b+4\,a\,B-8\,b\,C)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathtt{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(4\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)\right)+$$

$$\left((4\,a^2\,B+8\,b^2\,B+a\,b\,(7\,A+8\,C))\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathtt{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(4\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+$$

$$\left((3\,A\,b^2+12\,a\,b\,B+4\,a^2\,(A+2\,C))\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathtt{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(4\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\frac{(3\,A\,b+4\,a\,B)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Tan}[c+d\,x]}{4\,d}+$$

$$\frac{A\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sec}[c+d\,x]\;\mathrm{Tan}[c+d\,x]}{2\,d}$$

Result (type 4, 579 leaves) :

$$\frac{1}{16\,d}\left(\left(2\,(4\,a\,A\,b+16\,b^2\,B+32\,a\,b\,C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\left(2\,(8\,a^2\,A+A\,b^2+20\,a\,b\,B+16\,a^2\,C+8\,b^2\,C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,\mathrm{i}\,(-5\,A\,b^2-4\,a\,b\,B+8\,b^2\,C)\,\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\,\mathrm{Cos}[2\,(c+d\,x)]\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}\left(2\,a^2-b^2-4\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+2\,(a+b\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(\frac{1}{4}\,\mathrm{Sec}[c+d\,x]\,(5\,A\,b\,\mathrm{Sin}[c+d\,x]+4\,a\,B\,\mathrm{Sin}[c+d\,x])+\frac{1}{2}\,a\,A\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 1027: Result unnecessarily involves imaginary or complex numbers.

$$\int(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2)\,\mathrm{Sec}[c+d\,x]^4\,dx$$

Optimal (type 4, 399 leaves, 11 steps):

$$-\left(\left(\left(3 A b^2+30 a b B+8 a^2 (2 A+3 C)\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(24 a d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)+\left(\left(42 a b B+8 a^2 (2 A+3 C)+b^2 (17 A+48 C)\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(24 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(\left(A b^3-8 a^3 B-6 a b^2 B-12 a^2 b (A+2 C)\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(8 a d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\frac{\left(3 A b^2+30 a b B+8 a^2 (2 A+3 C)\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Tan}[c+d x]}{24 a d}+\frac{(A b+2 a B) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{4 d}+\frac{A (a+b \operatorname{Cos}[c+d x])^{3/2} \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 d}$$

Result (type 4, 667 leaves):

$$\frac{1}{96\,a\,d}\left(\left(\left(2\left(28\,a\,A\,b^2+24\,a^2\,b\,B+96\,a\,b^2\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\left(2\left(56\,a^2\,A\,b-9\,A\,b^3+48\,a^3\,B+6\,a\,b^2\,B+120\,a^2\,b\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(2\,i\left(-16\,a^2\,A\,b-3\,A\,b^3-30\,a\,b^2\,B-24\,a^2\,b\,C\right)\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}\left[2\left(c+d\,x\right)\right]\left(2\,a\left(a-b\right)\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\frac{a+b}{a},i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\text{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\left(a+b\,\text{Cos}[c+d\,x]\right)+\left(a+b\,\text{Cos}[c+d\,x]\right)^2}{b^2}}\left(2\,a^2-b^2-4\,a\left(a+b\,\text{Cos}[c+d\,x]\right)+2\left(a+b\,\text{Cos}[c+d\,x]\right)^2\right)\right)\right)+\frac{1}{d}$$

$$\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{1}{12}\text{Sec}[c+d\,x]^2\left(7\,A\,b\,\text{Sin}[c+d\,x]+6\,a\,B\,\text{Sin}[c+d\,x]\right)+\frac{1}{24\,a}\text{Sec}[c+d\,x]\left(16\,a^2\,A\,\text{Sin}[c+d\,x]+3\,A\,b^2\,\text{Sin}[c+d\,x]+30\,a\,b\,B\,\text{Sin}[c+d\,x]+24\,a^2\,C\,\text{Sin}[c+d\,x]\right)+\frac{1}{3}\,a\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)$$

Problem 1028: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 4, 503 leaves, 12 steps):

$$\left(\left(9\,A\,b^3-128\,a^3\,B-24\,a\,b^2\,B-12\,a^2\,b\,(13\,A+20\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(192\,a^2\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)-\left(\left(3\,A\,b^3-128\,a^3\,B-136\,a\,b^2\,B-12\,a^2\,b\,(19\,A+28\,C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(192\,a\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\left(\left(3\,A\,b^4+96\,a^3\,b\,B-8\,a\,b^3\,B+24\,a^2\,b^2\,(A+2\,C)+16\,a^4\,(3\,A+4\,C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(64\,a^2\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\frac{1}{192\,a^2\,d}\left(9\,A\,b^3-128\,a^3\,B-24\,a\,b^2\,B-12\,a^2\,b\,(13\,A+20\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Tan}[c+d\,x]+\frac{1}{96\,a\,d}\left(3\,A\,b^2+56\,a\,b\,B+12\,a^2\,(3\,A+4\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]+\frac{(3\,A\,b+8\,a\,B)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{24\,d}+\frac{A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 4, 783 leaves):

$$\frac{1}{768\,a^2\,d}\left(\left(\left(2\,\left(144\,a^3\,A\,b+12\,a\,A\,b^3+224\,a^2\,b^2\,B+192\,a^3\,b\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\left(2\,\left(288\,a^4\,A-12\,a^2\,A\,b^2+27\,A\,b^4+448\,a^3\,b\,B-72\,a\,b^3\,B+384\,a^4\,C+48\,a^2\,b^2\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(2\,i\,\left(-156\,a^2\,A\,b^2+9\,A\,b^4-128\,a^3\,b\,B-24\,a\,b^3\,B-240\,a^2\,b^2\,C\right)\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\right.\right.\right.$$

$$\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}[2\,(c+d\,x)]$$

$$\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},\,i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\,\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+2\,(a+b\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+\frac{1}{d}$$

$$\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(\frac{1}{24}\,\mathrm{Sec}[c+d\,x]^3\,(9\,A\,b\,\mathrm{Sin}[c+d\,x]+8\,a\,B\,\mathrm{Sin}[c+d\,x])+\right.$$

$$\frac{1}{96\,a}\mathrm{Sec}[c+d\,x]^2$$

$$\left(36\,a^2\,A\,\mathrm{Sin}[c+d\,x]+3\,A\,b^2\,\mathrm{Sin}[c+d\,x]+56\,a\,b\,B\,\mathrm{Sin}[c+d\,x]+48\,a^2\,C\,\mathrm{Sin}[c+d\,x]\right)+$$

$$\frac{1}{192\,a^2}\mathrm{Sec}[c+d\,x]\,\left(156\,a^2\,A\,b\,\mathrm{Sin}[c+d\,x]-9\,A\,b^3\,\mathrm{Sin}[c+d\,x]+128\,a^3\,B\,\mathrm{Sin}[c+d\,x]+\right.$$

$$\left.\left.24\,a\,b^2\,B\,\mathrm{Sin}[c+d\,x]+240\,a^2\,b\,C\,\mathrm{Sin}[c+d\,x]\right)+\frac{1}{4}\,a\,A\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 1032: Result unnecessarily involves imaginary or complex numbers.

$$\int(a+b\,\mathrm{Cos}[c+d\,x])^{5/2}\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]\,dx$$

Optimal (type 4, 383 leaves, 11 steps):

$$\left(2\left(161\,a^2\,b\,B+63\,b^3\,B+15\,a^3\,C+5\,a\,b^2\,(49\,A+29\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(105\,b\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)-$$

$$\left(2\left(56\,a^3\,b\,B-56\,a\,b^3\,B-10\,a^2\,b^2\,(7\,A-C)+15\,a^4\,C-5\,b^4\,(7\,A+5\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(105\,b\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+$$

$$\frac{2\,a^3\,A\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+$$

$$\frac{2\left(35\,A\,b^2+56\,a\,b\,B+15\,a^2\,C+25\,b^2\,C\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{105\,d}+$$

$$\frac{2\,(7\,b\,B+5\,a\,C)\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{35\,d}+$$

$$\frac{2\,C\,(a+b\,\mathrm{Cos}[c+d\,x])^{5/2}\,\mathrm{Sin}[c+d\,x]}{7\,d}$$

Result (type 4, 652 leaves) :

$$\frac{1}{210\,d}\left(\left(2\left(630\,a^2\,A\,b+70\,A\,b^3+210\,a^3\,B+238\,a\,b^2\,B+270\,a^2\,b\,C+50\,b^3\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\right.$$

$$\left(2\left(210\,a^3\,A+245\,a\,A\,b^2+161\,a^2\,b\,B+63\,b^3\,B+15\,a^3\,C+145\,a\,b^2\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right.$$

$$\left.\mathrm{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(2\,\mathrm{i}\left(245\,a\,A\,b^2+161\,a^2\,b\,B+63\,b^3\,B+15\,a^3\,C+145\,a\,b^2\,C\right)\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right.$$

$$\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}\left[2\left(c+d\,x\right)\right]$$

$$\left(2\,a\left(a-b\right)\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\Big)\Big/$$

$$\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+2\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2\right)\right)\right)+\frac{1}{d}$$

$$\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\left(\frac{1}{210}\left(140\,A\,b^2+308\,a\,b\,B+180\,a^2\,C+115\,b^2\,C\right)\mathrm{Sin}[c+d\,x]+\right.$$

$$\frac{1}{35}\,b\left(7\,b\,B+15\,a\,C\right)\mathrm{Sin}\left[2\left(c+d\,x\right)\right]+$$

$$\left.\frac{1}{14}\,b^2\,C\,\mathrm{Sin}\left[3\left(c+d\,x\right)\right]\right)$$

Problem 1033: Result unnecessarily involves imaginary or complex numbers.

$$\int (a + b \operatorname{Cos}[c + d x])^{5/2} \left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^2 \, dx$$

Optimal (type 4, 357 leaves, 11 steps):

$$\left(\left(70 a b B - a^2 (15 A - 46 C) + 6 b^2 (5 A + 3 C)\right) \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c + d x), \frac{2 b}{a + b}\right]\right) \Bigg/ \left(15 d \sqrt{\frac{a + b \operatorname{Cos}[c + d x]}{a + b}}\right) + \left(\left(20 a^2 b B + 10 b^3 B + a^3 (15 A - 16 C) + 4 a b^2 (15 A + 4 C)\right) \sqrt{\frac{a + b \operatorname{Cos}[c + d x]}{a + b}} \operatorname{EllipticF}\left[\frac{1}{2}(c + d x), \frac{2 b}{a + b}\right]\right) \Bigg/ \left(15 d \sqrt{a + b \operatorname{Cos}[c + d x]}\right) + \frac{a^2 (5 A b + 2 a B) \sqrt{\frac{a + b \operatorname{Cos}[c + d x]}{a + b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c + d x), \frac{2 b}{a + b}\right]}{d \sqrt{a + b \operatorname{Cos}[c + d x]}} - \frac{b (15 a A - 10 b B - 16 a C) \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{15 d} - \frac{b (5 A - 2 C) (a + b \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{5 d} + \frac{A (a + b \operatorname{Cos}[c + d x])^{5/2} \operatorname{Tan}[c + d x]}{d}$$

Result (type 4, 621 leaves):

$$\frac{1}{60\,d}\left(\left(2\left(180\,a\,A\,b^2+180\,a^2\,b\,B+20\,b^3\,B+60\,a^3\,C+68\,a\,b^2\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\left(2\left(135\,a^2\,A\,b+30\,A\,b^3+60\,a^3\,B+70\,a\,b^2\,B+46\,a^2\,b\,C+18\,b^3\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,i\left(-15\,a^2\,A\,b+30\,A\,b^3+70\,a\,b^2\,B+46\,a^2\,b\,C+18\,b^3\,C\right)\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}\left[2\left(c+d\,x\right)\right]\left(2\,a\left(a-b\right)\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(2\,a\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\frac{a+b}{a},i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2}{b^2}}\left(2\,a^2-b^2-4\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+2\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2\right)\right)\right)+\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\left(\frac{2}{15}\,b\left(5\,b\,B+11\,a\,C\right)\mathrm{Sin}[c+d\,x]+\frac{1}{5}\,b^2\,C\,\mathrm{Sin}\left[2\left(c+d\,x\right)\right]+a^2\,A\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 1034: Result unnecessarily involves imaginary or complex numbers.

$$\int (a+b\,\text{Cos}[c+d\,x])^{5/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 4, 372 leaves, 11 steps):

$$-\left(\left(\left(12\,a^2\,B-24\,b^2\,B+a\,b\,(27\,A-56\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Bigg/\left(12\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)\right)+$$
$$\left(\left(12\,a^3\,B+48\,a\,b^2\,B+8\,b^3\,(3\,A+C)+a^2\,b\,(33\,A+16\,C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right.$$
$$\left.\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Bigg/\left(12\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+$$
$$\left(a\left(15\,A\,b^2+20\,a\,b\,B+4\,a^2\,(A+2\,C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Bigg/$$
$$\left(4\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\frac{b\,(21\,A\,b+12\,a\,B-8\,b\,C)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{12\,d}+$$
$$\frac{(5\,A\,b+4\,a\,B)\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{4\,d}+$$
$$\frac{A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 4, 636 leaves):

$$\frac{1}{48\,d}\left(\left(\left(2\left(12\,a^2\,A\,b+48\,A\,b^3+144\,a\,b^2\,B+144\,a^2\,b\,C+16\,b^3\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\left(2\left(24\,a^3\,A+63\,a\,A\,b^2+108\,a^2\,b\,B+24\,b^3\,B+48\,a^3\,C+56\,a\,b^2\,C\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(2\,i\left(-27\,a\,A\,b^2-12\,a^2\,b\,B+24\,b^3\,B+56\,a\,b^2\,C\right)\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}\left[2\left(c+d\,x\right)\right]\left(2\,a\left(a-b\right)\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\frac{a+b}{a},i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\text{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\left(a+b\,\text{Cos}[c+d\,x]\right)+\left(a+b\,\text{Cos}[c+d\,x]\right)^2}{b^2}}\left(2\,a^2-b^2-4\,a\left(a+b\,\text{Cos}[c+d\,x]\right)+2\left(a+b\,\text{Cos}[c+d\,x]\right)^2\right)\right)\right)+\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{2}{3}\,b^2\,C\,\text{Sin}[c+d\,x]+\frac{1}{4}\,\text{Sec}[c+d\,x]\left(9\,a\,A\,b\,\text{Sin}[c+d\,x]+4\,a^2\,B\,\text{Sin}[c+d\,x]\right)+\frac{1}{2}\,a^2\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)$$

Problem 1035: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 4, 407 leaves, 11 steps):

$$-\left(\left(\left(54\,a\,b\,B+3\,b^2\,(11\,A-16\,C)+8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$
$$\left.\left.\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(24\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)\right)+$$
$$\left(\left(66\,a^2\,b\,B+48\,b^3\,B+8\,a^3\,(2\,A+3\,C)+a\,b^2\,(59\,A+96\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right.$$
$$\left.\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(24\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+$$
$$\left(\left(5\,A\,b^3+8\,a^3\,B+30\,a\,b^2\,B+20\,a^2\,b\,(A+2\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right.$$
$$\left.\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(8\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+$$
$$\frac{\left(15\,A\,b^2+42\,a\,b\,B+8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Tan}[c+d\,x]}{24\,d}+$$
$$\frac{(5\,A\,b+6\,a\,B)\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{12\,d}+$$
$$\frac{A\,(a+b\,\mathrm{Cos}[c+d\,x])^{5/2}\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{3\,d}$$

Result (type 4, 684 leaves):

$$\frac{1}{96 d}\left(\left(\left(2\left(52 a A b^2+24 a^2 b B+96 b^3 B+288 a b^2 C\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\right.\right.$$

$$\left(2\left(104 a^2 A b-3 A b^3+48 a^3 B+126 a b^2 B+216 a^2 b C+48 b^3 C\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right.$$

$$\left.\operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)-$$

$$\left(2 i\left(-16 a^2 A b-33 A b^3-54 a b^2 B-24 a^2 b C+48 b^3 C\right)\sqrt{\frac{b-b \operatorname{Cos}[c+d x]}{a+b}}\right.$$

$$\sqrt{-\frac{b+b \operatorname{Cos}[c+d x]}{a-b}}\ \operatorname{Cos}[2(c+d x)]$$

$$\left(2 a(a-b) \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\ \sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]+\right.$$

$$b\left(2 a \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\ \sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]-b \operatorname{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a}, i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\ \sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]\right)\right) \operatorname{Sin}[c+d x]\right) \Big/$$

$$\left(a \sqrt{-\frac{1}{a+b}}\ \sqrt{1-\operatorname{Cos}[c+d x]^2}\ \sqrt{-\frac{a^2-b^2-2 a(a+b \operatorname{Cos}[c+d x])+(a+b \operatorname{Cos}[c+d x])^2}{b^2}}\right.$$

$$\left.\left.\left.\left(2 a^2-b^2-4 a(a+b \operatorname{Cos}[c+d x])+2(a+b \operatorname{Cos}[c+d x])^2\right)\right)\right)+\frac{1}{d}$$

$$\sqrt{a+b \operatorname{Cos}[c+d x]}\ \left(\frac{1}{12} \operatorname{Sec}[c+d x]^2\left(13 a A b \operatorname{Sin}[c+d x]+6 a^2 B \operatorname{Sin}[c+d x]\right)+\right.$$

$$\frac{1}{24} \operatorname{Sec}[c+d x]$$

$$\left(16 a^2 A \operatorname{Sin}[c+d x]+33 A b^2 \operatorname{Sin}[c+d x]+54 a b B \operatorname{Sin}[c+d x]+24 a^2 C \operatorname{Sin}[c+d x]\right)+$$

$$\left.\frac{1}{3} a^2 A \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]\right)$$

Problem 1036: Result unnecessarily involves imaginary or complex numbers.

$$\int (a+b\,\text{Cos}[c+d\,x])^{5/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^5\,dx$$

Optimal (type 4, 502 leaves, 12 steps):

$$-\left(\left(\left(15\,A\,b^3+128\,a^3\,B+264\,a\,b^2\,B+4\,a^2\,b\,(71\,A+108\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(192\,a\,d\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)\right)+$$
$$\left(\left(128\,a^3\,B+472\,a\,b^2\,B+4\,a^2\,b\,(89\,A+132\,C)+b^3\,(133\,A+384\,C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(192\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$
$$\left(\left(5\,A\,b^4-160\,a^3\,b\,B-40\,a\,b^3\,B-120\,a^2\,b^2\,(A+2\,C)-16\,a^4\,(3\,A+4\,C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(64\,a\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{1}{192\,a\,d}$$
$$\left(15\,A\,b^3+128\,a^3\,B+264\,a\,b^2\,B+4\,a^2\,b\,(71\,A+108\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Tan}[c+d\,x]+$$
$$\frac{1}{32\,d}\left(5\,A\,b^2+24\,a\,b\,B+4\,a^2\,(3\,A+4\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]+$$
$$\frac{(5\,A\,b+8\,a\,B)\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{24\,d}+$$
$$\frac{A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 4, 792 leaves):

$$\frac{1}{768\,a\,d}\left(\left(2\left(144\,a^3\,A\,b+236\,a\,A\,b^3+416\,a^2\,b^2\,B+192\,a^3\,b\,C+768\,a\,b^3\,C\right)\right.\right.$$
$$\left.\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+$$
$$\left(2\left(288\,a^4\,A+436\,a^2\,A\,b^2-45\,A\,b^4+832\,a^3\,b\,B-24\,a\,b^3\,B+384\,a^4\,C+1008\,a^2\,b^2\,C\right)\right.$$

$$\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\ \text{EllipticPi}\left[2,\frac{1}{2}(c+d\,x),\frac{2\,b}{a+b}\right]\Bigg)\Bigg/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\Bigg(2\,\mathrm{i}\,\left(-284\,a^2\,A\,b^2-15\,A\,b^4-128\,a^3\,b\,B-264\,a\,b^3\,B-432\,a^2\,b^2\,C\right)$$

$$\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\ \sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\ \text{Cos}[2\,(c+d\,x)]$$

$$\Bigg(2\,a\,(a-b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+$$

$$b\,\Bigg(2\,a\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\Big[$$

$$\frac{a+b}{a},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\Big]\Bigg)\Bigg)\ \text{Sin}[c+d\,x]\Bigg)\Bigg/$$

$$\Bigg(a\,\sqrt{-\frac{1}{a+b}}\ \sqrt{1-\text{Cos}[c+d\,x]^2}\ \sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\text{Cos}[c+d\,x])+(a+b\,\text{Cos}[c+d\,x])^2}{b^2}}$$

$$\left(2\,a^2-b^2-4\,a\,(a+b\,\text{Cos}[c+d\,x])+2\,(a+b\,\text{Cos}[c+d\,x])^2\right)\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \Bigg(\frac{1}{24}\,\text{Sec}[c+d\,x]^3\,\left(17\,a\,A\,b\,\text{Sin}[c+d\,x]+8\,a^2\,B\,\text{Sin}[c+d\,x]\right)+$$

$$\frac{1}{96}\,\text{Sec}[c+d\,x]^2$$

$$\left(36\,a^2\,A\,\text{Sin}[c+d\,x]+59\,A\,b^2\,\text{Sin}[c+d\,x]+104\,a\,b\,B\,\text{Sin}[c+d\,x]+48\,a^2\,C\,\text{Sin}[c+d\,x]\right)+$$

$$\frac{1}{192\,a}\text{Sec}[c+d\,x]\,\Big(284\,a^2\,A\,b\,\text{Sin}[c+d\,x]+15\,A\,b^3\,\text{Sin}[c+d\,x]+128\,a^3\,B\,\text{Sin}[c+d\,x]+$$

$$264\,a\,b^2\,B\,\text{Sin}[c+d\,x]+432\,a^2\,b\,C\,\text{Sin}[c+d\,x]\Big)+\frac{1}{4}\,a^2\,A\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]\Bigg)$$

Problem 1037: Result unnecessarily involves imaginary or complex numbers.

$$\int (a+b\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^6\,dx$$

Optimal (type 4, 624 leaves, 13 steps):

$$\left(\left(45\,A\,b^4-2840\,a^3\,b\,B-150\,a\,b^3\,B-256\,a^4\,(4\,A+5\,C)-12\,a^2\,b^2\,(141\,A+220\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Bigg/\left(1920\,a^2\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)-$$

$$\left(\left(15\,A\,b^4-3560\,a^3\,b\,B-1330\,a\,b^3\,B-256\,a^4\,(4\,A+5\,C)-4\,a^2\,b^2\,(809\,A+1180\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Bigg/\left(1920\,a\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+$$

$$\left(\left(3\,A\,b^5+96\,a^5\,B+240\,a^3\,b^2\,B-10\,a\,b^4\,B+40\,a^2\,b^3\,(A+2\,C)+80\,a^4\,b\,(3\,A+4\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Bigg/\left(128\,a^2\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\frac{1}{1920\,a^2\,d}\left(45\,A\,b^4-2840\,a^3\,b\,B-150\,a\,b^3\,B-256\,a^4\,(4\,A+5\,C)-12\,a^2\,b^2\,(141\,A+220\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Tan}[c+d\,x]+\frac{1}{960\,a\,d}$$

$$\left(15\,A\,b^3+360\,a^3\,B+590\,a\,b^2\,B+4\,a^2\,b\,(193\,A+260\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]\;\mathrm{Tan}[c+d\,x]+$$

$$\frac{1}{240\,d}\left(15\,A\,b^2+110\,a\,b\,B+16\,a^2\,(4\,A+5\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]+$$

$$\frac{(A\,b+2\,a\,B)\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]}{8\,d}+$$

$$\frac{A\,(a+b\,\mathrm{Cos}[c+d\,x])^{5/2}\,\mathrm{Sec}[c+d\,x]^4\,\mathrm{Tan}[c+d\,x]}{5\,d}$$

Result (type 4, 930 leaves):

$$\frac{1}{7680\,a^2\,d}\left(\left(\left(2\,\left(3088\,a^3\,A\,b^2+60\,a\,A\,b^4+1440\,a^4\,b\,B+2360\,a^2\,b^3\,B+4160\,a^3\,b^2\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Bigg/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\right.\right.$$

$$\left(2\,\left(6176\,a^4\,A\,b-492\,a^2\,A\,b^3+135\,A\,b^5+2880\,a^5\,B+4360\,a^3\,b^2\,B-450\,a\,b^4\,B+8320\,a^4\,b\,C-240\,a^2\,b^3\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Bigg/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(2\,i\,\left(-1024\,a^4\,A\,b-1692\,a^2\,A\,b^3+45\,A\,b^5-2840\,a^3\,b^2\,B-150\,a\,b^4\,B-1280\,a^4\,b\,C-2640\,a^2\,b^3\,C\right)\right.$$

$$\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\,\mathrm{Cos}\left[2\,(c+d\,x)\right]$$

$$\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\left.\frac{a+b}{a},\,i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+2\,(a+b\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(\frac{1}{40}\,\mathrm{Sec}[c+d\,x]^4\,\left(21\,a\,A\,b\,\mathrm{Sin}[c+d\,x]+10\,a^2\,B\,\mathrm{Sin}[c+d\,x]\right)+\right.$$

$$\frac{1}{240}\,\mathrm{Sec}[c+d\,x]^3$$

$$\left(64\,a^2\,A\,\mathrm{Sin}[c+d\,x]+93\,A\,b^2\,\mathrm{Sin}[c+d\,x]+170\,a\,b\,B\,\mathrm{Sin}[c+d\,x]+80\,a^2\,C\,\mathrm{Sin}[c+d\,x]\right)+$$

$$\frac{1}{960\,a}\mathrm{Sec}[c+d\,x]^2\,\left(772\,a^2\,A\,b\,\mathrm{Sin}[c+d\,x]+15\,A\,b^3\,\mathrm{Sin}[c+d\,x]+\right.$$

$$\left.360\,a^3\,B\,\mathrm{Sin}[c+d\,x]+590\,a\,b^2\,B\,\mathrm{Sin}[c+d\,x]+1040\,a^2\,b\,C\,\mathrm{Sin}[c+d\,x]\right)+\frac{1}{1920\,a^2}$$

$$\mathrm{Sec}[c+d\,x]\,\left(1024\,a^4\,A\,\mathrm{Sin}[c+d\,x]+1692\,a^2\,A\,b^2\,\mathrm{Sin}[c+d\,x]-45\,A\,b^4\,\mathrm{Sin}[c+d\,x]+\right.$$

$$2840\,a^3\,b\,B\,\mathrm{Sin}[c+d\,x]+150\,a\,b^3\,B\,\mathrm{Sin}[c+d\,x]+1280\,a^4\,C\,\mathrm{Sin}[c+d\,x]+$$

$$\left.\left.2640\,a^2\,b^2\,C\,\mathrm{Sin}[c+d\,x]\right)+\frac{1}{5}\,a^2\,A\,\mathrm{Sec}[c+d\,x]^4\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 1043: Unable to integrate problem.

$$\int\frac{\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 189 leaves, 8 steps):

$$\frac{2\,C\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{b\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}}+\frac{2\,(b\,B-a\,C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{b\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\frac{2\,A\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 8, 43 leaves):

$$\int\frac{\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}\,dx$$

Problem 1044: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^2}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 220 leaves, 9 steps):

$$-\frac{A\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{a\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}}+\frac{(A+2\,C)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}-\frac{(A\,b-2\,a\,B)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{a\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\frac{A\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Tan}[c+d\,x]}{a\,d}$$

Result (type 4, 600 leaves):

$$\left(2\,A\,\text{Cos}[c+d\,x]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(a\,d\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)\right)+$$
$$\frac{1}{2\,a\,d\,\left(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x]\right)}\text{Cos}[c+d\,x]^2$$
$$\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\left(\frac{8\,a\,C\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.$$
$$\frac{2\,(-3\,A\,b+4\,a\,B)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\,\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$
$$\left(2\,i\,A\,b\,\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}[2\,(c+d\,x)]\right.$$
$$\left(2\,a\,(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$
$$b\left(2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$
$$\left.\left.\left.\frac{a+b}{a},i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\text{Cos}[c+d\,x])+(a+b\,\text{Cos}[c+d\,x])^2}{b^2}}\right.$$
$$\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\text{Cos}[c+d\,x])+2\,(a+b\,\text{Cos}[c+d\,x])^2\right)\right)\right)$$

Problem 1045: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 303 leaves, 10 steps):

$$\frac{(3 A b-4 a B) \sqrt{a+b \operatorname{Cos}[c+d x]}\ \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{4 a^2 d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}}-$$

$$\frac{(A b-4 a B) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{4 a d \sqrt{a+b \operatorname{Cos}[c+d x]}}+$$

$$\left(\left(3 A b^2-4 a b B+4 a^2 (A+2 C)\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/$$

$$\left(4 a^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\frac{(3 A b-4 a B) \sqrt{a+b \operatorname{Cos}[c+d x]}\ \operatorname{Tan}[c+d x]}{4 a^2 d}+$$

$$\frac{A \sqrt{a+b \operatorname{Cos}[c+d x]}\ \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 a d}$$

Result (type 4, 562 leaves) :

$$
\frac{1}{16\,a^2\,d}\left(\frac{8\,a\,A\,b\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\right.
$$

$$
\left(2\,\left(8\,a^2\,A+9\,A\,b^2-12\,a\,b\,B+16\,a^2\,C\right)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/
$$

$$
\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,\mathrm{i}\,\left(3\,A\,b^2-4\,a\,b\,B\right)\,\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\right.
$$

$$
\mathrm{Cos}[2\,(c+d\,x)]\,\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+\right.
$$

$$
b\,\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.
$$

$$
\left.\left.\left.\frac{a+b}{a},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\,\mathrm{Sin}[c+d\,x]\right)\Big/
$$

$$
\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}\right.
$$

$$
\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+2\,(a+b\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+
$$

$$
\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(\frac{\mathrm{Sec}[c+d\,x]\,\left(-3\,A\,b\,\mathrm{Sin}[c+d\,x]+4\,a\,B\,\mathrm{Sin}[c+d\,x]\right)}{4\,a^2}+\right.
$$

$$
\left.\frac{A\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,a}\right)
$$

Problem 1046: Result unnecessarily involves imaginary or complex numbers.

$$
\int\frac{\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^4}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}\,dx
$$

Optimal (type 4, 405 leaves, 11 steps):

$$-\left(\left(\left(15\,A\,b^2-18\,a\,b\,B+8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(24\,a^3\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)\right)+$$

$$\left(\left(5\,A\,b^2-6\,a\,b\,B+8\,a^2\,(2\,A+3\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(24\,a^2\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(\left(5\,A\,b^3-8\,a^3\,B-6\,a\,b^2\,B+4\,a^2\,b\,(A+2\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right.$$

$$\left.\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(8\,a^3\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+$$

$$\frac{\left(15\,A\,b^2-18\,a\,b\,B+8\,a^2\,(2\,A+3\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Tan}[c+d\,x]}{24\,a^3\,d}-$$

$$\frac{(5\,A\,b-6\,a\,B)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{12\,a^2\,d}+$$

$$\frac{A\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{3\,a\,d}$$

Result (type 4, 665 leaves) :

$$\frac{1}{96\,a^3\,d}\left(\frac{2\left(-20\,a\,A\,b^2+24\,a^2\,b\,B\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\left(2\left(-40\,a^2\,A\,b-45\,A\,b^3+48\,a^3\,B+54\,a\,b^2\,B-72\,a^2\,b\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right.$$

$$\left.\mathrm{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(2\,\mathrm{i}\left(-16\,a^2\,A\,b-15\,A\,b^3+18\,a\,b^2\,B-24\,a^2\,b\,C\right)\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\right.$$

$$\mathrm{Cos}\left[2\left(c+d\,x\right)\right]\left(2\,a\left(a-b\right)\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\left.\frac{a+b}{a},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/$$

$$\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\sqrt{-\frac{a^2-b^2-2\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2}{b^2}}\right.$$

$$\left.\left.\left(2\,a^2-b^2-4\,a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+2\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2\right)\right)\right)+$$

$$\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\left(\frac{\mathrm{Sec}[c+d\,x]^2\left(-5\,A\,b\,\mathrm{Sin}[c+d\,x]+6\,a\,B\,\mathrm{Sin}[c+d\,x]\right)}{12\,a^2}+\right.$$

$$\frac{1}{24\,a^3}\mathrm{Sec}[c+d\,x]$$

$$\left(16\,a^2\,A\,\mathrm{Sin}[c+d\,x]+15\,A\,b^2\,\mathrm{Sin}[c+d\,x]-18\,a\,b\,B\,\mathrm{Sin}[c+d\,x]+24\,a^2\,C\,\mathrm{Sin}[c+d\,x]\right)+$$

$$\left.\frac{A\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{3\,a}\right)$$

Problem 1050: Unable to integrate problem.

$$\int \frac{\left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]}{\left(a + b \operatorname{Cos}[c + d x]\right)^{3/2}} \, dx$$

Optimal (type 4, 271 leaves, 9 steps):

$$-\left(\left(2 \left(A b^2 - a \left(b B - a C\right)\right) \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 b}{a + b}\right]\right) \Big/ \left(a b \left(a^2 - b^2\right) d \sqrt{\frac{a + b \operatorname{Cos}[c + d x]}{a + b}}\right)\right) + \frac{2 C \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{b d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{2 A \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{a d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{2 \left(A b^2 - a \left(b B - a C\right)\right) \operatorname{Sin}[c + d x]}{a \left(a^2 - b^2\right) d \sqrt{a + b \operatorname{Cos}[c + d x]}}$$

Result (type 8, 43 leaves):

$$\int \frac{\left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]}{\left(a + b \operatorname{Cos}[c + d x]\right)^{3/2}} \, dx$$

Problem 1051: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^2}{\left(a + b \operatorname{Cos}[c + d x]\right)^{3/2}} \, dx$$

Optimal (type 4, 313 leaves, 10 steps):

$$\left(\left(3 A b^2 - 2 a b B - a^2 (A - 2 C)\right) \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 b}{a + b}\right]\right) \Big/ \left(a^2 \left(a^2 - b^2\right) d \sqrt{\frac{a + b \operatorname{Cos}[c + d x]}{a + b}}\right) + \frac{A \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{a d \sqrt{a + b \operatorname{Cos}[c + d x]}} - \frac{(3 A b - 2 a B) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{a^2 d \sqrt{a + b \operatorname{Cos}[c + d x]}} - \frac{b \left(3 A b^2 - 2 a b B - a^2 (A - 2 C)\right) \operatorname{Sin}[c + d x]}{a^2 \left(a^2 - b^2\right) d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{A \operatorname{Tan}[c + d x]}{a d \sqrt{a + b \operatorname{Cos}[c + d x]}}$$

Result (type 4, 751 leaves):

$$\frac{1}{2 a^2 (a-b) (a+b) d (2 A+C+2 B \mathrm{Cos}[c+d x]+C \mathrm{Cos}[2 c+2 d x])} \mathrm{Cos}[c+d x]^2 \left(C+B \mathrm{Sec}[c+d x]+A \mathrm{Sec}[c+d x]^2\right) \left(\left(\left(2 \left(4 a A b^2-4 a^2 b B+4 a^3 C\right) \sqrt{\frac{a+b \mathrm{Cos}[c+d x]}{a+b}} \, \mathrm{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(\sqrt{a+b \mathrm{Cos}[c+d x]}\right)+\left(2 \left(-7 a^2 A b+9 A b^3+4 a^3 B-6 a b^2 B+2 a^2 b C\right) \sqrt{\frac{a+b \mathrm{Cos}[c+d x]}{a+b}} \, \mathrm{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(\sqrt{a+b \mathrm{Cos}[c+d x]}\right)-\left(2 i \left(-a^2 A b+3 A b^3-2 a b^2 B+2 a^2 b C\right) \sqrt{\frac{b-b \mathrm{Cos}[c+d x]}{a+b}} \sqrt{-\frac{b+b \mathrm{Cos}[c+d x]}{a-b}} \mathrm{Cos}[2 (c+d x)] \left(2 a (a-b) \mathrm{EllipticE}\left[i \mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \mathrm{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]+b \left(2 a \mathrm{EllipticF}\left[i \mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \mathrm{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]-b \mathrm{EllipticPi}\left[\frac{a+b}{a}, i \mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \mathrm{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]\right)\right) \mathrm{Sin}[c+d x]\right) \Big/ \left(a \sqrt{-\frac{1}{a+b}} \sqrt{1-\mathrm{Cos}[c+d x]^2} \sqrt{-\frac{a^2-b^2-2 a (a+b \mathrm{Cos}[c+d x])+(a+b \mathrm{Cos}[c+d x])^2}{b^2}} \left(2 a^2-b^2-4 a (a+b \mathrm{Cos}[c+d x])+2 (a+b \mathrm{Cos}[c+d x])^2\right)\right)\right)+$$

$$\left(\mathrm{Cos}[c+d x]^2 \sqrt{a+b \mathrm{Cos}[c+d x]} \left(C+B \mathrm{Sec}[c+d x]+A \mathrm{Sec}[c+d x]^2\right) \left(-\frac{4 \left(A b^3 \mathrm{Sin}[c+d x]-a b^2 B \mathrm{Sin}[c+d x]+a^2 b C \mathrm{Sin}[c+d x]\right)}{a^2 \left(a^2-b^2\right) (a+b \mathrm{Cos}[c+d x])}+\frac{2 A \mathrm{Tan}[c+d x]}{a^2}\right)\right) \Big/ (d (2 A+C+2 B \mathrm{Cos}[c+d x]+C \mathrm{Cos}[2 c+2 d x]))$$

Problem 1052: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3}{\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 416 leaves, 11 steps):

$$-\left(\left(\left(15\,A\,b^3+4\,a^3\,B-12\,a\,b^2\,B-a^2\,(7\,A\,b-8\,b\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(4\,a^3\,(a^2-b^2)\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)\right)-\frac{(5\,A\,b-4\,a\,B)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{4\,a^2\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\left(\left(15\,A\,b^2-12\,a\,b\,B+4\,a^2\,(A+2\,C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(4\,a^3\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{b\,\left(15\,A\,b^3+4\,a^3\,B-12\,a\,b^2\,B-a^2\,(7\,A\,b-8\,b\,C)\right)\,\text{Sin}[c+d\,x]}{4\,a^3\,(a^2-b^2)\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-\frac{(5\,A\,b-4\,a\,B)\,\text{Tan}[c+d\,x]}{4\,a^2\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 723 leaves):

$$-\frac{1}{16 a^3 (-a+b)(a+b) d}\left(\left(\left(2 \left(4 a^3 A b-20 a A b^3+16 a^2 b^2 B-16 a^3 b C\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\right.\right.$$

$$\left(2 \left(8 a^4 A+29 a^2 A b^2-45 A b^4-28 a^3 b B+36 a b^3 B+16 a^4 C-24 a^2 b^2 C\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)-$$

$$\left(2 i \left(7 a^2 A b^2-15 A b^4-4 a^3 b B+12 a b^3 B-8 a^2 b^2 C\right)\sqrt{\frac{b-b \operatorname{Cos}[c+d x]}{a+b}}\sqrt{-\frac{b+b \operatorname{Cos}[c+d x]}{a-b}} \operatorname{Cos}[2(c+d x)]\right.$$

$$\left(2 a (a-b) \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]+\right.$$

$$b\left(2 a \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]-b \operatorname{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\left.\frac{a+b}{a}, i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]\right)\right) \operatorname{Sin}[c+d x]\right) \Big/$$

$$\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\operatorname{Cos}[c+d x]^2}\sqrt{-\frac{a^2-b^2-2 a (a+b \operatorname{Cos}[c+d x])+(a+b \operatorname{Cos}[c+d x])^2}{b^2}}\right.$$

$$\left.\left.\left(2 a^2-b^2-4 a (a+b \operatorname{Cos}[c+d x])+2 (a+b \operatorname{Cos}[c+d x])^2\right)\right)\right)+$$

$$\frac{1}{d}\sqrt{a+b \operatorname{Cos}[c+d x]}\left(\frac{\operatorname{Sec}[c+d x]\,(-7 A b \operatorname{Sin}[c+d x]+4 a B \operatorname{Sin}[c+d x])}{4 a^3}+\right.$$

$$\frac{2 \left(A b^4 \operatorname{Sin}[c+d x]-a b^3 B \operatorname{Sin}[c+d x]+a^2 b^2 C \operatorname{Sin}[c+d x]\right)}{a^3 \left(a^2-b^2\right)(a+b \operatorname{Cos}[c+d x])}+$$

$$\left.\frac{A \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 a^2}\right)$$

Problem 1057: Unable to integrate problem.

$$\int \frac{\left(A + B\,\text{Cos}[c + d\,x] + C\,\text{Cos}[c + d\,x]^2\right)\,\text{Sec}[c + d\,x]}{\left(a + b\,\text{Cos}[c + d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 401 leaves, 10 steps):

$$\left(2\left(3\,A\,b^4 + 4\,a^3\,b\,B - a^4\,C - a^2\,b^2\,(7\,A + 3\,C)\right)\sqrt{a + b\,\text{Cos}[c + d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,\frac{2\,b}{a + b}\right]\right) \Big/ \left(3\,a^2\,b\,\left(a^2 - b^2\right)^2 d\,\sqrt{\frac{a + b\,\text{Cos}[c + d\,x]}{a + b}}\right) +$$

$$\frac{2\left(A\,b^2 - a\,(b\,B - a\,C)\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,\frac{2\,b}{a+b}\right]}{3\,a\,b\,\left(a^2 - b^2\right)d\,\sqrt{a + b\,\text{Cos}[c + d\,x]}} +$$

$$\frac{2\,A\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c + d\,x),\,\frac{2\,b}{a+b}\right]}{a^2\,d\,\sqrt{a + b\,\text{Cos}[c + d\,x]}} + \frac{2\left(A\,b^2 - a\,(b\,B - a\,C)\right)\text{Sin}[c + d\,x]}{3\,a\,\left(a^2 - b^2\right)d\,\left(a + b\,\text{Cos}[c + d\,x]\right)^{3/2}} -$$

$$\frac{2\left(3\,A\,b^4 + 4\,a^3\,b\,B - a^4\,C - a^2\,b^2\,(7\,A + 3\,C)\right)\text{Sin}[c + d\,x]}{3\,a^2\,\left(a^2 - b^2\right)^2 d\,\sqrt{a + b\,\text{Cos}[c + d\,x]}}$$

Result (type 8, 43 leaves):

$$\int \frac{\left(A + B\,\text{Cos}[c + d\,x] + C\,\text{Cos}[c + d\,x]^2\right)\,\text{Sec}[c + d\,x]}{\left(a + b\,\text{Cos}[c + d\,x]\right)^{5/2}}\,dx$$

Problem 1058: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A + B\,\text{Cos}[c + d\,x] + C\,\text{Cos}[c + d\,x]^2\right)\,\text{Sec}[c + d\,x]^2}{\left(a + b\,\text{Cos}[c + d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 461 leaves, 11 steps):

$$\left(\left(26 a^2 A b^2-15 A b^4-14 a^3 b B+6 a b^3 B-a^4 (3 A-8 C)\right) \sqrt{a+b \operatorname{Cos}[c+d x]}\ \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(3 a^3 \left(a^2-b^2\right)^2 d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)-\left(\left(5 A b^2-2 a b B-a^2 (3 A-2 C)\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(3 a^2 \left(a^2-b^2\right) d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\frac{(5 A b-2 a B) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]}{a^3 d \sqrt{a+b \operatorname{Cos}[c+d x]}}-\frac{b \left(5 A b^2-2 a b B-a^2 (3 A-2 C)\right) \operatorname{Sin}[c+d x]}{3 a^2 \left(a^2-b^2\right) d (a+b \operatorname{Cos}[c+d x])^{3/2}}-\frac{b \left(26 a^2 A b^2-15 A b^4-14 a^3 b B+6 a b^3 B-a^4 (3 A-8 C)\right) \operatorname{Sin}[c+d x]}{3 a^3 \left(a^2-b^2\right)^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}}+\frac{A \operatorname{Tan}[c+d x]}{a d (a+b \operatorname{Cos}[c+d x])^{3/2}}$$

Result (type 4, 915 leaves):

$$\frac{1}{6 a^3 (-a+b)^2 (a+b)^2 d\, (2 A+C+2 B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[2 c+2 d x])} \operatorname{Cos}[c+d x]^2 \left(C+B \operatorname{Sec}[c+d x]+A \operatorname{Sec}[c+d x]^2\right) \left(\left(2 \left(36 a^3 A b^2-20 a A b^4-24 a^4 b B+8 a^2 b^3 B+12 a^5 C+4 a^3 b^2 C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\left(2 \left(-33 a^4 A b+86 a^2 A b^3-45 A b^5+12 a^5 B-38 a^3 b^2 B+18 a b^4 B+8 a^4 b C\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticPi}\left[2, \frac{1}{2} (c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(2 i \left(-3 a^4 A b+26 a^2 A b^3-15 A b^5-14 a^3 b^2 B+6 a b^4 B+8 a^4 b C\right) \sqrt{\frac{b-b \operatorname{Cos}[c+d x]}{a+b}} \sqrt{-\frac{b+b \operatorname{Cos}[c+d x]}{a-b}}\ \operatorname{Cos}[2 (c+d x)]\right.\right.$$

$$\left(2\,a\,(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$
$$b\left(2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$
$$\left.\left.\left.\frac{a+b}{a},\,i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\Bigg)\Bigg/$$
$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\text{Cos}[c+d\,x])+(a+b\,\text{Cos}[c+d\,x])^2}{b^2}}\right.$$
$$\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\text{Cos}[c+d\,x])+2\,(a+b\,\text{Cos}[c+d\,x])^2\right)\right)\Bigg)+$$
$$\left(\text{Cos}[c+d\,x]^2\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(C+B\,\text{Sec}[c+d\,x]+A\,\text{Sec}[c+d\,x]^2\right)\right.$$
$$\left(-\frac{4\,\left(A\,b^3\,\text{Sin}[c+d\,x]-a\,b^2\,B\,\text{Sin}[c+d\,x]+a^2\,b\,C\,\text{Sin}[c+d\,x]\right)}{3\,a^2\,(a^2-b^2)\,(a+b\,\text{Cos}[c+d\,x])^2}-\right.$$
$$\left(4\,\left(10\,a^2\,A\,b^3\,\text{Sin}[c+d\,x]-6\,A\,b^5\,\text{Sin}[c+d\,x]-7\,a^3\,b^2\,B\,\text{Sin}[c+d\,x]+\right.\right.$$
$$\left.\left.3\,a\,b^4\,B\,\text{Sin}[c+d\,x]+4\,a^4\,b\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/\left(3\,a^3\,(a^2-b^2)^2\,(a+b\,\text{Cos}[c+d\,x])\right)+$$
$$\left.\left.\frac{2\,A\,\text{Tan}[c+d\,x]}{a^3}\right)\right)\Big/\left(d\,(2\,A+C+2\,B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[2\,c+2\,d\,x])\right)$$

Problem 1059: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^3}{(a+b\,\text{Cos}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 572 leaves, 12 steps):

$$\left(\left(105\,A\,b^5-12\,a^5\,B+104\,a^3\,b^2\,B-60\,a\,b^4\,B+a^4\,b\,(33\,A-56\,C)-2\,a^2\,b^3\,(85\,A-12\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(12\,a^4\,(a^2-b^2)^2\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)+$$

$$\left(\left(35\,A\,b^3+12\,a^3\,B-20\,a\,b^2\,B-a^2\,(27\,A\,b-8\,b\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(12\,a^3\,(a^2-b^2)\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+$$

$$\left(\left(35\,A\,b^2-20\,a\,b\,B+4\,a^2\,(A+2\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(4\,a^4\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+$$

$$\frac{b\,\left(35\,A\,b^3+12\,a^3\,B-20\,a\,b^2\,B-a^2\,(27\,A\,b-8\,b\,C)\right)\mathrm{Sin}[c+d\,x]}{12\,a^3\,(a^2-b^2)\,d\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}}-$$

$$\left(b\,\left(105\,A\,b^5-12\,a^5\,B+104\,a^3\,b^2\,B-60\,a\,b^4\,B+a^4\,b\,(33\,A-56\,C)-2\,a^2\,b^3\,(85\,A-12\,C)\right)\mathrm{Sin}[c+d\,x]\right)\Big/\left(12\,a^4\,(a^2-b^2)^2\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\frac{(7\,A\,b-4\,a\,B)\,\mathrm{Tan}[c+d\,x]}{4\,a^2\,d\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}}+\frac{A\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,a\,d\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}}$$

Result (type 4, 922 leaves):

$$\frac{1}{48\,a^4\,(a-b)^2\,(a+b)^2\,d}$$

$$\Bigg(\Bigg(\left(2\,\left(12\,a^5\,A\,b-216\,a^3\,A\,b^3+140\,a\,A\,b^5+144\,a^4\,b^2\,B-80\,a^2\,b^4\,B-96\,a^5\,b\,C+32\,a^3\,b^3\,C\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+$$

$$\Big(2\,\big(24\,a^6\,A+195\,a^4\,A\,b^2-566\,a^2\,A\,b^4+315\,A\,b^6-132\,a^5\,b\,B+344\,a^3\,b^3\,B-180\,a\,b^5\,B+48\,a^6\,C-152\,a^4\,b^2\,C+72\,a^2\,b^4\,C\big)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}$$

$$\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\Big)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(2\,i\,\left(33\,a^4\,A\,b^2-170\,a^2\,A\,b^4+105\,A\,b^6-12\,a^5\,b\,B+104\,a^3\,b^3\,B-60\,a\,b^5\,B-56\,a^4\,b^2\,C+24\,a^2\,b^4\,C\right)\right.$$
$$\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\,\text{Cos}\left[2\,(c+d\,x)\right]$$
$$\left(2\,a\,(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$
$$b\left(2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$
$$\left.\left.\left.\left.\frac{a+b}{a},\,i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\text{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\text{Cos}[c+d\,x])+(a+b\,\text{Cos}[c+d\,x])^2}{b^2}}\right.$$
$$\left.\left.\left(2\,a^2-b^2-4\,a\,(a+b\,\text{Cos}[c+d\,x])+2\,(a+b\,\text{Cos}[c+d\,x])^2\right)\right)\right)+$$
$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{\text{Sec}[c+d\,x]\,(-11\,A\,b\,\text{Sin}[c+d\,x]+4\,a\,B\,\text{Sin}[c+d\,x])}{4\,a^4}+\right.$$
$$\frac{2\,\left(A\,b^4\,\text{Sin}[c+d\,x]-a\,b^3\,B\,\text{Sin}[c+d\,x]+a^2\,b^2\,C\,\text{Sin}[c+d\,x]\right)}{3\,a^3\,(a^2-b^2)\,(a+b\,\text{Cos}[c+d\,x])^2}+$$
$$\left(2\,\left(13\,a^2\,A\,b^4\,\text{Sin}[c+d\,x]-9\,A\,b^6\,\text{Sin}[c+d\,x]-10\,a^3\,b^3\,B\,\text{Sin}[c+d\,x]+\right.\right.$$
$$\left.\left.6\,a\,b^5\,B\,\text{Sin}[c+d\,x]+7\,a^4\,b^2\,C\,\text{Sin}[c+d\,x]-3\,a^2\,b^4\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/$$
$$\left.\left(3\,a^4\,(a^2-b^2)^2\,(a+b\,\text{Cos}[c+d\,x])\right)+\frac{A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a^3}\right)$$

Problem 1116: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 586 leaves, 8 steps):

$$-\frac{1}{24\, a\, b^2\, d}(a-b)\,\sqrt{a+b}\,\left(8\, b^2\,(3\, A+2\, C)+3\, a\,(2\, b\, B-a\, C)\right)\\ \text{Cot}[c+d\, x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\, x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\, x]}}\right],-\frac{a+b}{a-b}\right]\\ \sqrt{\frac{a\,(1-\text{Sec}[c+d\, x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\, x])}{a-b}}+\\ \frac{1}{24\, b^2\, d}\sqrt{a+b}\,\left(24\, A\, b^2+(a+2\, b)\,(6\, b\, B-3\, a\, C+8\, b\, C)\right)\,\text{Cot}[c+d\, x]\\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\, x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\, x]}}\right],-\frac{a+b}{a-b}\right]\\ \sqrt{\frac{a\,(1-\text{Sec}[c+d\, x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\, x])}{a-b}}+\frac{1}{8\, b^3\, d}\\ \sqrt{a+b}\,\left(2\, a^2\, b\, B-8\, b^3\, B-a^3\, C-4\, a\, b^2\,(2\, A+C)\right)\,\text{Cot}[c+d\, x]\\ \text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\, x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\, x]}}\right],-\frac{a+b}{a-b}\right]\\ \sqrt{\frac{a\,(1-\text{Sec}[c+d\, x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\, x])}{a-b}}+\\ \frac{\left(8\, b^2\,(3\, A+2\, C)+3\, a\,(2\, b\, B-a\, C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\, x]}\,\text{Sin}[c+d\, x]}{24\, b^2\, d\,\sqrt{\text{Cos}[c+d\, x]}}+\\ \frac{(2\, b\, B-a\, C)\,\sqrt{\text{Cos}[c+d\, x]}\,\sqrt{a+b\,\text{Cos}[c+d\, x]}\,\text{Sin}[c+d\, x]}{4\, b\, d}+\\ \frac{C\,\sqrt{\text{Cos}[c+d\, x]}\,(a+b\,\text{Cos}[c+d\, x])^{3/2}\,\text{Sin}[c+d\, x]}{3\, b\, d}$$

Result (type 4, 1242 leaves):

$$\frac{1}{48\, b\, d}\left(-\left(\left(4\, a\,\left(24\, A\, b^2+18\, a\, b\, B-a^2\, C+16\, b^2\, C\right)\right.\right.\right.\\ \sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\, x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\, x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\, x)\right]^2}{a}}\\ \sqrt{\frac{(a+b\,\text{Cos}[c+d\, x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\, x)\right]^2}{a}}\,\text{Csc}[c+d\, x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(48\,a\,A\,b+24\,b^2\,B+28\,a\,b\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(24 A b^2+6 a b B-3 a^2 C+16 b^2 C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\mathrm{Sec}[c+d x]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]^2\mathrm{Sec}[c+d x]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\mathrm{Csc}[c+d x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\mathrm{Csc}[c+d x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}\,\mathrm{Sin}[c+d x]}{b\sqrt{\mathrm{Cos}[c+d x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\ \left(\frac{(6\,b\,B+a\,C)\ \text{Sin}[c+d\,x]}{12\,b}+\frac{1}{6}\,C\,\text{Sin}[2\,(c+d\,x)]\right)$$

Problem 1117: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 483 leaves, 7 steps):

$$-\frac{1}{4\,a\,b\,d}(a-b)\,\sqrt{a+b}\ (4\,b\,B+a\,C)\ \text{Cot}[c+d\,x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d\,x]}}\right],\ -\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{4\,b\,d}\sqrt{a+b}\ (8\,A\,b+a\,C+2\,b\,(2\,B+C))\ \text{Cot}[c+d\,x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d\,x]}}\right],\ -\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,b^2\,d}\sqrt{a+b}\ \left(8\,A\,b^2+4\,a\,b\,B-a^2\,C+4\,b^2\,C\right)\ \text{Cot}[c+d\,x]\ \text{EllipticPi}\left[\frac{a+b}{b},\ \text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d\,x]}}\right],\ -\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{(4\,b\,B+a\,C)\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{4\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 1183 leaves):

$$\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{2\,d}+\frac{1}{8\,d}\left(-\left(\left(4\,a\,(8\,a\,A+4\,b\,B+3\,a\,C)\,\sqrt{\frac{(a+b)\ \text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left((a+b)\sqrt{\text{Cos}[c+d x]}\;\sqrt{a+b\,\text{Cos}[c+d x]}\right)\Bigg)-4 a$$

$$(8 A b+8 a B+4 b C)\left(\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\;\sqrt{a+b\,\text{Cos}[c+d x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\;\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d x]}\;\sqrt{a+b\,\text{Cos}[c+d x]}\right)\Bigg)+$$

$$2\,(4\,b\,B+a\,C)\,\left(\left(i\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\right.\right.\right.$$

$$\left.\left.i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\,\left(\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 1118: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 449 leaves, 7 steps):

$$\frac{1}{a\,d}(a-b)\sqrt{a+b}\,(2A-C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{a\,d}$$
$$\sqrt{a+b}\,\left(2\,A\,b-a\,(2\,A-2\,B-C)\right)\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{b\,d}$$
$$\sqrt{a+b}\,(2\,b\,B+a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(2\,A-C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 1176 leaves):

$$\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}+$$
$$\frac{1}{2\,d}\left(-\left(\left(4\,a\,(2\,a\,B+b\,C)\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.\right.$$
$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$
$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-4\,a\,\left(-2\,a\,A+2\,b\,B+2\,a\,C\right)$$

$$\left(\left(\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^4\right)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^4\right)\Bigg/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\,\left(-2\,A\,b+b\,C\right)\,\left(\left(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\right.\right.\right.$$

$$\left.\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Bigg/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Big)\Big/$$

$$\left.\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)$$

Problem 1119: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 407 leaves, 6 steps):

$$\frac{1}{3 a^2 d} 2 (a-b) \sqrt{a+b} (A b+3 a B) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{3 a d} 2 \sqrt{a+b} (b (A-3 B)-a (A-3 B+3 C)) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{d} 2 \sqrt{a+b} C \text{Cot}[c+d x] \text{EllipticPi}\left[\frac{a+b}{b}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 A \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{3 d \text{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1240 leaves):

$$\frac{1}{3 a d} \left(-\left(\left(4 a \left(a^2 A-A b^2+3 a^2 C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\right) - 4 a \left(-a A b-3 a^2 B+3 a b C\right) \left(\left(\sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-A\,b^2-3\,a\,b\,B\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\;\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2\,\text{Sec}[c+d\,x]\,(A\,b\,\text{Sin}[c+d\,x]+3\,a\,B\,\text{Sin}[c+d\,x])}{3\,a}+\right.$$

$$\left.\frac{2}{3}\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)$$

Problem 1120: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 360 leaves, 5 steps):

$$-\frac{1}{15\,a^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(2\,A\,b^2-5\,a\,b\,B-3\,a^2\,(3\,A+5\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{15\,a^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(2\,A\,b+a\,(9\,A-5\,B+15\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,(A\,b+5\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1340 leaves):

$$-\frac{1}{15\,a^2\,d}\left(-\left(\left(4\,a\,\left(2\,a^2\,A\,b-2\,A\,b^3-5\,a^3\,B+5\,a\,b^2\,B\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(9\,a^3\,A-2\,a\,A\,b^2+5\,a^2\,b\,B+15\,a^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(9\,a^2\,A\,b-2\,A\,b^3+5\,a\,b^2\,B+15\,a^2\,b\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Bigg/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b} 2 a \left(\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right) - \left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right) + \frac{\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{b \sqrt{\operatorname{Cos}[c+d x]}}\right)\right) +$$

$$\frac{1}{d} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]} \left(\frac{2 \operatorname{Sec}[c+d x]^2 (A b \operatorname{Sin}[c+d x]+5 a B \operatorname{Sin}[c+d x])}{15 a} + \frac{1}{15 a^2} 2 \operatorname{Sec}[c+d x] \left(9 a^2 A \operatorname{Sin}[c+d x]-2 A b^2 \operatorname{Sin}[c+d x]+5 a b B \operatorname{Sin}[c+d x]+15 a^2 C \operatorname{Sin}[c+d x]\right)+\frac{2}{5} A \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]\right)$$

Problem 1121: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 447 leaves, 6 steps):

$$\frac{1}{105\,a^4\,d}2\,(a-b)\,\sqrt{a+b}\,\left(8\,A\,b^3+63\,a^3\,B-14\,a\,b^2\,B+a^2\,b\,(19\,A+35\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{105\,a^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(8\,A\,b^2+2\,a\,b\,(3\,A-7\,B)+a^2\,(25\,A-63\,B+35\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,(A\,b+7\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{35\,a\,d\,\text{Cos}[c+d\,x]^{5/2}}-\frac{2\,\left(4\,A\,b^2-7\,a\,b\,B-5\,a^2\,(5\,A+7\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,a^2\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1464 leaves):

$$\frac{1}{105\,a^3\,d}\left(-\left(\left(4\,a\,\left(25\,a^4\,A-17\,a^2\,A\,b^2-8\,A\,b^4-14\,a^3\,b\,B+14\,a\,b^3\,B+35\,a^4\,C-35\,a^2\,b^2\,C\right)\right.\right.\right.$$
$$\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$
$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$
$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-$$

$$4\,a\left(-19\,a^3\,A\,b-8\,a\,A\,b^3-63\,a^4\,B+14\,a^2\,b^2\,B-35\,a^3\,b\,C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\ \sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\ \text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\Bigg)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\ \sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\Bigg)\Bigg/\left(b\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\left(-19\,a^2\,A\,b^2-8\,A\,b^4-63\,a^3\,b\,B+14\,a\,b^3\,B-35\,a^2\,b^2\,C\right)$$

$$\Bigg(\Bigg(i\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\Bigg)\Bigg/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Bigg/\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2\,\text{Sec}[c+d\,x]^3\left(A\,b\,\text{Sin}[c+d\,x]+7\,a\,B\,\text{Sin}[c+d\,x]\right)}{35\,a}+\right.$$

$$\frac{1}{105\,a^2}\,2\,\mathrm{Sec}[c+d\,x]^2\,\left(25\,a^2\,A\,\mathrm{Sin}[c+d\,x]-4\,A\,b^2\,\mathrm{Sin}[c+d\,x]+7\,a\,b\,B\,\mathrm{Sin}[c+d\,x]+35\,a^2\,C\,\mathrm{Sin}[c+d\,x]\right)+\frac{1}{105\,a^3}2\,\mathrm{Sec}[c+d\,x]\,\left(19\,a^2\,A\,b\,\mathrm{Sin}[c+d\,x]+8\,A\,b^3\,\mathrm{Sin}[c+d\,x]+63\,a^3\,B\,\mathrm{Sin}[c+d\,x]-14\,a\,b^2\,B\,\mathrm{Sin}[c+d\,x]+35\,a^2\,b\,C\,\mathrm{Sin}[c+d\,x]\right)+\frac{2}{7}\,A\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]\Bigg)$$

Problem 1122: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 704 leaves, 9 steps):

$$-\frac{1}{192\,a\,b^2\,d}(a-b)\sqrt{a+b}\left(24\,a^2\,b\,B+128\,b^3\,B-9\,a^3\,C+12\,a\,b^2\,(20\,A+13\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{192\,b^2\,d}$$
$$\sqrt{a+b}\,\left(9\,a^3\,C-6\,a^2\,b\,(4\,B+C)-8\,b^3\,(12\,A+16\,B+9\,C)-4\,a\,b^2\,(60\,A+28\,B+39\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{64\,b^3\,d}$$
$$\sqrt{a+b}\,\left(8\,a^3\,b\,B-96\,a\,b^3\,B-3\,a^4\,C-24\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\left(\left(24\,a^2\,b\,B+128\,b^3\,B-9\,a^3\,C+12\,a\,b^2\,(20\,A+13\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(192\,b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\right)+\frac{1}{32\,b\,d}$$
$$\left(4\,b^2\,(4\,A+3\,C)+a\,(8\,b\,B-3\,a\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]+$$
$$\frac{(8\,b\,B-3\,a\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{24\,b\,d}+$$
$$\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{4\,b\,d}$$

Result (type 4, 1317 leaves):

$$-\frac{1}{384\,b\,d}\left(-\left(\left(\left(4\,a\,\left(-336\,a\,A\,b^2-136\,a^2\,b\,B-128\,b^3\,B+3\,a^3\,C-228\,a\,b^2\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.\right.$$
$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$
$$\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right) \Big/ \left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right) -$$

$$4\,a\left(-384\,a^2\,A\,b-192\,A\,b^3-416\,a\,b^2\,B-228\,a^2\,b\,C-144\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right) \Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right) \Big/ \left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-240\,a\,A\,b^2-24\,a^2\,b\,B-128\,b^3\,B+9\,a^3\,C-156\,a\,b^2\,C\right)$$

$$\left(\left(i\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\Bigg)\Bigg/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Bigg[$$

$$\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\Bigg]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\Bigg[-\frac{a}{b},$$

$$\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\Bigg]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{(48\,A\,b^2+56\,a\,b\,B+3\,a^2\,C+42\,b^2\,C)\,\text{Sin}[c+d\,x]}{96\,b}+\right.$$

$$\frac{1}{48}$$

$$(8\,b\,B+9\,a\,C)$$

$$\text{Sin}\left[2\left(c+d\,x\right)\right]+\frac{1}{16}\,b\,C\,\text{Sin}\left[3\left(c+d\,x\right)\right]\Big)$$

Problem 1123: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 587 leaves, 8 steps):

$$-\frac{1}{24\,a\,b\,d}\left(a-b\right)\sqrt{a+b}\,\left(24\,A\,b^2+30\,a\,b\,B+3\,a^2\,C+16\,b^2\,C\right)\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}+\frac{1}{24\,b\,d}\sqrt{a+b}\,\left(3\,a^2\,C+4\,b^2\left(6\,A+3\,B+4\,C\right)+2\,a\,b\left(24\,A+15\,B+7\,C\right)\right)\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}-\frac{1}{8\,b^2\,d}\sqrt{a+b}\,\left(6\,a^2\,b\,B+8\,b^3\,B-a^3\,C+12\,a\,b^2\left(2\,A+C\right)\right)\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}+\frac{\left(24\,A\,b^2+30\,a\,b\,B+3\,a^2\,C+16\,b^2\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{\left(2\,b\,B+a\,C\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}+\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 1250 leaves):

$$\frac{1}{48 d}\left(-\left(\left(4 a \left(48 a^2 A+24 A b^2+42 a b B+17 a^2 C+16 b^2 C\right)\right.\right.\right.$$

$$\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left.\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right)-4 a \left(96 a A b+48 a^2 B+24 b^2 B+52 a b C\right)$$

$$\left(\left(\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\ \mathrm{EllipticPi}\left[-\frac{a}{b},\ \mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(24\,A\,b^2+30\,a\,b\,B+3\,a^2\,C+16\,b^2\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],\ -\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\mathrm{Sec}[c+d\,x]}\ \sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\ \sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\ \mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\ \sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\ \mathrm{Csc}[c+d\,x]\ \mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left.\left.\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{1}{12}\,(6\,b\,B+7\,a\,C)\,\text{Sin}[c+d\,x]+\frac{1}{6}\,b\,C\,\text{Sin}[2\,(c+d\,x)]\right)$$

Problem 1124: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 535 leaves, 8 steps):

$$\frac{1}{4\,a\,d}(a-b)\sqrt{a+b}\,(8\,a\,A-4\,b\,B-5\,a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,d}\sqrt{a+b}\,(a\,(8\,A-8\,B-5\,C)-2\,b\,(8\,A+2\,B+C))\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,b\,d}\sqrt{a+b}\,(8\,A\,b^2+12\,a\,b\,B+3\,a^2\,C+4\,b^2\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{(8\,a\,A-4\,b\,B-5\,a\,C)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\sqrt{\text{Cos}[c+d\,x]}}-\frac{b\,(4\,A-C)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}+\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{d\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 1232 leaves) :

$$\frac{1}{8\,d}\left(\left(4\,a\,(-8\,a\,A\,b-8\,a^2\,B-4\,b^2\,B-7\,a\,b\,C)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+4\,a\,(8\,a^2\,A-8\,A\,b^2-16\,a\,b\,B-8\,a^2\,C-4\,b^2\,C)\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}\;\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$2\,\left(8\,a\,A\,b-4\,b^2\,B-5\,a\,b\,C\right)\,\left(\left(i\,\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2\,\text{Sec}[c+d\,x]}\;\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\,\left(\left(a\,\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{-a+b}}\;\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]\ \text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\,\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\ \left(\frac{1}{2}\,b\,C\,\text{Sin}[c+d\,x]+\right.$$

$$2$$

$$a$$

$$A$$

$$\left.\text{Tan}[c+d\,x]\right)$$

Problem 1125: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 528 leaves, 8 steps):

$$\frac{1}{3\,a\,d}(a-b)\sqrt{a+b}\,(8\,A\,b+6\,a\,B-3\,b\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{3\,a\,d}\sqrt{a+b}\,\left(6\,A\,b^2+2\,a^2\,(A-3\,B+3\,C)-a\,b\,(8\,A-3\,(4\,B+C))\right)\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}\sqrt{a+b}\,(2\,b\,B+3\,a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,(A\,b+a\,B)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(8\,A\,b+6\,a\,B-3\,b\,C)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1260 leaves):

$$\frac{1}{6\,d}\left(-\left(\left(4\,a\,(2\,a^2\,A-2\,A\,b^2+6\,a\,b\,B+6\,a^2\,C+3\,b^2\,C)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,(-8\,a\,A\,b-6\,a^2\,B+6\,b^2\,B+12\,a\,b\,C)\right.$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg/\left(b\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\left(-8\,A\,b^2-6\,a\,b\,B+3\,b^2\,C\right)\Bigg(\Bigg(\mathrm{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\Bigg)\Bigg/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b} 2 a \left(\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right) - \left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right]$$

$$\left.\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right) +$$

$$\left.\left.\frac{\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{b \sqrt{\operatorname{Cos}[c+d x]}}\right)\right) + \frac{1}{d} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}$$

$$\left(\frac{2}{3} \operatorname{Sec}[c+d x] (4 A b \operatorname{Sin}[c+d x] + 3 a B \operatorname{Sin}[c+d x]) +\right.$$

$$\frac{2}{3}$$

$$a$$

$$A$$

$$\operatorname{Sec}[c+d x]$$

$$\left.\operatorname{Tan}[c+d x]\right)$$

Problem 1126: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d\,x])^{3/2}\,(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2)}{\text{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 490 leaves, 7 steps):

$$\frac{1}{15\,a^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(3\,A\,b^2+20\,a\,b\,B+3\,a^2\,(3\,A+5\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{15\,a\,d}2\,\sqrt{a+b}\,\left(3\,b^2\,(A-5\,B)-2\,a\,b\,(6\,A-10\,B+15\,C)+a^2\,(9\,A-5\,B+15\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}2\,b\,\sqrt{a+b}\,C\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,(3\,A\,b+5\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 4, 1353 leaves):

$$-\frac{1}{15\,a\,d}\Bigg(-\Bigg(\Bigg(4\,a\,\left(-3\,a^2\,A\,b+3\,A\,b^3-5\,a^3\,B+5\,a\,b^2\,B-15\,a^2\,b\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right/\left((a+b)\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)-$$

$$4 a\left(9 a^3 A+3 a A b^2+20 a^2 b B+15 a^3 C-15 a b^2 C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\;\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right/\left(b\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)+$$

$$2\left(9 a^2 A b+3 A b^3+20 a b^2 B+15 a^2 b C\right)\left(\left(i\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\right.\right.$$

$$\left.\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\text{Sec}[c+d x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\text{Csc}[c+d x]\,\text{EllipticF}\Big[$$

$$\left.\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\Big],-\frac{2a}{-a+b}\Big]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\text{Csc}[c+d x]\,\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\left.\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\Big],-\frac{2a}{-a+b}\Big]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{b\sqrt{\text{Cos}[c+d x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\left(\frac{2}{15}\text{Sec}[c+d x]^2\right.$$

$$(6\,A\,b\,\text{Sin}[c+d x]+5\,a\,B\,\text{Sin}[c+d x])+$$

$$\frac{1}{15\,a}$$

$$2$$

$$\text{Sec}[$$

$$c+d x]$$

$$\left(9 a^2 A \operatorname{Sin}[c+d x]+3 A b^2 \operatorname{Sin}[c+d x]+20 a b B \operatorname{Sin}[c+d x]+15 a^2 C \operatorname{Sin}[c+d x]\right)+\frac{2}{5} a A \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]\Big)$$

Problem 1127: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b \operatorname{Cos}[c+d x])^{3/2}\left(A+B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right)}{\operatorname{Cos}[c+d x]^{9/2}} \, dx$$

Optimal (type 4, 450 leaves, 6 steps):

$$-\frac{1}{105 a^3 d} 2 (a-b) \sqrt{a+b} \left(6 A b^3-63 a^3 B-21 a b^2 B-2 a^2 b (41 A+70 C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}-\frac{1}{105 a^2 d} 2 (a-b) \sqrt{a+b} \left(6 A b^2-a^2 (25 A-63 B+35 C)+3 a b (19 A-7 B+35 C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{2 (3 A b+7 a B) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{35 d \operatorname{Cos}[c+d x]^{5/2}}+\frac{2 \left(3 A b^2+42 a b B+5 a^2 (5 A+7 C)\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{105 a d \operatorname{Cos}[c+d x]^{3/2}}+\frac{2 A (a+b \operatorname{Cos}[c+d x])^{3/2} \operatorname{Sin}[c+d x]}{7 d \operatorname{Cos}[c+d x]^{7/2}}$$

Result (type 4, 1463 leaves):

$$\frac{1}{105 a^2 d}\Bigg(-\Bigg(\Bigg(4 a \left(25 a^4 A-31 a^2 A b^2+6 A b^4+21 a^3 b B-21 a b^3 B+35 a^4 C-35 a^2 b^2 C\right) \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\right/$$

$$\left.\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\left(-82\,a^3\,A\,b+6\,a\,A\,b^3-63\,a^4\,B-21\,a^2\,b^2\,B-140\,a^3\,b\,C\right)$$

$$\left(\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\right/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\right/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-82\,a^2\,A\,b^2+6\,A\,b^4-63\,a^3\,b\,B-21\,a\,b^3\,B-140\,a^2\,b^2\,C\right)$$

$$\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+d\,x]}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+d\,x]}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2}{35}\,\text{Sec}[c+d\,x]^3\,\left(8\,A\,b\,\text{Sin}[c+d\,x]+7\,a\,B\,\text{Sin}[c+d\,x]\right)+\frac{1}{105\,a}\,2\,\text{Sec}[c+d\,x]^2\,\left(25\,a^2\,A\,\text{Sin}[c+d\,x]+3\,A\,b^2\,\text{Sin}[c+d\,x]+42\,a\,b\,B\,\text{Sin}[c+d\,x]+35\,a^2\,C\,\text{Sin}[c+d\,x]\right)+\frac{1}{105\,a^2}2\,\text{Sec}[c+d\,x]\,\left(82\,a^2\,A\,b\,\text{Sin}[c+d\,x]-6\,A\,b^3\,\text{Sin}[c+d\,x]+63\,a^3\,B\,\text{Sin}[c+d\,x]+21\,a\,b^2\,B\,\text{Sin}[c+d\,x]+140\,a^2\,b\,C\,\text{Sin}[c+d\,x]\right)+\frac{2}{7}\,a\,A\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]\right)$$

Problem 1128: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 550 leaves, 7 steps):

$$\frac{1}{315\,a^4\,d}2\,(a-b)\,\sqrt{a+b}\,\left(8\,A\,b^4+246\,a^3\,b\,B-18\,a\,b^3\,B+21\,a^4\,(7\,A+9\,C)+3\,a^2\,b^2\,(11\,A+21\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\,\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{315\,a^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(8\,A\,b^3+6\,a\,b^2\,(A-3\,B)+3\,a^2\,b\,(13\,A-57\,B+21\,C)-3\,a^3\,(49\,A-25\,B+63\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\,\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,(A\,b+3\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{21\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,\left(3\,A\,b^2+72\,a\,b\,B+7\,a^2\,(7\,A+9\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{315\,a\,d\,\text{Cos}[c+d\,x]^{5/2}}-\left(2\,\left(4\,A\,b^3-75\,a^3\,B-9\,a\,b^2\,B-2\,a^2\,b\,(44\,A+63\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]\right)\Big/\left(315\,a^2\,d\,\text{Cos}[c+d\,x]^{3/2}\right)+\frac{2\,A\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Sin}[c+d\,x]}{9\,d\,\text{Cos}[c+d\,x]^{9/2}}$$

Result (type 4, 1614 leaves):

$$-\frac{1}{315 a^3 d}\left(-\left(\left(4 a \left(-39 a^4 A b+31 a^2 A b^3+8 A b^5-75 a^5 B+93 a^3 b^2 B-18 a b^4 B-63 a^4 b C+63 a^2 b^3 C\right)\right.\right.\right.$$

$$\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left.\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right)-$$

$$4 a \left(147 a^5 A+33 a^3 A b^2+8 a A b^4+246 a^4 b B-18 a^2 b^3 B+189 a^5 C+63 a^3 b^2 C\right)$$

$$\left(\left(\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(147\,a^4\,A\,b+33\,a^2\,A\,b^3+8\,A\,b^5+246\,a^3\,b^2\,B-18\,a\,b^4\,B+189\,a^4\,b\,C+63\,a^2\,b^3\,C\right)$$

$$\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticF}\Big[$$

$$\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\,\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\Bigg(\frac{2}{63}\text{Sec}[c+d\,x]^4\,(10\,A\,b\,\text{Sin}[c+d\,x]+9\,a\,B\,\text{Sin}[c+d\,x])+$$

$$\frac{1}{315\,a}2\,\text{Sec}[c+d\,x]^3\,\left(49\,a^2\,A\,\text{Sin}[c+d\,x]+3\,A\,b^2\,\text{Sin}[c+d\,x]+72\,a\,b\,B\,\text{Sin}[c+d\,x]+63\,a^2\,C\,\text{Sin}[c+d\,x]\right)+$$

$$\frac{1}{315\,a^2}2\,\text{Sec}[c+d\,x]^2\,\big(88\,a^2\,A\,b\,\text{Sin}[c+d\,x]-4\,A\,b^3\,\text{Sin}[c+d\,x]+$$

$$75\,a^3\,B\,\text{Sin}[c+d\,x]+9\,a\,b^2\,B\,\text{Sin}[c+d\,x]+126\,a^2\,b\,C\,\text{Sin}[c+d\,x]\big)+\frac{1}{315\,a^3}$$

$$2\,\text{Sec}[c+d\,x]\,\big(147\,a^4\,A\,\text{Sin}[c+d\,x]+33\,a^2\,A\,b^2\,\text{Sin}[c+d\,x]+8\,A\,b^4\,\text{Sin}[c+d\,x]+$$

$$246\,a^3\,b\,B\,\text{Sin}[c+d\,x]-18\,a\,b^3\,B\,\text{Sin}[c+d\,x]+189\,a^4\,C\,\text{Sin}[c+d\,x]+$$

$$63\,a^2\,b^2\,C\,\text{Sin}[c+d\,x]\big)+\frac{2}{9}a\,A\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]\Bigg)$$

Problem 1129: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 4, 834 leaves, 10 steps):

$$-\frac{1}{1920 a b^2 d}(a-b)\sqrt{a+b}\left(150 a^3 b B+2840 a b^3 B-45 a^4 C+256 b^4 (5 A+4 C)+12 a^2 b^2 (220 A+141 C)\right)$$
$$\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}-$$
$$\frac{1}{1920 b^2 d}\sqrt{a+b}\left(45 a^4 C-30 a^3 b (5 B+C)-16 b^4 (80 A+45 B+64 C)-\right.$$
$$\left.8 a b^3 (260 A+355 B+193 C)-4 a^2 b^2 (660 A+295 B+423 C)\right)\text{Cot}[c+d x]$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}}$$
$$\sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{128 b^3 d}$$
$$\sqrt{a+b}\left(10 a^4 b B-240 a^2 b^3 B-96 b^5 B-3 a^5 C-40 a^3 b^2 (2 A+C)-80 a b^4 (4 A+3 C)\right)$$
$$\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+$$
$$\left(\left(150 a^3 b B+2840 a b^3 B-45 a^4 C+256 b^4 (5 A+4 C)+12 a^2 b^2 (220 A+141 C)\right)\right.$$
$$\left.\sqrt{a+b \text{Cos}[c+d x]}\,\text{Sin}[c+d x]\right)\Big/\left(1920 b^2 d\sqrt{\text{Cos}[c+d x]}\right)+\frac{1}{320 b d}$$
$$\left(50 a^2 b B+120 b^3 B-15 a^3 C+4 a b^2 (60 A+43 C)\right)\sqrt{\text{Cos}[c+d x]}\sqrt{a+b \text{Cos}[c+d x]}\,\text{Sin}[c+d x]+$$
$$\frac{1}{240 b d}\left(80 A b^2+50 a b B-15 a^2 C+64 b^2 C\right)\sqrt{\text{Cos}[c+d x]}\,(a+b \text{Cos}[c+d x])^{3/2}\text{Sin}[c+d x]+$$
$$\frac{(10 b B-3 a C)\sqrt{\text{Cos}[c+d x]}\,(a+b \text{Cos}[c+d x])^{5/2}\text{Sin}[c+d x]}{40 b d}+$$
$$\frac{C\sqrt{\text{Cos}[c+d x]}\,(a+b \text{Cos}[c+d x])^{7/2}\text{Sin}[c+d x]}{5 b d}$$

Result (type 4, 1410 leaves):

$$-\frac{1}{3840 b d}$$
$$\left(-\left(\left(4 a \left(-4720 a^2 A b^2-1280 A b^4-1330 a^3 b B-3560 a b^3 B+15 a^4 C-3236 a^2 b^2 C-1024 b^4 C\right)\right.\right.\right.$$

$$\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\,\left(-3840\,a^3\,A\,b-6080\,a\,A\,b^3-6440\,a^2\,b^2\,B-1440\,b^4\,B-2292\,a^3\,b\,C-4624\,a\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(-2640\,a^2\,A\,b^2-1280\,A\,b^4-150\,a^3\,b\,B-2840\,a\,b^3\,B+45\,a^4\,C-1692\,a^2\,b^2\,C-1024\,b^4\,C\right)$$

$$\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\,\left(\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\Big[$$

$$-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\Big]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\bigg/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{b\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}$$

$$\left(\frac{\left(1040\,a\,A\,b^2+590\,a^2\,b\,B+420\,b^3\,B+15\,a^3\,C+898\,a\,b^2\,C\right)\,\mathrm{Sin}[c+d\,x]}{960\,b}+\right.$$

$$\frac{1}{480}\left(80\,A\,b^2+170\,a\,b\,B+93\,a^2\,C+88\,b^2\,C\right)\mathrm{Sin}\left[2\left(c+d\,x\right)\right]+\frac{1}{160}b\left(10\,b\,B+21\,a\,C\right)\mathrm{Sin}\left[3\left(c+d\,x\right)\right]+\frac{1}{40}b^2\,C\,\mathrm{Sin}\left[4\left(c+d\,x\right)\right]\Bigg)$$

Problem 1130: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{5/2}\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{\sqrt{\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 700 leaves, 9 steps):

$$-\frac{1}{192\,a\,b\,d}(a-b)\sqrt{a+b}\,\left(264\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+4\,a\,b^2\,(108\,A+71\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{192\,b\,d}$$
$$\sqrt{a+b}\,\left(15\,a^3\,C+8\,b^3\,(12\,A+16\,B+9\,C)+2\,a^2\,b\,(192\,A+132\,B+59\,C)+4\,a\,b^2\,(108\,A+52\,B+71\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{64\,b^2\,d}$$
$$\sqrt{a+b}\,\left(40\,a^3\,b\,B+160\,a\,b^3\,B-5\,a^4\,C+120\,a^2\,b^2\,(2\,A+C)+16\,b^4\,(4\,A+3\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\left(\left(264\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+4\,a\,b^2\,(108\,A+71\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(192\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}\right)+\frac{1}{32\,d}$$
$$\left(16\,A\,b^2+24\,a\,b\,B+5\,a^2\,C+12\,b^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]+$$
$$\frac{(8\,b\,B+5\,a\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{24\,d}+$$
$$\frac{C\,\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 4, 1326 leaves):

$$\frac{1}{384\,d}\left(-\left(\left(4\,a\,\left(384\,a^3\,A+528\,a\,A\,b^2+472\,a^2\,b\,B+128\,b^3\,B+133\,a^3\,C+356\,a\,b^2\,C\right)\right.\right.\right.$$
$$\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$
$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-$$

$$4\,a\,\left(1152\,a^2\,A\,b+192\,A\,b^3+384\,a^3\,B+608\,a\,b^2\,B+644\,a^2\,b\,C+144\,b^3\,C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\,\left(432\,a\,A\,b^2+264\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+284\,a\,b^2\,C\right)$$

$$\left(\left(i \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] \sqrt{a+b \operatorname{Cos}[c+d x]}\right.\right.$$

$$\left.\operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\frac{\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right] \operatorname{Sec}[c+d x]\right) \Big/$$

$$\left(b \sqrt{\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^{2} \operatorname{Sec}[c+d x]} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b} 2 a\left(\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^{2}}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^{2}}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^{2}}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^{2}}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^{4}\right) \Big/$$

$$\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^{2}}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^{2}}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^{2}}{a}}$$

$$\operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^{2}}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^{4}\right) \Big/\left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{1}{96}\left(48\,A\,b^2+104\,a\,b\,B+59\,a^2\,C+42\,b^2\,C\right)\,\text{Sin}[c+d\,x]+\frac{1}{48}\,b\,\left(8\,b\,B+17\,a\,C\right)\,\text{Sin}\left[2\,\left(c+d\,x\right)\right]+\frac{1}{16}\,b^2\,C\,\text{Sin}\left[3\,\left(c+d\,x\right)\right]\right)$$

Problem 1131: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 647 leaves, 9 steps):

$$-\frac{1}{24 a d}(a-b)\sqrt{a+b}\left(54 a b B-a^2(48 A-33 C)+8 b^2(3 A+2 C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{24 d}\sqrt{a+b}\left(a^2(48 A-48 B-33 C)-4 b^2(6 A+3 B+4 C)-2 a b(72 A+27 B+13 C)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{8 b d}\sqrt{a+b}\left(30 a^2 b B+8 b^3 B+5 a^3 C+20 a b^2(2 A+C)\right) \text{Cot}[c+d x] \text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\text{Sec}[c+d x])}{a-b}}+\left(\left(54 a b B-a^2(48 A-33 C)+8 b^2(3 A+2 C)\right)\sqrt{a+b \text{Cos}[c+d x]}\,\text{Sin}[c+d x]\right)\Big/\left(24 d\sqrt{\text{Cos}[c+d x]}\right)-\frac{b(8 a A-2 b B-3 a C)\sqrt{\text{Cos}[c+d x]}\sqrt{a+b \text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{4 d}-\frac{b(6 A-C)\sqrt{\text{Cos}[c+d x]}\,(a+b \text{Cos}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{3 d}+\frac{2 A (a+b \text{Cos}[c+d x])^{5/2}\,\text{Sin}[c+d x]}{d\sqrt{\text{Cos}[c+d x]}}$$

Result (type 4, 1302 leaves):

$$\frac{1}{48 d}\left(\left(4 a\left(-96 a^2 A b-24 A b^3-48 a^3 B-66 a b^2 B-59 a^2 b C-16 b^3 C\right)\sqrt{\frac{(a+b)\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\text{Cos}[c+d x]\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b \text{Cos}[c+d x])\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$
$$\text{Csc}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x])\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left((a+b)\sqrt{\mathrm{Cos}[c+d x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)+$$

$$4 a \left(48 a^3 A-144 a A b^2-144 a^2 b B-24 b^3 B-48 a^3 C-76 a b^2 C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\mathrm{Csc}[c+d x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+d x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b\sqrt{\mathrm{Cos}[c+d x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)\right)-$$

$$2\left(48 a^2 A b-24 A b^3-54 a b^2 B-33 a^2 b C-16 b^3 C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\mathrm{Sec}[c+d x]\right) \Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}$$

$$\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\left(\frac{1}{12}b\,(6\,b\,B+13\,a\,C)\,\text{Sin}[c+d\,x]+\right.$$

$$\frac{1}{6}$$

$$b^2$$

$$C$$

Sin[2 (c + d x)] + 2
a^2
A
Tan[c + d x])

Problem 1132: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d\,x])^{5/2}\,(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 622 leaves, 9 steps):

$$\frac{1}{12\,a\,d}(a-b)\sqrt{a+b}\,\left(24\,a^2\,B-12\,b^2\,B+a\,b\,(56\,A-27\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{12\,d}\sqrt{a+b}\,\left(a\,b\,(56\,A-72\,B-27\,C)-6\,b^2\,(12\,A+2\,B+C)-8\,a^2\,(A-3\,B+3\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,d}\sqrt{a+b}\,\left(8\,A\,b^2+20\,a\,b\,B+15\,a^2\,C+4\,b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{\left(24\,a^2\,B-12\,b^2\,B+a\,b\,(56\,A-27\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{b\,(8\,A\,b+4\,a\,B-b\,C)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}+\frac{2\,(5\,A\,b+3\,a\,B)\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1316 leaves):

$$\frac{1}{24 d}\left(-\left(\left(4 a\left(8 a^3 A+16 a A b^2+48 a^2 b B+12 b^3 B+24 a^3 C+33 a b^2 C\right)\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.\right.\right.$$

$$\sqrt{-\frac{(a+b)\operatorname{Cos}[c+d x]\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\operatorname{Csc}[c+d x]\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left.\left((a+b)\sqrt{\operatorname{Cos}[c+d x]}\sqrt{a+b\operatorname{Cos}[c+d x]}\right)\right)-$$

$$4 a\left(-56 a^2 A b+24 A b^3-24 a^3 B+72 a b^2 B+72 a^2 b C+12 b^3 C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\operatorname{Cos}[c+d x]\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\operatorname{Cos}[c+d x]}\sqrt{a+b\operatorname{Cos}[c+d x]}\right)-\left(\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\operatorname{Cos}[c+d x]\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\operatorname{Csc}[c+d x]\operatorname{EllipticPi}\left[-\frac{a}{b},\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-56\,a\,A\,b^2-24\,a^2\,b\,B+12\,b^3\,B+27\,a\,b^2\,C\right)\left(\left(\mathrm{i}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\operatorname{Cos}[c+d\,x]}\;\sqrt{a+b\operatorname{Cos}[c+d\,x]}\right)\right.+\frac{\sqrt{a+b\operatorname{Cos}[c+d\,x]}\;\operatorname{Sin}[c+d\,x]}{b\sqrt{\operatorname{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\operatorname{Cos}[c+d\,x]}\;\sqrt{a+b\operatorname{Cos}[c+d\,x]}\;\left(\frac{1}{2}b^2\,C\operatorname{Sin}[c+d\,x]+\frac{2}{3}\operatorname{Sec}[c+d\,x]\left(7\,a\,A\,b\operatorname{Sin}[c+d\,x]+3\,a^2\,B\operatorname{Sin}[c+d\,x]\right)+\frac{2}{3}a^2\,A\operatorname{Sec}[c+d\,x]\operatorname{Tan}[c+d\,x]\right)$$

Problem 1133: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+b\operatorname{Cos}[c+d\,x]\right)^{5/2}\left(A+B\operatorname{Cos}[c+d\,x]+C\operatorname{Cos}[c+d\,x]^2\right)}{\operatorname{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 643 leaves, 9 steps):

$$\frac{1}{15\,a\,d}(a-b)\sqrt{a+b}\left(70\,a\,b\,B+b^2\,(46\,A-15\,C)+6\,a^2\,(3\,A+5\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{15\,a\,d}$$
$$\sqrt{a+b}\,\left(30\,A\,b^3-2\,a^3\,(9\,A-5\,B+15\,C)+2\,a^2\,b\,(17\,A-35\,B+45\,C)-a\,b^2\,(46\,A-15\,(6\,B+C))\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}$$
$$b\,\sqrt{a+b}\,(2\,b\,B+5\,a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\frac{2\,(5\,A\,b^2+10\,a\,b\,B+a^2\,(3\,A+5\,C))\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}-$$
$$\left((70\,a\,b\,B+b^2\,(46\,A-15\,C)+6\,a^2\,(3\,A+5\,C))\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(15\,d\,\sqrt{\text{Cos}[c+d\,x]}\right)+\frac{2\,(A\,b+a\,B)\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+$$
$$\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 4, 1370 leaves):

$$\frac{1}{30\,d}\left(\left(4\,a\,\left(-16\,a^2\,A\,b+16\,A\,b^3-10\,a^3\,B-20\,a\,b^2\,B-60\,a^2\,b\,C-15\,b^3\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.$$
$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$
$$\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \bigg/ \left((a+b)\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)+$$

$$4 a \left(18 a^3 A+46 a A b^2+70 a^2 b B-30 b^3 B+30 a^3 C-90 a b^2 C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \bigg/ \left(b\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)-$$

$$2\left(18 a^2 A b+46 A b^3+70 a b^2 B+30 a^2 b C-15 b^3 C\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\text{Sec}[c+d x]\right) \bigg/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2}{15}\text{Sec}[c+d\,x]^2\left(11\,a\,A\,b\,\text{Sin}[c+d\,x]+5\,a^2\,B\,\text{Sin}[c+d\,x]\right)+\right.$$

$$\frac{2}{15}$$

$$\text{Sec}[c+d\,x]$$

$$\left(9\,a^2\,A\,\text{Sin}[c+d\,x]+23\,A\,b^2\,\text{Sin}[c+d\,x]+35\,a\,b\,B\,\text{Sin}[c+d\,x]+15\,a^2\,C\,\text{Sin}[c+d\,x]\right)+\frac{2}{5}$$

$$a^2$$
$$A$$
$$\text{Sec}[c+d\,x]^2$$
$$\text{Tan}[c+d\,x]\Big)$$

Problem 1134: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Cos}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 580 leaves, 8 steps):

$$\frac{1}{105\,a^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(15\,A\,b^3+63\,a^3\,B+161\,a\,b^2\,B+5\,a^2\,b\,(29\,A+49\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{105\,a\,d}2\,\sqrt{a+b}$$
$$\left(15\,b^3\,(A-7\,B)-a^3\,(25\,A-63\,B+35\,C)+a^2\,b\,(145\,A-119\,B+245\,C)-a\,b^2\,(135\,A-161\,B+315\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}$$
$$2\,b^2\,\sqrt{a+b}\,C\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\frac{2\,\left(15\,A\,b^2+56\,a\,b\,B+5\,a^2\,(5\,A+7\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,d\,\text{Cos}[c+d\,x]^{3/2}}+$$
$$\frac{2\,(5\,A\,b+7\,a\,B)\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{35\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 4, 1472 leaves):

$$\frac{1}{105\,a\,d}\left(-\left(\left(4\,a\,\left(25\,a^4\,A-10\,a^2\,A\,b^2-15\,A\,b^4+56\,a^3\,b\,B-56\,a\,b^3\,B+35\,a^4\,C+70\,a^2\,b^2\,C\right)\right.\right.\right.$$

$$\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\,\left(-145\,a^3\,A\,b-15\,a\,A\,b^3-63\,a^4\,B-161\,a^2\,b^2\,B-245\,a^3\,b\,C+105\,a\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[-\frac{a}{b}, \text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\right) +$$

$$2\left(-145 a^2 A b^2 - 15 A b^4 - 63 a^3 b B - 161 a b^3 B - 245 a^2 b^2 C\right)$$

$$\left(\left(\mathbb{i}\ \text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathbb{i}\ \text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right], -\frac{2 a}{-a-b}\right]\text{Sec}[c+d x]\right) \Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]}{a+b}}\right) +$$

$$\frac{1}{b} 2 a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right) - \left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[-\frac{a}{b}, \text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\right) +$$

$$\left.\left.\frac{\sqrt{a+b \text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{b \sqrt{\text{Cos}[c+d x]}}\right)\right) + \frac{1}{d} \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}$$

$$\left(\frac{2}{35} \text{Sec}[c+d x]^3 \left(15 a A b \text{Sin}[c+d x] + 7 a^2 B \text{Sin}[c+d x]\right) + \frac{2}{105} \text{Sec}[c+d x]^2 \left(25 a^2 A \text{Sin}[c+d x] + 45 A b^2 \text{Sin}[c+d x] + 77 a b B \text{Sin}[c+d x] + 35 a^2 C \text{Sin}[c+d x]\right) + \frac{1}{105 a} 2 \text{Sec}[c+d x] \left(145 a^2 A b \text{Sin}[c+d x] + 15 A b^3 \text{Sin}[c+d x] + 63 a^3 B \text{Sin}[c+d x] + 161 a b^2 B \text{Sin}[c+d x] + 245 a^2 b C \text{Sin}[c+d x]\right) + \frac{2}{7} a^2 A \text{Sec}[c+d x]^3 \text{Tan}[c+d x]\right)$$

Problem 1135: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b \text{Cos}[c+d x])^{5/2} \left(A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right)}{\text{Cos}[c+d x]^{11/2}} \, dx$$

Optimal (type 4, 552 leaves, 7 steps):

$$-\frac{1}{315\,a^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(10\,A\,b^4-435\,a^3\,b\,B-45\,a\,b^3\,B-21\,a^4\,(7\,A+9\,C)-3\,a^2\,b^2\,(93\,A+161\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{315\,a^2\,d}2\,(a-b)\,\sqrt{a+b}$$
$$\left(10\,A\,b^3+15\,a\,b^2\,(11\,A-3\,B+21\,C)-6\,a^2\,b\,(19\,A-60\,B+28\,C)+3\,a^3\,(49\,A-25\,B+63\,C)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\frac{2\,\left(15\,A\,b^2+90\,a\,b\,B+7\,a^2\,(7\,A+9\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{315\,d\,\text{Cos}[c+d\,x]^{5/2}}+$$
$$\left(2\,\left(5\,A\,b^3+75\,a^3\,B+135\,a\,b^2\,B+a^2\,b\,(163\,A+231\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(315\,a\,d\,\text{Cos}[c+d\,x]^{3/2}\right)+$$
$$\frac{2\,(5\,A\,b+9\,a\,B)\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{63\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{9\,d\,\text{Cos}[c+d\,x]^{9/2}}$$

Result (type 4, 1616 leaves):

$$-\frac{1}{315\,a^2\,d}$$
$$\Bigg(-\Bigg(\Bigg(4\,a\,\left(-114\,a^4\,A\,b+124\,a^2\,A\,b^3-10\,A\,b^5-75\,a^5\,B+30\,a^3\,b^2\,B+45\,a\,b^4\,B-168\,a^4\,b\,C+168\,a^2\,b^3\,C\right)$$
$$\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$
$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$
$$\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4\Bigg)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-$$

$$4\,a\left(147\,a^5\,A+279\,a^3\,A\,b^2-10\,a\,A\,b^4+435\,a^4\,b\,B+45\,a^2\,b^3\,B+189\,a^5\,C+483\,a^3\,b^2\,C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\Bigg)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\Bigg)\Bigg/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\left(147\,a^4\,A\,b+279\,a^2\,A\,b^3-10\,A\,b^5+435\,a^3\,b^2\,B+45\,a\,b^4\,B+189\,a^4\,b\,C+483\,a^2\,b^3\,C\right)$$

$$\Bigg(\Bigg(i\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\Bigg)\Bigg/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Bigg[$$

$$\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\Bigg]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\Bigg)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\Bigg[-\frac{a}{b},$$

$$\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\Bigg]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\Bigg)\Bigg/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{2}{63}\text{Sec}[c+d\,x]^4\left(19\,a\,A\,b\,\text{Sin}[c+d\,x]+9\,a^2\,B\,\text{Sin}[c+d\,x]\right)+\right.$$

$$\frac{2}{315}$$

$$\text{Sec}[c+d\,x]^3$$

$$\left(49 a^2 A \operatorname{Sin}[c+d x]+75 A b^2 \operatorname{Sin}[c+d x]+135 a b B \operatorname{Sin}[c+d x]+63 a^2 C \operatorname{Sin}[c+d x]\right)+\frac{1}{315 a} 2 \operatorname{Sec}[c+d x]^2 \left(163 a^2 A b \operatorname{Sin}[c+d x]+5 A b^3 \operatorname{Sin}[c+d x]+75 a^3 B \operatorname{Sin}[c+d x]+135 a b^2 B \operatorname{Sin}[c+d x]+231 a^2 b C \operatorname{Sin}[c+d x]\right)+\frac{1}{315 a^2} 2 \operatorname{Sec}[c+d x] \left(147 a^4 A \operatorname{Sin}[c+d x]+279 a^2 A b^2 \operatorname{Sin}[c+d x]-10 A b^4 \operatorname{Sin}[c+d x]+435 a^3 b B \operatorname{Sin}[c+d x]+45 a b^3 B \operatorname{Sin}[c+d x]+189 a^4 C \operatorname{Sin}[c+d x]+483 a^2 b^2 C \operatorname{Sin}[c+d x]\right)+\frac{2}{9} a^2 A \operatorname{Sec}[c+d x]^4 \operatorname{Tan}[c+d x]\Big)$$

Problem 1136: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Cos}[c+d x]^{3/2} \left(A+B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right)}{\sqrt{a+b \operatorname{Cos}[c+d x]}} \, dx$$

Optimal (type 4, 593 leaves, 8 steps):

$$-\frac{1}{24 a b^3 d} (a-b) \sqrt{a+b} \left(24 A b^2-18 a b B+15 a^2 C+16 b^2 C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{1}{24 b^3 d} \sqrt{a+b} \left(24 A b^2-18 a b B+12 b^2 B+15 a^2 C-10 a b C+16 b^2 C\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}-\frac{1}{8 b^4 d} \sqrt{a+b} \left(6 a^2 b B+8 b^3 B-5 a^3 C-4 a b^2 (2 A+C)\right) \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{\left(24 A b^2-18 a b B+15 a^2 C+16 b^2 C\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{24 b^3 d \sqrt{\operatorname{Cos}[c+d x]}}+\frac{(6 b B-5 a C) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{12 b^2 d}+\frac{C \operatorname{Cos}[c+d x]^{3/2} \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{3 b d}$$

Result (type 4, 1241 leaves):

$$\frac{1}{48 b^2 d}\left(-\left(\left(4 a \left(24 A b^2-6 a b B+5 a^2 C+16 b^2 C\right) \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.\right.\right.$$

$$\sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right)-$$

$$4 a \left(24 b^2 B+4 a b C\right)\left(\left(\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left.\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.\right.$$

$$\sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)+$$

$$2\left(24 A b^2-18 a b B+15 a^2 C+16 b^2 C\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\text{Sec}[c+d x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\text{Csc}[c+d x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left.\left.\left.\left(b\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\right.+\frac{\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{b\sqrt{\text{Cos}[c+d x]}}\right)\right)+$$

$$\frac{\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\ \left(\frac{(6 b B-5 a C)\,\text{Sin}[c+d x]}{12 b^2}+\frac{C\,\text{Sin}[2 (c+d x)]}{6 b}\right)}{d}$$

Problem 1137: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\text{Cos}[c+d x]}\ \left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)}{\sqrt{a+b\,\text{Cos}[c+d x]}}\,dx$$

Optimal (type 4, 485 leaves, 7 steps):

$$-\frac{1}{4 a b^2 d}$$

$$(a-b)\sqrt{a+b}\ (4 b B-3 a C)\ \text{Cot}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{4 b^2 d}$$

$$\sqrt{a+b}\ (3 a C-2 b\,(2 B+C))\ \text{Cot}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}-$$

$$\frac{1}{4 b^3 d}\sqrt{a+b}\ \left(8 A b^2-4 a b B+3 a^2 C+4 b^2 C\right)\ \text{Cot}[c+d x]$$

$$\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}+$$

$$\frac{(4 b B-3 a C)\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{4 b^2 d\sqrt{\text{Cos}[c+d x]}}+\frac{C\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{2 b d}$$

Result (type 4, 1182 leaves):

$$\frac{C\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{2 b d}+$$

$$\frac{1}{8\,b\,d}\left(-\left(\left(4\,a\,(4\,b\,B-a\,C)\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-4\,a\,(8\,A\,b+4\,b\,C)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{4}\right)\bigg/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(4\,b\,B-3\,a\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\right.\right.\right.$$

$$\left.\left.\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\bigg/$$

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{4}\right)\bigg/$$

$$\left(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}}{a}}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{2}}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{4}\right)\bigg/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 1138: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 401 leaves, 6 steps):

$$-\frac{1}{a\,b\,d}(a-b)\sqrt{a+b}\ C\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{a\,b\,d}\sqrt{a+b}\ (2\,A\,b+a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{b^2\,d}\sqrt{a+b}\ (2\,b\,B-a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{C\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{b\,d\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 1117 leaves):

$$\frac{1}{2\,d}\left(-\left(\left(4\,a\,(2\,A+C)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\right/\right.\right.$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-$$

$$8\,a\,B\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\,C\left(\left(\mathrm{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\right.\right.$$

$$\left.\text{Sec}[c+d\,x]\right)\Bigg/\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}\;\mathrm{Sin}[c+dx]}{b\sqrt{\mathrm{Cos}[c+dx]}}\right)$$

Problem 1139: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\mathrm{Cos}[c+dx]+C\,\mathrm{Cos}[c+dx]^2}{\mathrm{Cos}[c+dx]^{3/2}\sqrt{a+b\,\mathrm{Cos}[c+dx]}}\,dx$$

Optimal (type 4, 347 leaves, 5 steps):

$$\frac{1}{a^2 d}2 A (a-b) \sqrt{a+b} \, Cot[c+d x] \, EllipticE\left[ArcSin\left[\frac{\sqrt{a+b Cos[c+d x]}}{\sqrt{a+b} \sqrt{Cos[c+d x]}}\right], -\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a (1-Sec[c+d x])}{a+b}} \sqrt{\frac{a (1+Sec[c+d x])}{a-b}} - \frac{1}{a d}$$
$$2 \sqrt{a+b} \, (A-B) \, Cot[c+d x] \, EllipticF\left[ArcSin\left[\frac{\sqrt{a+b Cos[c+d x]}}{\sqrt{a+b} \sqrt{Cos[c+d x]}}\right], -\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a (1-Sec[c+d x])}{a+b}} \sqrt{\frac{a (1+Sec[c+d x])}{a-b}} - \frac{1}{b d}$$
$$2 \sqrt{a+b} \, C \, Cot[c+d x] \, EllipticPi\left[\frac{a+b}{b}, ArcSin\left[\frac{\sqrt{a+b Cos[c+d x]}}{\sqrt{a+b} \sqrt{Cos[c+d x]}}\right], -\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a (1-Sec[c+d x])}{a+b}} \sqrt{\frac{a (1+Sec[c+d x])}{a-b}}$$

Result (type 4, 1169 leaves):

$$\frac{2 A \sqrt{a+b Cos[c+d x]} \, Sin[c+d x]}{a d \sqrt{Cos[c+d x]}} -$$
$$\frac{1}{a d} \left(- \left(\left(4 a (A b - a B) \sqrt{\frac{(a+b) Cot\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) Cos[c+d x] Csc\left[\frac{1}{2} (c+d x)\right]^2}{a}} \right.\right.\right.$$
$$\sqrt{\frac{(a+b Cos[c+d x]) Csc\left[\frac{1}{2} (c+d x)\right]^2}{a}} \, Csc[c+d x]$$
$$\left. EllipticF\left[ArcSin\left[\frac{\sqrt{\frac{(a+b Cos[c+d x]) Csc\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] Sin\left[\frac{1}{2} (c+d x)\right]^4 \right) \Big/$$
$$\left. \left((a+b) \sqrt{Cos[c+d x]} \sqrt{a+b Cos[c+d x]} \right) \right) - 4 a (a A - a C)$$
$$\left(\left(\sqrt{\frac{(a+b) Cot\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) Cos[c+d x] Csc\left[\frac{1}{2} (c+d x)\right]^2}{a}} \right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Bigg/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\,A\,b\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\right.\right.\right.$$

$$\left.\left.-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Bigg/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\Bigg(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left(b\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)$$

Problem 1140: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{5/2}\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 293 leaves, 4 steps):

$$-\frac{1}{3 a^3 d} 2 (a-b) \sqrt{a+b} (2 A b-3 a B) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}} + \frac{1}{3 a^2 d} 2 \sqrt{a+b} (2 A b+a (A-3 B+3 C)) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}} + \frac{2 A \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{3 a d \operatorname{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1244 leaves):

$$\frac{1}{3 a^2 d} \left(-\left(\left(4 a \left(a^2 A+2 A b^2-3 a b B+3 a^2 C\right) \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right) - 4 a \left(2 a A b-3 a^2 B\right) \left(\left(\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/\right.$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\left(2\,A\,b^2-3\,a\,b\,B\right)\left(\left(i\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2\,\text{Sec}[c+d\,x]\,(-2\,A\,b\,\text{Sin}[c+d\,x]+3\,a\,B\,\text{Sin}[c+d\,x])}{3\,a^2}+\right.$$

$$\left.\frac{2\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{3\,a}\right)$$

Problem 1141: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{7/2}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 372 leaves, 5 steps):

$$\frac{1}{15 a^4 d} 2 (a-b) \sqrt{a+b} \left(8 A b^2 - 10 a b B + 3 a^2 (3 A + 5 C)\right) \text{Cot}[c+d x]$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}}$$
$$\sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{15 a^3 d} 2 \sqrt{a+b} \left(8 A b^2 - 2 a b (A+5 B) + a^2 (9 A - 5 B + 15 C)\right)$$
$$\text{Cot}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} +$$
$$\frac{2 A \sqrt{a+b\,\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{5 a d\, \text{Cos}[c+d x]^{5/2}} - \frac{2 (4 A b - 5 a B) \sqrt{a+b\,\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{15 a^2 d\, \text{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1351 leaves):

$$-\frac{1}{15 a^3 d} \left(-\left(\left(4 a \left(7 a^2 A b + 8 A b^3 - 5 a^3 B - 10 a b^2 B + 15 a^2 b C\right)\right.\right.\right.$$
$$\sqrt{\frac{(a+b)\, \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b)\, \text{Cos}[c+d x]\, \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}$$
$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\, \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}\, \text{Csc}[c+d x]$$
$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\, \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/$$
$$\left.\left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b\,\text{Cos}[c+d x]}\right)\right) - 4 a \left(9 a^3 A + 8 a A b^2 - 10 a^2 b B + 15 a^3 C\right)$$
$$\left(\left(\sqrt{\frac{(a+b)\, \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b)\, \text{Cos}[c+d x]\, \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+d\,x]}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\ \mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+d\,x]}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(9\,a^2\,A\,b+8\,A\,b^3-10\,a\,b^2\,B+15\,a^2\,b\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\ \sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\Big[$$

$$\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2\,a}{-a+b}\Big]\;\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4\Bigg)\Bigg/$$

$$\left(\left(a+b\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\Bigg(a\,\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2\,a}{-a+b}\Big]\;\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]^4\Bigg)\Bigg/$$

$$\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{2\,\text{Sec}[c+d\,x]^2\,\left(-4\,A\,b\,\text{Sin}[c+d\,x]+5\,a\,B\,\text{Sin}[c+d\,x]\right)}{15\,a^2}+\right.$$

$$\frac{1}{15\,a^3}\,2\,\text{Sec}[c+d\,x]\,\left(9\,a^2\,A\,\text{Sin}[c+d\,x]+8\,A\,b^2\,\text{Sin}[c+d\,x]-10\,a\,b\,B\,\text{Sin}[c+d\,x]+\right.$$

$$\left.\left.15\,a^2\,C\,\text{Sin}[c+d\,x]\right)+\frac{2\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{5\,a}\right)$$

Problem 1142: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{9/2}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 466 leaves, 6 steps):

$$-\frac{1}{105 a^5 d}2 (a-b) \sqrt{a+b} \left(48 A b^3-63 a^3 B-56 a b^2 B+a^2 (44 A b+70 b C)\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{105 a^4 d} 2 \sqrt{a+b} \left(48 A b^3-4 a b^2 (3 A+14 B)+a^3 (25 A-63 B+35 C)+2 a^2 b (22 A+7 (B+5 C))\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 A \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{7 a d \text{Cos}[c+d x]^{7/2}}-\frac{2 (6 A b-7 a B) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{35 a^2 d \text{Cos}[c+d x]^{5/2}}+\frac{2 \left(24 A b^2-28 a b B+5 a^2 (5 A+7 C)\right) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{105 a^3 d \text{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1468 leaves):

$$\frac{1}{105 a^4 d}\left(-\left(\left(4 a \left(25 a^4 A+32 a^2 A b^2+48 A b^4-49 a^3 b B-56 a b^3 B+35 a^4 C+70 a^2 b^2 C\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\right)-\right.$$

$$4 a \left(44 a^3 A b+48 a A b^3-63 a^4 B-56 a^2 b^2 B+70 a^3 b C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\,\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(44\,a^2\,A\,b^2+48\,A\,b^4-63\,a^3\,b\,B-56\,a\,b^3\,B+70\,a^2\,b^2\,C\right)$$

$$\left(\left(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2\,\text{Sec}[c+d\,x]^3\,(-6\,A\,b\,\text{Sin}[c+d\,x]+7\,a\,B\,\text{Sin}[c+d\,x])}{35\,a^2}+\right.$$

$$\frac{1}{105\,a^3}2\,\text{Sec}[c+d\,x]^2\,\left(25\,a^2\,A\,\text{Sin}[c+d\,x]+24\,A\,b^2\,\text{Sin}[c+d\,x]-\right.$$

$$\left.28\,a\,b\,B\,\text{Sin}[c+d\,x]+35\,a^2\,C\,\text{Sin}[c+d\,x]\right)+\frac{1}{105\,a^4}$$

$$2\,\text{Sec}[c+d x]\left(-44 a^2 A b\,\text{Sin}[c+d x]-48 A b^3\,\text{Sin}[c+d x]+63 a^3 B\,\text{Sin}[c+d x]+56 a b^2 B\,\text{Sin}[c+d x]-70 a^2 b C\,\text{Sin}[c+d x]\right)+\frac{2 A\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{7 a}\Bigg)$$

Problem 1143: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\text{Cos}[c+d x]}\,\left(a A+(A b+a B)\,\text{Cos}[c+d x]+b B\,\text{Cos}[c+d x]^2\right)}{\sqrt{a+b\,\text{Cos}[c+d x]}}\,dx$$

Optimal (type 4, 473 leaves, 8 steps):

$$-\frac{1}{4 a b d}(a-b)\sqrt{a+b}\,(4 A b+a B)\,\text{Cot}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{4 b d}\sqrt{a+b}\,(4 A b+(a+2 b) B)\,\text{Cot}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{4 b^2 d}\sqrt{a+b}\,\left(4 a A b-a^2 B+4 b^2 B\right)\,\text{Cot}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}+\frac{(4 A b+a B)\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{4 b d\sqrt{\text{Cos}[c+d x]}}+\frac{B\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{2 d}$$

Result (type 4, 1175 leaves):

$$\frac{B\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{2 d}+\frac{1}{8 d}\left(-\left(\left(4 a\,(4 A b+3 a B)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,(8\,a\,A+4\,b\,B)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\,(4\,A\,b+a\,B)\left(\left(\mathbb{i}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\mathbb{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{b\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right)\right)$$

Problem 1145: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^{3/2} \left(A+B \text{Cos}[c+d x]+C \text{Cos}[c+d x]^2\right)}{(a+b \text{Cos}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 660 leaves, 8 steps):

$$-\frac{1}{4 a b^3 \sqrt{a+b}\, d}\left(12 a^2 b B-4 b^3 B-a b^2 (8 A-7 C)-15 a^3 C\right) \text{Cot}[c+d x] \, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{4 b^3 \sqrt{a+b}\, d}\left(8 A b^2-a b (12 B-5 C)+15 a^2 C-2 b^2 (2 B+C)\right) \text{Cot}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{4 b^4 d}\sqrt{a+b} \left(8 A b^2-12 a b B+15 a^2 C+4 b^2 C\right) \text{Cot}[c+d x] \, \text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}-\frac{2 \left(A b^2-a (b B-a C)\right) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{b \left(a^2-b^2\right) d \sqrt{a+b \text{Cos}[c+d x]}}+\left(\left(12 a^2 b B-4 b^3 B-a b^2 (8 A-7 C)-15 a^3 C\right) \sqrt{a+b \text{Cos}[c+d x]} \, \text{Sin}[c+d x]\right) \Big/ \left(4 b^3 \left(a^2-b^2\right) d \sqrt{\text{Cos}[c+d x]}\right)+\frac{1}{2 b^2 \left(a^2-b^2\right) d}\left(4 A b^2-4 a b B+5 a^2 C-b^2 C\right) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]} \, \text{Sin}[c+d x]$$

Result (type 4, 1322 leaves):

$$\frac{1}{d}\sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]} \left(\frac{C \text{Sin}[c+d x]}{2 b^2}-\frac{2 \left(a A b^2 \text{Sin}[c+d x]-a^2 b B \text{Sin}[c+d x]+a^3 C \text{Sin}[c+d x]\right)}{b^2 \left(-a^2+b^2\right) (a+b \text{Cos}[c+d x])}\right)-$$

$$\frac{1}{8\,(a-b)\,b^2\,(a+b)\,d}\Bigg(-\Bigg(\Bigg(4\,a\,\left(-4\,a^2\,b\,B+4\,b^3\,B+5\,a^3\,C-5\,a\,b^2\,C\right)$$

$$\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\Bigg)-4\,a\,\left(8\,A\,b^3-8\,a\,b^2\,B+4\,a^2\,b\,C+4\,b^3\,C\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\,\text{EllipticPi}\Big[-\frac{a}{b},\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\Big],-\frac{2 a}{-a+b}\Big]$$

$$\left.\left.\text{Sin}\Big[\frac{1}{2}(c+d x)\Big]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)+$$

$$2\left(8 a A b^2-12 a^2 b B+4 b^3 B+15 a^3 C-7 a b^2 C\right)\left(\left(\mathbb{i}\,\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]\sqrt{a+b\,\text{Cos}[c+d x]}\right.\right.$$

$$\left.\text{EllipticE}\Big[\mathbb{i}\,\text{ArcSinh}\Big[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\Big],-\frac{2 a}{-a-b}\Big]\,\text{Sec}[c+d x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2\,\text{Sec}[c+d x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\Big],-\frac{2 a}{-a+b}\Big]\,\text{Sin}\Big[\frac{1}{2}(c+d x)\Big]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+b\,\text{Cos}[c+d x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\text{Csc}[c+d x]\,\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg) \Bigg/$$

$$\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)$$

Problem 1146: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{(a+b\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 535 leaves, 7 steps):

$$-\frac{1}{a\,b^2\,\sqrt{a+b}\,d}\left(2\,A\,b^2-2\,a\,b\,B+3\,a^2\,C-b^2\,C\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{a\,b^2\,\sqrt{a+b}\,d}$$

$$\left(2\,A\,b^2-a\,(b\,(2\,B-C)-3\,a\,C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{b^3\,d}$$

$$\sqrt{a+b}\,\,(2\,b\,B-3\,a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-$$

$$\frac{2\,\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{\left(2\,A\,b^2-2\,a\,b\,B+3\,a^2\,C-b^2\,C\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b^2\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 1256 leaves):

$$\left(2\sqrt{\operatorname{Cos}[c+d\,x]}\,\left(A\,b^2\operatorname{Sin}[c+d\,x]-a\,b\,B\operatorname{Sin}[c+d\,x]+a^2\,C\operatorname{Sin}[c+d\,x]\right)\right)\Big/$$

$$\left(b\left(-a^2+b^2\right)d\sqrt{a+b\operatorname{Cos}[c+d\,x]}\right)+\frac{1}{2\,(a-b)\,b\,(a+b)\,d}$$

$$\left(-\left(\left(4\,a\left(a^2\,C-b^2\,C\right)\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\operatorname{Cos}[c+d\,x]\operatorname{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{\left(a+b\operatorname{Cos}[c+d\,x]\right)\operatorname{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\operatorname{Csc}[c+d\,x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+d\,x])\operatorname{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\operatorname{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\sqrt{\operatorname{Cos}[c+d\,x]}\sqrt{a+b\operatorname{Cos}[c+d\,x]}\right)\right)-4\,a\left(2\,a\,A\,b-2\,b^2\,B+2\,a\,b\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\operatorname{Cos}[c+d\,x]\operatorname{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\operatorname{Cos}[c+d\,x]\right)\operatorname{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\operatorname{Csc}[c+d\,x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+d\,x])\operatorname{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\operatorname{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\operatorname{Cos}[c+d\,x]}\sqrt{a+b\operatorname{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\operatorname{Cos}[c+d\,x]\operatorname{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{\left(a+b\operatorname{Cos}[c+d\,x]\right)\operatorname{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\ \mathrm{EllipticPi}\Big[-\frac{a}{b},\ \mathrm{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\ -\frac{2\,a}{-a+b}\Big]$$

$$\left.\left.\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]^4\right)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(2\,A\,b^2-2\,a\,b\,B+3\,a^2\,C-b^2\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\Big[\mathrm{i}\,\mathrm{ArcSinh}\Big[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\Big],\ -\frac{2\,a}{-a-b}\Big]\,\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\mathrm{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]^2\,\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\ -\frac{2\,a}{-a+b}\Big]\,\mathrm{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\ \mathrm{EllipticPi}\Big[-\frac{a}{b},$$

$$\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg/$$

$$\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)$$

Problem 1147: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 436 leaves, 6 steps):

$$\frac{1}{a^2\,b\sqrt{a+b}\,d}2\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{a\,b\sqrt{a+b}\,d}$$

$$2\,(A\,b+b\,B-a\,C)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{b^2\,d}$$

$$2\sqrt{a+b}\,C\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{2\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Sin}[c+d\,x]}{b\,(a^2-b^2)\,d\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 1245 leaves):

$$\left(2\sqrt{\text{Cos}[c+d\,x]}\,\left(A\,b^2\,\text{Sin}[c+d\,x]-a\,b\,B\,\text{Sin}[c+d\,x]+a^2\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/$$

$$\left(a\,(a^2-b^2)\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{1}{a\,(a-b)\,(a+b)\,d}$$

$$\left(-\left(\left(4\,a\,\left(a^2\,A-A\,b^2\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(-a\,A\,b+a^2\,B-a\,b\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-A\,b^2+a\,b\,B-a^2\,C\right)\left(\left(\dot{\imath}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\dot{\imath}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\text{Sec}[c+d\,x]}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left.\left.\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 1148: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 322 leaves, 4 steps):

$$-\frac{1}{a^3\,\sqrt{a+b}\,d}2\,\left(2\,A\,b^2-a\,b\,B-a^2\,\left(A-C\right)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}-\frac{1}{a^2\,\sqrt{a+b}\,d}$$

$$2\,\left(2\,A\,b+a\,\left(A-B-C\right)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}+\frac{2\,\left(A\,b^2-a\,\left(b\,B-a\,C\right)\right)\,\text{Sin}[c+d\,x]}{a\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 1306 leaves):

$$\frac{1}{a^2\,\left(-a+b\right)\,\left(a+b\right)\,d}\left(-\left(\left(4\,a\,\left(2\,a^2\,A\,b-2\,A\,b^3-a^3\,B+a\,b^2\,B\right)\right.\right.\right.$$

$$\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left.\left((a+b)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\right) - 4\,a\,\left(a^3 A - 2\,a\,A\,b^2 + a^2\,b\,B - a^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right) - \left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\,\text{EllipticPi}\left[-\frac{a}{b}, \text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\right) +$$

$$2\,\left(a^2\,A\,b - 2\,A\,b^3 + a\,b^2\,B - a^2\,b\,C\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right], -\frac{2\,a}{-a-b}\right]\text{Sec}[c+d x]\right) \Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(-\frac{2\left(A\,b^3\,\text{Sin}[c+d\,x]-a\,b^2\,B\,\text{Sin}[c+d\,x]+a^2\,b\,C\,\text{Sin}[c+d\,x]\right)}{a^2\left(a^2-b^2\right)(a+b\,\text{Cos}[c+d\,x])}+\right.$$

$$\left.\frac{2\,A\,\text{Tan}[c+d\,x]}{a^2}\right)$$

Problem 1149: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + B\,\text{Cos}[c + d\,x] + C\,\text{Cos}[c + d\,x]^2}{\text{Cos}[c + d\,x]^{5/2}\,\left(a + b\,\text{Cos}[c + d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 424 leaves, 5 steps):

$$\frac{1}{3\,a^4\,\sqrt{a+b}\,d}2\,\left(8\,A\,b^3 + 3\,a^3\,B - 6\,a\,b^2\,B - a^2\,\left(5\,A\,b - 3\,b\,C\right)\right)\,\text{Cot}[c + d\,x]$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a + b\,\text{Cos}[c + d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c + d\,x]}}\right],\,-\frac{a+b}{a-b}\right]\,\sqrt{\frac{a\,\left(1 - \text{Sec}[c + d\,x]\right)}{a+b}}$$
$$\sqrt{\frac{a\,\left(1 + \text{Sec}[c + d\,x]\right)}{a-b}} + \frac{1}{3\,a^3\,\sqrt{a+b}\,d}2\,\left(8\,A\,b^2 + 6\,a\,b\,(A - B) + a^2\,\left(A - 3\,B + 3\,C\right)\right)$$
$$\text{Cot}[c + d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a + b\,\text{Cos}[c + d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c + d\,x]}}\right],\,-\frac{a+b}{a-b}\right]\,\sqrt{\frac{a\,\left(1 - \text{Sec}[c + d\,x]\right)}{a+b}}$$
$$\sqrt{\frac{a\,\left(1 + \text{Sec}[c + d\,x]\right)}{a-b}} + \frac{2\,\left(A\,b^2 - a\,\left(b\,B - a\,C\right)\right)\,\text{Sin}[c + d\,x]}{a\,\left(a^2 - b^2\right)\,d\,\text{Cos}[c + d\,x]^{3/2}\,\sqrt{a + b\,\text{Cos}[c + d\,x]}} -$$
$$\frac{2\,\left(4\,A\,b^2 - 3\,a\,b\,B - a^2\,\left(A - 3\,C\right)\right)\,\sqrt{a + b\,\text{Cos}[c + d\,x]}\,\text{Sin}[c + d\,x]}{3\,a^2\,\left(a^2 - b^2\right)\,d\,\text{Cos}[c + d\,x]^{3/2}}$$

Result (type 4, 1402 leaves):

$$\frac{1}{3\,a^3\,(a - b)\,(a + b)\,d}$$
$$\left(-\left(\left(4\,a\,\left(a^4\,A + 7\,a^2\,A\,b^2 - 8\,A\,b^4 - 6\,a^3\,b\,B + 6\,a\,b^3\,B + 3\,a^4\,C - 3\,a^2\,b^2\,C\right)\,\sqrt{\frac{(a + b)\,\text{Cot}\left[\frac{1}{2}\,(c + d\,x)\right]^2}{-a + b}}\right.\right.\right.$$
$$\sqrt{-\frac{(a + b)\,\text{Cos}[c + d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c + d\,x)\right]^2}{a}}\,\sqrt{\frac{\left(a + b\,\text{Cos}[c + d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\,(c + d\,x)\right]^2}{a}}$$
$$\text{Csc}[c + d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a + b\,\text{Cos}[c + d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c + d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a + b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right/\left(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\,\left(5\,a^3\,A\,b-8\,a\,A\,b^3-3\,a^4\,B+6\,a^2\,b^2\,B-3\,a^3\,b\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right/$$

$$\left(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\,\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\,\left(5\,a^2\,A\,b^2-8\,A\,b^4-3\,a^3\,b\,B+6\,a\,b^3\,B-3\,a^2\,b^2\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],\,-\frac{2\,a}{-a-b}\right]\,\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2\,\text{Sec}[c+d\,x]\,(-5\,A\,b\,\text{Sin}[c+d\,x]+3\,a\,B\,\text{Sin}[c+d\,x])}{3\,a^3}+\right.$$

$$\frac{2\left(A\,b^4\,\text{Sin}[c+d\,x]-a\,b^3\,B\,\text{Sin}[c+d\,x]+a^2\,b^2\,C\,\text{Sin}[c+d\,x]\right)}{a^3\left(a^2-b^2\right)(a+b\,\text{Cos}[c+d\,x])}+$$

$$\left.\frac{2\,A\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{3\,a^2}\right)$$

Problem 1150: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2}{\mathrm{Cos}[c+d\,x]^{7/2}\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 545 leaves, 6 steps):

$$-\frac{1}{15\,a^5\,\sqrt{a+b}\,d}2\,\left(48\,A\,b^4+25\,a^3\,b\,B-40\,a\,b^3\,B-6\,a^2\,b^2\,(4\,A-5\,C)-3\,a^4\,(3\,A+5\,C)\right)$$
$$\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{15\,a^4\,\sqrt{a+b}\,d}$$
$$2\,\left(48\,A\,b^3+4\,a\,b^2\,(9\,A-10\,B)+6\,a^2\,b\,(2\,A-5\,B+5\,C)+a^3\,(9\,A-5\,B+15\,C)\right)\,\mathrm{Cot}[c+d\,x]$$
$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\,\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}$$
$$\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{2\,\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\mathrm{Sin}[c+d\,x]}{a\,(a^2-b^2)\,d\,\mathrm{Cos}[c+d\,x]^{5/2}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}-$$
$$\frac{2\,\left(6\,A\,b^2-5\,a\,b\,B-a^2\,(A-5\,C)\right)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{5\,a^2\,(a^2-b^2)\,d\,\mathrm{Cos}[c+d\,x]^{5/2}}+$$
$$\left(2\,\left(24\,A\,b^3+5\,a^3\,B-20\,a\,b^2\,B-a^2\,(9\,A\,b-15\,b\,C)\right)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]\right)\Big/$$
$$\left(15\,a^3\,(a^2-b^2)\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\right)$$

Result (type 4, 1511 leaves):

$$\frac{1}{15\,a^4\,(-a+b)\,(a+b)\,d}$$
$$\left(-\left(\left(4\,a\,\left(12\,a^4\,A\,b+36\,a^2\,A\,b^3-48\,A\,b^5-5\,a^5\,B-35\,a^3\,b^2\,B+40\,a\,b^4\,B+30\,a^4\,b\,C-30\,a^2\,b^3\,C\right)\right.\right.\right.$$
$$\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\right/$$

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\left(9\,a^5\,A+24\,a^3\,A\,b^2-48\,a\,A\,b^4-25\,a^4\,b\,B+40\,a^2\,b^3\,B+15\,a^5\,C-30\,a^3\,b^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\right/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(9 a^4 A b+24 a^2 A b^3-48 A b^5-25 a^3 b^2 B+40 a b^4 B+15 a^4 b C-30 a^2 b^3 C\right)$$

$$\left(\left(\mathbb{i} \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] \sqrt{a+b \operatorname{Cos}[c+d x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathbb{i} \operatorname{ArcSinh}\left[\frac{\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right] \operatorname{Sec}[c+d x]\right) \Big/$$

$$\left(b \sqrt{\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Sec}[c+d x]} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b} 2 a\left(\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

$$\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\operatorname{Csc}[c+d x] \text{EllipticPi}\left[-\frac{a}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/\left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2\,\text{Sec}[c+d\,x]^2\,\left(-9\,A\,b\,\text{Sin}[c+d\,x]+5\,a\,B\,\text{Sin}[c+d\,x]\right)}{15\,a^3}+\right.$$

$$\frac{1}{15\,a^4}$$

$$2$$

$$\text{Sec}[c+d\,x]$$

$$\left(9\,a^2\,A\,\text{Sin}[c+d\,x]+33\,A\,b^2\,\text{Sin}[c+d\,x]-25\,a\,b\,B\,\text{Sin}[c+d\,x]+15\,a^2\,C\,\text{Sin}[c+d\,x]\right)-$$

$$\frac{2\,\left(A\,b^5\,\text{Sin}[c+d\,x]-a\,b^4\,B\,\text{Sin}[c+d\,x]+a^2\,b^3\,C\,\text{Sin}[c+d\,x]\right)}{a^4\,\left(a^2-b^2\right)\,\left(a+b\,\text{Cos}[c+d\,x]\right)}+$$

$$\left.\frac{2\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{5\,a^2}\right)$$

Problem 1151: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 723 leaves, 8 steps):

$$\left(\left(8 A b^4+6 a^3 b B-14 a b^3 B-15 a^4 C+26 a^2 b^2 C-3 b^4 C\right)\right.$$

$$\text{Cot}[c+d x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b}\, \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\, \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a\,(a-b)\, b^3\,(a+b)^{3/2} d\right)-$$

$$\left(\left(6 A b^4-a b^3\,(2 A+3\,(4 B-C))+a^3 b\,(6 B-5 C)-15 a^4 C+a^2 b^2\,(2 B+21 C)\right)\right.$$

$$\text{Cot}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b}\, \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\, \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a b^3 \sqrt{a+b}\,\left(a^2-b^2\right) d\right)-\frac{1}{b^4 d}$$

$$\sqrt{a+b}\,(2 b B-5 a C)\, \text{Cot}[c+d x]\, \text{EllipticPi}\left[\frac{a+b}{b}, \text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b}\, \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\, \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}-$$

$$\frac{2\left(A b^2-a\,(b B-a C)\right) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{3 b\left(a^2-b^2\right) d\,(a+b \text{Cos}[c+d x])^{3/2}}+$$

$$\left(2\left(3 A b^4+2 a^3 b B-6 a b^3 B-5 a^4 C+a^2 b^2\,(A+9 C)\right) \sqrt{\text{Cos}[c+d x]}\, \text{Sin}[c+d x]\right) \Big/$$

$$\left(3 b^2\left(a^2-b^2\right)^2 d \sqrt{a+b \text{Cos}[c+d x]}\right)-$$

$$\left(\left(8 A b^4+6 a^3 b B-14 a b^3 B-15 a^4 C+26 a^2 b^2 C-3 b^4 C\right) \sqrt{a+b \text{Cos}[c+d x]}\, \text{Sin}[c+d x]\right) \Big/$$

$$\left(3 b^3\left(a^2-b^2\right)^2 d \sqrt{\text{Cos}[c+d x]}\right)$$

Result (type 4, 1448 leaves):

$$\frac{1}{d}\sqrt{\text{Cos}[c+d x]}\, \sqrt{a+b \text{Cos}[c+d x]}$$

$$\left(-\frac{2\left(a A b^2 \text{Sin}[c+d x]-a^2 b B \text{Sin}[c+d x]+a^3 C \text{Sin}[c+d x]\right)}{3 b^2\left(-a^2+b^2\right)(a+b \text{Cos}[c+d x])^2}+\left(2\left(4 A b^4 \text{Sin}[c+d x]+\right.\right.\right.$$

$$\left.\left.3 a^3 b B \text{Sin}[c+d x]-7 a b^3 B \text{Sin}[c+d x]-6 a^4 C \text{Sin}[c+d x]+10 a^2 b^2 C \text{Sin}[c+d x]\right)\right) \Big/$$

$$\left.\left(3 b^2\left(-a^2+b^2\right)^2 (a+b \text{Cos}[c+d x])\right)\right)+\frac{1}{6\,(a-b)^2 b^2\,(a+b)^2 d}$$

$$\left(-\left(\left(4\,a\,\left(2\,a^2\,A\,b^2-2\,A\,b^4-2\,a^3\,b\,B+2\,a\,b^3\,B+5\,a^4\,C-8\,a^2\,b^2\,C+3\,b^4\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(\left.(a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\,\left(-8\,a\,A\,b^3+2\,a^2\,b^2\,B+6\,b^4\,B+4\,a^3\,b\,C-12\,a\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)+$$

$$2\left(-8 A b^4-6 a^3 b B+14 a b^3 B+15 a^4 C-26 a^2 b^2 C+3 b^4 C\right)$$

$$\left(\left(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\text{Sec}[c+d x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]}\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\text{Csc}[c+d x]\;\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\,-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)$$

Problem 1152: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 589 leaves, 7 steps):

$$-\left(\left(2\left(A b^4-4 a b^3 B-3 a^4 C+a^2 b^2 (3 A+7 C)\right)\right.\right.$$

$$\text{Cot}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(3 a^2 b^2 \sqrt{a+b}\ \left(a^2-b^2\right) d\right)\right)-$$

$$\left(2\left(b^3 (A+3 B)+3 a^3 C+a^2 b C-a b^2 (3 A+B+6 C)\right)\text{Cot}[c+d x]\right.$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}$$

$$\left.\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(3 a b^2 \sqrt{a+b}\ \left(a^2-b^2\right) d\right)-\frac{1}{b^3 d}$$

$$2\sqrt{a+b}\ C\,\text{Cot}[c+d x]\ \text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}-$$

$$\frac{2\left(A b^2-a\,(b B-a C)\right)\sqrt{\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{3 b\left(a^2-b^2\right) d\,(a+b\,\text{Cos}[c+d x])^{3/2}}+$$

$$\frac{2\left(A b^4-4 a b^3 B-3 a^4 C+a^2 b^2 (3 A+7 C)\right)\text{Sin}[c+d x]}{3 b^2\left(a^2-b^2\right)^2 d\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}}$$

Result (type 4, 1441 leaves):

$$\frac{1}{d}\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}$$

$$\left(\frac{2\left(A b^2\,\text{Sin}[c+d x]-a b B\,\text{Sin}[c+d x]+a^2 C\,\text{Sin}[c+d x]\right)}{3 b\left(-a^2+b^2\right)(a+b\,\text{Cos}[c+d x])^2}+\left(2\left(-3 a^2 A b^2\,\text{Sin}[c+d x]-\right.\right.\right.$$

$$\left.\left.A b^4\,\text{Sin}[c+d x]+4 a b^3 B\,\text{Sin}[c+d x]+3 a^4 C\,\text{Sin}[c+d x]-7 a^2 b^2 C\,\text{Sin}[c+d x]\right)\right)\Big/$$

$$\left.\left(3 a b\left(a^2-b^2\right)^2(a+b\,\text{Cos}[c+d x])\right)\right)-\frac{1}{3 a\,(a-b)^2 b\,(a+b)^2 d}$$

$$\left(-\left(\left(4\,a\,\left(a^2\,A\,b^2-A\,b^4-a^3\,b\,B+a\,b^3\,B+a^4\,C-a^2\,b^2\,C\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\bigg/\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-$$

$$4\,a\,\left(-3\,a^3\,A\,b-a\,A\,b^3+4\,a^2\,b^2\,B-a^3\,b\,C-3\,a\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\bigg/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right) \Big/ \left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(-3\,a^2\,A\,b^2-A\,b^4+4\,a\,b^3\,B+3\,a^4\,C-7\,a^2\,b^2\,C\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\right)\Big/$$

$$\left.\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}[c+d\,x]}{a+b}}\right)\right)+$$

$$\frac{1}{b}2\,a\left(\left(a\,\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 1153: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 457 leaves, 5 steps):

$$\left(2\left(6\,a^2\,A\,b-2\,A\,b^3-3\,a^3\,B-a\,b^2\,B+4\,a^2\,b\,C\right)\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\right.\right.$$
$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\right)\bigg/\left(3\,a^3\,(a-b)\,(a+b)^{3/2}\,d\right)-$$
$$\left(2\left(2\,A\,b^2-a^2\left(3\,A+3\,B+C\right)+a\,b\left(3\,A+B+3\,C\right)\right)\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\right.\right.$$
$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\right)\bigg/$$
$$\left(3\,a^2\sqrt{a+b}\,\left(a^2-b^2\right)d\right)+\frac{2\left(A\,b^2-a\left(b\,B-a\,C\right)\right)\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{3\,a\left(a^2-b^2\right)d\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}+$$
$$\frac{2\left(2\,A\,b^3+3\,a^3\,B+a\,b^2\,B-2\,a^2\,b\left(3\,A+2\,C\right)\right)\text{Sin}[c+d\,x]}{3\,a\left(a^2-b^2\right)^2d\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 1440 leaves):

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}$$
$$\left(\frac{2\left(A\,b^2\,\text{Sin}[c+d\,x]-a\,b\,B\,\text{Sin}[c+d\,x]+a^2\,C\,\text{Sin}[c+d\,x]\right)}{3\,a\left(a^2-b^2\right)\left(a+b\,\text{Cos}[c+d\,x]\right)^2}-\left(2\left(-6\,a^2\,A\,b^2\,\text{Sin}[c+d\,x]+\right.\right.\right.$$
$$\left.\left.2\,A\,b^4\,\text{Sin}[c+d\,x]+3\,a^3\,b\,B\,\text{Sin}[c+d\,x]+a\,b^3\,B\,\text{Sin}[c+d\,x]-4\,a^2\,b^2\,C\,\text{Sin}[c+d\,x]\right)\right)\bigg/$$
$$\left.\left(3\,a^2\left(a^2-b^2\right)^2\left(a+b\,\text{Cos}[c+d\,x]\right)\right)\right)+\frac{1}{3\,a^2\,(a-b)^2\,(a+b)^2\,d}$$

$$\left(-\left(\left(4\,a\,\left(3\,a^4\,A-5\,a^2\,A\,b^2+2\,A\,b^4-a^3\,b\,B+a\,b^3\,B+a^4\,C-a^2\,b^2\,C\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(\left.(a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\,\left(-6\,a^3\,A\,b+2\,a\,A\,b^3+3\,a^4\,B+a^2\,b^2\,B-4\,a^3\,b\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)+$$

$$2\left(-6 a^2 A b^2+2 A b^4+3 a^3 b B+a b^3 B-4 a^2 b^2 C\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\text{Sec}[c+d x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]}\sqrt{\frac{\left(a+b\,\text{Cos}[c+d x]\right)\text{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d x]\right)\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d x]\right)\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d x]\right)\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\text{Csc}[c+d x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d x]\right)\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right.+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 1154: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{3/2}\,(a+b\,\text{Cos}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 495 leaves, 5 steps):

$$\left(2\left(8\,A\,b^4+6\,a^3\,b\,B-2\,a\,b^3\,B+3\,a^4\,(A-C)-a^2\,b^2\,(15\,A+C)\right)\right.$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,a^4\,\sqrt{a+b}\,(a^2-b^2)\,d\right)+$$
$$\left(2\left(8\,A\,b^3+2\,a\,b^2\,(3\,A-B)-3\,a^3\,(A-B-C)-a^2\,b\,(9\,A+3\,B+C)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\right.\right.$$
$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/$$
$$\left(3\,a^3\,\sqrt{a+b}\,(a^2-b^2)\,d\right)+\frac{2\,(A\,b^2-a\,(b\,B-a\,C))\,\text{Sin}[c+d\,x]}{3\,a\,(a^2-b^2)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{3/2}}-$$
$$\frac{2\,(4\,A\,b^4+5\,a^3\,b\,B-a\,b^3\,B-2\,a^4\,C-2\,a^2\,b^2\,(4\,A+C))\,\text{Sin}[c+d\,x]}{3\,a^2\,(a^2-b^2)^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 1516 leaves):

$$-\frac{1}{3\,a^3\,(a-b)^2\,(a+b)^2\,d}$$
$$\left(-\left(\left(4\,a\,\left(9\,a^4\,A\,b-17\,a^2\,A\,b^3+8\,A\,b^5-3\,a^5\,B+5\,a^3\,b^2\,B-2\,a\,b^4\,B+a^4\,b\,C-a^2\,b^3\,C\right)\right.\right.\right.$$

$$\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\,\left(3\,a^5\,A-15\,a^3\,A\,b^2+8\,a\,A\,b^4+6\,a^4\,b\,B-2\,a^2\,b^3\,B-3\,a^5\,C-a^3\,b^2\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(3\,a^4\,A\,b-15\,a^2\,A\,b^3+8\,A\,b^5+6\,a^3\,b^2\,B-2\,a\,b^4\,B-3\,a^4\,b\,C-a^2\,b^3\,C\right)$$

$$\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

$$\left(b\,\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(a\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\Big[-\frac{a}{b},$$

$$\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\right)\Bigg/$$

$$\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}$$

$$\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(-\frac{2\left(A\,b^3\,\text{Sin}[c+d\,x]-a\,b^2\,B\,\text{Sin}[c+d\,x]+a^2\,b\,C\,\text{Sin}[c+d\,x]\right)}{3\,a^2\left(a^2-b^2\right)\left(a+b\,\text{Cos}[c+d\,x]\right)^2}-\right.$$

$$\left(2\left(9\,a^2\,A\,b^3\,\text{Sin}[c+d\,x]-5\,A\,b^5\,\text{Sin}[c+d\,x]-6\,a^3\,b^2\,B\,\text{Sin}[c+d\,x]+\right.\right.$$

$$\left.\left.2\,a\,b^4\,B\,\text{Sin}[c+d\,x]+3\,a^4\,b\,C\,\text{Sin}[c+d\,x]+a^2\,b^3\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/$$

$$\left.\left(3\,a^3\left(a^2-b^2\right)^2\left(a+b\,\text{Cos}[c+d\,x]\right)\right)+\frac{2\,A\,\text{Tan}[c+d\,x]}{a^3}\right)$$

Problem 1155: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\text{Cos}[c+d\,x]^{5/2}\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 620 leaves, 6 steps):

$$-\Bigg(\Bigg(2\left(16\,A\,b^5-3\,a^5\,B+15\,a^3\,b^2\,B-8\,a\,b^4\,B-2\,a^2\,b^3\,(14\,A-C)+a^4\,(8\,A\,b-6\,b\,C)\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\Bigg)\Bigg/\left(3\,a^5\,\sqrt{a+b}\,\left(a^2-b^2\right)\,d\right)\Bigg)-$$

$$\Bigg(2\left(16\,A\,b^4+4\,a\,b^3\,(3\,A-2\,B)-3\,a^3\,b\,(3\,A-3\,B-C)-2\,a^2\,b^2\,(8\,A+3\,B-C)-a^4\,(A-3\,B+3\,C)\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\Bigg)\Bigg/\left(3\,a^4\,\sqrt{a+b}\,\left(a^2-b^2\right)\,d\right)+$$

$$\frac{2\left(A\,b^2-a\,(b\,B-a\,C)\right)\,\text{Sin}[c+d\,x]}{3\,a\,\left(a^2-b^2\right)\,d\,\text{Cos}[c+d\,x]^{3/2}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}+$$

$$\frac{2\left(10\,a^2\,A\,b^2-6\,A\,b^4-7\,a^3\,b\,B+3\,a\,b^3\,B+4\,a^4\,C\right)\,\text{Sin}[c+d\,x]}{3\,a^2\,\left(a^2-b^2\right)^2\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\left(2\left(8\,A\,b^4+8\,a^3\,b\,B-4\,a\,b^3\,B+a^4\,(A-5\,C)-a^2\,b^2\,(13\,A-C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(3\,a^3\,\left(a^2-b^2\right)^2\,d\,\text{Cos}[c+d\,x]^{3/2}\right)$$

Result (type 4, 1601 leaves):

$$\frac{1}{3\,a^4\,(a-b)^2\,(a+b)^2\,d}$$

$$\Bigg(-\Bigg(\Bigg(4\,a\,\left(a^6\,A+15\,a^4\,A\,b^2-32\,a^2\,A\,b^4+16\,A\,b^6-9\,a^5\,b\,B+17\,a^3\,b^3\,B-8\,a\,b^5\,B+3\,a^6\,C-5\,a^4\,b^2\,C+\right.$$

$$\left.2\,a^2\,b^4\,C\right)\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\right/$$

$$\left.\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\left(8\,a^5\,A\,b-28\,a^3\,A\,b^3+16\,a\,A\,b^5-3\,a^6\,B+15\,a^4\,b^2\,B-8\,a^2\,b^4\,B-6\,a^5\,b\,C+2\,a^3\,b^3\,C\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(8\,a^4\,A\,b^2-28\,a^2\,A\,b^4+16\,A\,b^6-3\,a^5\,b\,B+15\,a^3\,b^3\,B-8\,a\,b^5\,B-6\,a^4\,b^2\,C+2\,a^2\,b^4\,C\right)$$

$$\left(\left(i \operatorname{Cos}\left[\frac{1}{2}(c+d x)\right] \sqrt{a+b \operatorname{Cos}[c+d x]}\right.\right.$$

$$\left.\left.\operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\frac{\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right] \operatorname{Sec}[c+d x]\right) \Big/$$

$$\left(b \sqrt{\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^{2} \operatorname{Sec}[c+d x]} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b} 2 a\left(\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^{2}}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^{2}}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^{2}}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^{2}}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^{4}\right) \Big/$$

$$\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^{2}}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^{2}}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^{2}}{a}}$$

$$\operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^{2}}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^{4}\right) \Big/\left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2\,\text{Sec}[c+d\,x]\,\left(-8\,A\,b\,\text{Sin}[c+d\,x]+3\,a\,B\,\text{Sin}[c+d\,x]\right)}{3\,a^4}+\frac{2\,\left(A\,b^4\,\text{Sin}[c+d\,x]-a\,b^3\,B\,\text{Sin}[c+d\,x]+a^2\,b^2\,C\,\text{Sin}[c+d\,x]\right)}{3\,a^3\,\left(a^2-b^2\right)\,\left(a+b\,\text{Cos}[c+d\,x]\right)^2}+\left(2\,\left(12\,a^2\,A\,b^4\,\text{Sin}[c+d\,x]-8\,A\,b^6\,\text{Sin}[c+d\,x]-9\,a^3\,b^3\,B\,\text{Sin}[c+d\,x]+5\,a\,b^5\,B\,\text{Sin}[c+d\,x]+6\,a^4\,b^2\,C\,\text{Sin}[c+d\,x]-2\,a^2\,b^4\,C\,\text{Sin}[c+d\,x]\right)\right)\Big/\left(3\,a^4\,\left(a^2-b^2\right)^2\,\left(a+b\,\text{Cos}[c+d\,x]\right)\right)+\frac{2\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{3\,a^3}\right)$$

Problem 1156: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^m\,\left(a+b\,\text{Cos}[c+d\,x]\right)^2\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 367 leaves, 6 steps):

$$\frac{1}{d\,(2+m)\,(4+m)}\left(2\,a^2\,C+b^2\,C\,(3+m)+A\,b^2\,(4+m)+2\,a\,b\,B\,(4+m)\right)\,\text{Cos}[c+d\,x]^{1+m}\,\text{Sin}[c+d\,x]+\frac{b\,\left(2\,a\,C+b\,B\,(4+m)\right)\,\text{Cos}[c+d\,x]^{2+m}\,\text{Sin}[c+d\,x]}{d\,(3+m)\,(4+m)}+\frac{C\,\text{Cos}[c+d\,x]^{1+m}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{d\,(4+m)}-\left(\left(2\,a\,b\,B\,\left(4+5\,m+m^2\right)+a^2\,(4+m)\,\left(C\,(1+m)+A\,(2+m)\right)+b^2\,(1+m)\,\left(C\,(3+m)+A\,(4+m)\right)\right)\,\text{Cos}[c+d\,x]^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Cos}[c+d\,x]^2\right]\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(1+m)\,(2+m)\,(4+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-\left(\left(b^2\,B\,(2+m)+a^2\,B\,(3+m)+2\,a\,b\,\left(C\,(2+m)+A\,(3+m)\right)\right)\,\text{Cos}[c+d\,x]^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},\text{Cos}[c+d\,x]^2\right]\,\text{Sin}[c+d\,x]\right)\Big/\left(d\,(2+m)\,(3+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 5, 1677 leaves):

$$-\left(\left(b^2\,C\,\text{Cos}[c+d\,x]^{1+m}\,\text{Hypergeometric2F1}\left[-\frac{3}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Cos}[c+d\,x]^2\right]\,\text{Sin}[c+d\,x]^5\right)\Big/\left(8\,d\,(1+m)\,\left(\text{Sin}[c+d\,x]^2\right)^{5/2}\right)+\left(A\,b^2\,\text{Cos}[c+d\,x]^{1+m}\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Cos}[c+d\,x]^2\right]\,\text{Sin}[c+d\,x]^3\right)\Big/\right.$$

$$\left(2\,d\,(1+m)\,\left(\text{Sin}[c+d\,x]^2\right)^{3/2}\right)+$$
$$\left(a\,b\,B\,\text{Cos}[c+d\,x]^{1+m}\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]^3\right)\Big/$$
$$\left(d\,(1+m)\,\left(\text{Sin}[c+d\,x]^2\right)^{3/2}\right)+$$
$$\left(a^2\,C\,\text{Cos}[c+d\,x]^{1+m}\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]^3\right)\Big/$$
$$\left(2\,d\,(1+m)\,\left(\text{Sin}[c+d\,x]^2\right)^{3/2}\right)+$$
$$\left(b^2\,C\,\text{Cos}[c+d\,x]^{1+m}\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]^3\right)\Big/$$
$$\left(2\,d\,(1+m)\,\left(\text{Sin}[c+d\,x]^2\right)^{3/2}\right)+$$
$$\left(3\,b^2\,B\,\text{Cos}[c+d\,x]^{2+m}\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]^3\right)\Big/$$
$$\left(4\,d\,(2+m)\,\left(\text{Sin}[c+d\,x]^2\right)^{3/2}\right)+$$
$$\left(3\,a\,b\,C\,\text{Cos}[c+d\,x]^{2+m}\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]^3\right)\Big/$$
$$\left(2\,d\,(2+m)\,\left(\text{Sin}[c+d\,x]^2\right)^{3/2}\right)+$$
$$\left(3\,b^2\,C\,\text{Cos}[c+d\,x]^{3+m}\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{3+m}{2},\frac{5+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]^3\right)\Big/$$
$$\left(4\,d\,(3+m)\,\left(\text{Sin}[c+d\,x]^2\right)^{3/2}\right)-$$
$$\left(a^2\,A\,\text{Cos}[c+d\,x]^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(d\,(1+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(A\,b^2\,\text{Cos}[c+d\,x]^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(2\,d\,(1+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(a\,b\,B\,\text{Cos}[c+d\,x]^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(d\,(1+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(a^2\,C\,\text{Cos}[c+d\,x]^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(2\,d\,(1+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(3\,b^2\,C\,\text{Cos}[c+d\,x]^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(8\,d\,(1+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(2\,a\,A\,b\,\text{Cos}[c+d\,x]^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(d\,(2+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(a^2\,B\,\text{Cos}[c+d\,x]^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$

$$\left(d\,(2+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(3\,b^2\,B\,\text{Cos}[c+d\,x]^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(4\,d\,(2+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(3\,a\,b\,C\,\text{Cos}[c+d\,x]^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(2\,d\,(2+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(A\,b^2\,\text{Cos}[c+d\,x]^{3+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3+m}{2},\frac{5+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(2\,d\,(3+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(a\,b\,B\,\text{Cos}[c+d\,x]^{3+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3+m}{2},\frac{5+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(d\,(3+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(a^2\,C\,\text{Cos}[c+d\,x]^{3+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3+m}{2},\frac{5+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(2\,d\,(3+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(b^2\,C\,\text{Cos}[c+d\,x]^{3+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3+m}{2},\frac{5+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(2\,d\,(3+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(b^2\,B\,\text{Cos}[c+d\,x]^{4+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{4+m}{2},\frac{6+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(4\,d\,(4+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(a\,b\,C\,\text{Cos}[c+d\,x]^{4+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{4+m}{2},\frac{6+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(2\,d\,(4+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)-$$
$$\left(b^2\,C\,\text{Cos}[c+d\,x]^{5+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{5+m}{2},\frac{7+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(8\,d\,(5+m)\,\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Problem 1157: Result more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^m\,(a+b\,\text{Cos}[c+d\,x])\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,dx$$

Optimal (type 5, 235 leaves, 5 steps):

$$\frac{(b B+a C) \operatorname{Cos}[c+d x]^{1+m} \operatorname{Sin}[c+d x]}{d (2+m)}+\frac{b C \operatorname{Cos}[c+d x]^{2+m} \operatorname{Sin}[c+d x]}{d (3+m)}-\left(\left((b B+a C) (1+m)+a A (2+m)\right) \operatorname{Cos}[c+d x]^{1+m} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \operatorname{Cos}[c+d x]^2\right] \operatorname{Sin}[c+d x]\right) \Big/ \left(d (1+m) (2+m) \sqrt{\operatorname{Sin}[c+d x]^2}\right)-\left((b C (2+m)+A b (3+m)+a B (3+m)) \operatorname{Cos}[c+d x]^{2+m} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, \operatorname{Cos}[c+d x]^2\right] \operatorname{Sin}[c+d x]\right) \Big/ \left(d (2+m) (3+m) \sqrt{\operatorname{Sin}[c+d x]^2}\right)$$

Result (type 5, 474 leaves):

$$\frac{1}{4 d} \operatorname{Cos}[c+d x]^{1+m} \operatorname{Csc}[c+d x] \left(\frac{2 (b B+a C) \operatorname{Hypergeometric2F1}\left[-\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \operatorname{Cos}[c+d x]^2\right]}{1+m}+\frac{1}{2+m} 3 b C \operatorname{Cos}[c+d x] \operatorname{Hypergeometric2F1}\left[-\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, \operatorname{Cos}[c+d x]^2\right]-\frac{4 a A \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \operatorname{Cos}[c+d x]^2\right]}{1+m}-\frac{2 b B \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \operatorname{Cos}[c+d x]^2\right]}{1+m}-\frac{2 a C \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \operatorname{Cos}[c+d x]^2\right]}{1+m}-\frac{4 A b \operatorname{Cos}[c+d x] \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, \operatorname{Cos}[c+d x]^2\right]}{2+m}-\frac{4 a B \operatorname{Cos}[c+d x] \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, \operatorname{Cos}[c+d x]^2\right]}{2+m}-\frac{3 b C \operatorname{Cos}[c+d x] \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, \operatorname{Cos}[c+d x]^2\right]}{2+m}-\frac{2 b B \operatorname{Cos}[c+d x]^2 \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3+m}{2}, \frac{5+m}{2}, \operatorname{Cos}[c+d x]^2\right]}{3+m}-\frac{2 a C \operatorname{Cos}[c+d x]^2 \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3+m}{2}, \frac{5+m}{2}, \operatorname{Cos}[c+d x]^2\right]}{3+m}-\frac{b C \operatorname{Cos}[c+d x]^3 \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{4+m}{2}, \frac{6+m}{2}, \operatorname{Cos}[c+d x]^2\right]}{4+m}\right) \sqrt{\operatorname{Sin}[c+d x]^2}$$

Problem 1158: Result more than twice size of optimal antiderivative.

$$\int \frac{\operatorname{Cos}[c+d x]^m \left(A+B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right)}{a+b \operatorname{Cos}[c+d x]} \, dx$$

Optimal (type 6, 372 leaves, 8 steps):

$$\frac{1}{b^2 \left(a^2-b^2\right) d} a \left(A b^2 - a \left(b B - a C\right)\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1-m}{2}, 1, \frac{3}{2}, \text{Sin}[c+d x]^2, -\frac{b^2 \text{Sin}[c+d x]^2}{a^2-b^2}\right] \text{Cos}[c+d x]^{-1+m} \left(\text{Cos}[c+d x]^2\right)^{\frac{1-m}{2}} \text{Sin}[c+d x] - \frac{1}{b \left(a^2-b^2\right) d} \left(A b^2 - a \left(b B - a C\right)\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{m}{2}, 1, \frac{3}{2}, \text{Sin}[c+d x]^2, -\frac{b^2 \text{Sin}[c+d x]^2}{a^2-b^2}\right] \text{Cos}[c+d x]^m \left(\text{Cos}[c+d x]^2\right)^{-m/2} \text{Sin}[c+d x] - \left(\left(b B - a C\right) \text{Cos}[c+d x]^{1+m} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \text{Cos}[c+d x]^2\right] \text{Sin}[c+d x]\right) \Big/ \left(b^2 d \left(1+m\right) \sqrt{\text{Sin}[c+d x]^2}\right) - \left(C \text{Cos}[c+d x]^{2+m} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, \text{Cos}[c+d x]^2\right] \text{Sin}[c+d x]\right) \Big/ \left(b d \left(2+m\right) \sqrt{\text{Sin}[c+d x]^2}\right)$$

Result (type 6, 16 153 leaves):

$$\Bigg(\Bigg(\frac{A \text{Cos}[c+d x]^m}{a+b \text{Cos}[c+d x]} + \frac{C \text{Cos}[c+d x]^m}{2 \left(a+b \text{Cos}[c+d x]\right)} + \frac{B \text{Cos}[c+d x]^{1+m}}{a+b \text{Cos}[c+d x]} + \frac{C \text{Cos}[c+d x]^m \text{Cos}\left[2 \left(c+d x\right)\right]}{2 \left(a+b \text{Cos}[c+d x]\right)}\Bigg)$$

$$\Bigg(\frac{A \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1}{2}+\frac{m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right] \text{Tan}[c+d x]}{b} - \frac{1}{b^2} a B \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1}{2}+\frac{m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right] \text{Tan}[c+d x] + \frac{1}{b^3} a^2 C \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1}{2}+\frac{m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right] \text{Tan}[c+d x] + \frac{B \text{Hypergeometric2F1}\left[\frac{1}{2}, 1+\frac{m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right] \text{Tan}[c+d x]}{b} - \frac{a C \text{Hypergeometric2F1}\left[\frac{1}{2}, 1+\frac{m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right] \text{Tan}[c+d x]}{b^2} + \frac{C \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{2}+\frac{m}{2}, \frac{3}{2}, -\text{Tan}[c+d x]^2\right] \text{Tan}[c+d x]}{b} +$$

$$\left(3 a^2 A \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2} \left(-1+m\right), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \text{Tan}[c+d x] \left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right) \Big/$$

$$\Bigg(b \Bigg(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2} \left(-1+m\right), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \Bigg(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2} \left(-1+m\right), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) \left(-1+m\right) \text{AppellF1}\left[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d\,x]^2\Big)\,\left(-b^2+a^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)\Big)-$$

$$\left(3\,a^3\left(a^2-b^2\right)B\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\right.$$
$$\left.\text{Tan}[c+d\,x]\left(1+\text{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Big/$$
$$\left(b^2\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right)(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$
$$\left.\text{Tan}[c+d\,x]^2\Big)\left(-b^2+a^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)+$$

$$\left(3\,a^4\left(a^2-b^2\right)C\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\right.$$
$$\left.\text{Tan}[c+d\,x]\left(1+\text{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Big/$$
$$\left(b^3\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right)(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$
$$\left.\text{Tan}[c+d\,x]^2\Big)\left(-b^2+a^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)-$$

$$\left(3\,a\,A\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right.$$
$$\left.\text{Tan}[c+d\,x]\left(1+\text{Tan}[c+d\,x]^2\right)^{-m/2}\right)\Big/$$
$$\left(\left(\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.\right.$$
$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)m\right.$$
$$\left.\left.\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d\,x]^2\right)$$
$$\left.\left(-b^2+a^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)+\left(3\,a^2\left(a^2-b^2\right)B\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},\right.\right.$$
$$\left.\left.-\text{Tan}[c+d\,x]^2,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\text{Tan}[c+d\,x]\left(1+\text{Tan}[c+d\,x]^2\right)^{-m/2}\right)\Big/$$
$$\left(b\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)\,m\right.$$

$$\left.\text{AppellF1}\left[\frac{3}{2},\,\frac{2+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)\,\text{Tan}[c+d\,x]^2\Big)$$

$$\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\Bigg)-\left(3\,a^3\,\left(a^2-b^2\right)\,C\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\right.\right.$$

$$\left.\left.-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\,\text{Tan}[c+d\,x]\,\left(1+\text{Tan}[c+d\,x]^2\right)^{-m/2}\right)\Big/$$

$$\left(b^2\,\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{3}{2},\,\frac{2+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[c+d\,x]^2\Big)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)\right)\Bigg)\Big/$$

$$\left(d\,\left(\frac{A\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{2}+\frac{m}{2},\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^2}{b}-\frac{1}{b^2}\right.\right.$$

$$a\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{2}+\frac{m}{2},\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^2+\frac{1}{b^3}$$

$$a^2\,C\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{2}+\frac{m}{2},\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^2+$$

$$\frac{B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,1+\frac{m}{2},\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^2}{b}-\frac{1}{b^2}$$

$$a\,C\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,1+\frac{m}{2},\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^2+$$

$$\frac{C\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{2}+\frac{m}{2},\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2\right]\,\text{Sec}[c+d\,x]^2}{b}-$$

$$\left(6\,a^4\,A\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,\left(-1+m\right),\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\right.$$

$$\left.\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]^2\,\left(1+\text{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Big/$$

$$\left(b\,\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,\left(-1+m\right),\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,\left(-1+m\right),\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\,\left(-1+m\right)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$

$$\left.\text{Tan}[c+d\,x]^2\Big)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)^2\right)+$$

$$\left(6\,a^5\,\left(a^2-b^2\right)\,B\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,\left(-1+m\right),\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\right.$$
$$\left.\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]^2\,\left(1+\text{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\bigg/$$
$$\left(b^2\,\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,\left(-1+m\right),\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,\left(-1+m\right),\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right)\,\left(-1+m\right)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\text{Tan}[c+d\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)^2\right)-$$
$$\left(6\,a^6\,\left(a^2-b^2\right)\,C\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,\left(-1+m\right),\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\right.$$
$$\left.\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]^2\,\left(1+\text{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\bigg/$$
$$\left(b^3\,\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,\left(-1+m\right),\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,\left(-1+m\right),\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right)\,\left(-1+m\right)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\text{Tan}[c+d\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)^2\right)+$$
$$\left(6\,a^3\,A\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right.$$
$$\left.\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]^2\,\left(1+\text{Tan}[c+d\,x]^2\right)^{-m/2}\right)\bigg/$$
$$\left(\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{3}{2},\,\frac{2+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\text{Tan}[c+d\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)^2\right)-$$
$$\left(6\,a^4\,\left(a^2-b^2\right)\,B\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\right.$$
$$\left.\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]^2\,\left(1+\text{Tan}[c+d\,x]^2\right)^{-m/2}\right)\bigg/$$
$$\left(b\,\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\Big) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)^2\Big) +$$

$$\left(6 a^5 \left(a^2-b^2\right) C \,\text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\right) \Big/$$

$$\Big(b^2 \Big(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\Big) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)^2\Big) +$$

$$\left(6 a^2 A \left(a^2-b^2\right) \left(\frac{1}{2}-\frac{m}{2}\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-\frac{1}{2}-\frac{m}{2}}\right) \Big/$$

$$\Big(b \Big(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right)(-1+m) \,\text{AppellF1}\left[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\Big) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\Big) -$$

$$\left(6 a^3 \left(a^2-b^2\right) B \left(\frac{1}{2}-\frac{m}{2}\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-\frac{1}{2}-\frac{m}{2}}\right) \Big/$$

$$\Big(b^2 \Big(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right)(-1+m) \,\text{AppellF1}\left[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \text{Tan}[c+d x]^2\Big) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\Big) +$$

$$\left(6\, a^4\, \left(a^2-b^2\right)\, C\, \left(\frac{1}{2}-\frac{m}{2}\right)\, \text{AppellF1}\left[\frac{1}{2},\, \frac{1}{2}\, \left(-1+m\right),\, 1,\, \frac{3}{2},\, -\text{Tan}[c+d\, x]^2,\, \frac{a^2\, \text{Tan}[c+d\, x]^2}{-a^2+b^2}\right]\right.$$

$$\left.\text{Sec}[c+d\, x]^2\, \text{Tan}[c+d\, x]^2\, \left(1+\text{Tan}[c+d\, x]^2\right)^{-\frac{1}{2}-\frac{m}{2}}\right)\Big/$$

$$\left(b^3\, \left(-3\, \left(a^2-b^2\right)\, \text{AppellF1}\left[\frac{1}{2},\, \frac{1}{2}\, \left(-1+m\right),\, 1,\, \frac{3}{2},\, -\text{Tan}[c+d\, x]^2,\, -\frac{a^2\, \text{Tan}[c+d\, x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\, a^2\, \text{AppellF1}\left[\frac{3}{2},\, \frac{1}{2}\, \left(-1+m\right),\, 2,\, \frac{5}{2},\, -\text{Tan}[c+d\, x]^2,\, -\frac{a^2\, \text{Tan}[c+d\, x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\, \left(-1+m\right)\, \text{AppellF1}\left[\frac{3}{2},\, \frac{1+m}{2},\, 1,\, \frac{5}{2},\, -\text{Tan}[c+d\, x]^2,\, -\frac{a^2\, \text{Tan}[c+d\, x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[c+d\, x]^2\right)\, \left(-b^2+a^2\, \left(1+\text{Tan}[c+d\, x]^2\right)\right)\right)+$$

$$\left(3\, a^2\, A\, \left(a^2-b^2\right)\, \text{AppellF1}\left[\frac{1}{2},\, \frac{1}{2}\, \left(-1+m\right),\, 1,\, \frac{3}{2},\, -\text{Tan}[c+d\, x]^2,\, \frac{a^2\, \text{Tan}[c+d\, x]^2}{-a^2+b^2}\right]\right.$$

$$\left.\text{Sec}[c+d\, x]^2\, \left(1+\text{Tan}[c+d\, x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Big/$$

$$\left(b\, \left(-3\, \left(a^2-b^2\right)\, \text{AppellF1}\left[\frac{1}{2},\, \frac{1}{2}\, \left(-1+m\right),\, 1,\, \frac{3}{2},\, -\text{Tan}[c+d\, x]^2,\, -\frac{a^2\, \text{Tan}[c+d\, x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\, a^2\, \text{AppellF1}\left[\frac{3}{2},\, \frac{1}{2}\, \left(-1+m\right),\, 2,\, \frac{5}{2},\, -\text{Tan}[c+d\, x]^2,\, -\frac{a^2\, \text{Tan}[c+d\, x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\, \left(-1+m\right)\, \text{AppellF1}\left[\frac{3}{2},\, \frac{1+m}{2},\, 1,\, \frac{5}{2},\, -\text{Tan}[c+d\, x]^2,\, -\frac{a^2\, \text{Tan}[c+d\, x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[c+d\, x]^2\right)\, \left(-b^2+a^2\, \left(1+\text{Tan}[c+d\, x]^2\right)\right)\right)-$$

$$\left(3\, a^3\, \left(a^2-b^2\right)\, B\, \text{AppellF1}\left[\frac{1}{2},\, \frac{1}{2}\, \left(-1+m\right),\, 1,\, \frac{3}{2},\, -\text{Tan}[c+d\, x]^2,\, \frac{a^2\, \text{Tan}[c+d\, x]^2}{-a^2+b^2}\right]\right.$$

$$\left.\text{Sec}[c+d\, x]^2\, \left(1+\text{Tan}[c+d\, x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Big/$$

$$\left(b^2\, \left(-3\, \left(a^2-b^2\right)\, \text{AppellF1}\left[\frac{1}{2},\, \frac{1}{2}\, \left(-1+m\right),\, 1,\, \frac{3}{2},\, -\text{Tan}[c+d\, x]^2,\, -\frac{a^2\, \text{Tan}[c+d\, x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\, a^2\, \text{AppellF1}\left[\frac{3}{2},\, \frac{1}{2}\, \left(-1+m\right),\, 2,\, \frac{5}{2},\, -\text{Tan}[c+d\, x]^2,\, -\frac{a^2\, \text{Tan}[c+d\, x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\, \left(-1+m\right)\, \text{AppellF1}\left[\frac{3}{2},\, \frac{1+m}{2},\, 1,\, \frac{5}{2},\, -\text{Tan}[c+d\, x]^2,\, -\frac{a^2\, \text{Tan}[c+d\, x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[c+d\, x]^2\right)\, \left(-b^2+a^2\, \left(1+\text{Tan}[c+d\, x]^2\right)\right)\right)+$$

$$\left(3\, a^4\, \left(a^2-b^2\right)\, C\, \text{AppellF1}\left[\frac{1}{2},\, \frac{1}{2}\, \left(-1+m\right),\, 1,\, \frac{3}{2},\, -\text{Tan}[c+d\, x]^2,\, \frac{a^2\, \text{Tan}[c+d\, x]^2}{-a^2+b^2}\right]\right.$$

$$\left.\text{Sec}[c+d\, x]^2\, \left(1+\text{Tan}[c+d\, x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Big/$$

$$\left(b^3\, \left(-3\, \left(a^2-b^2\right)\, \text{AppellF1}\left[\frac{1}{2},\, \frac{1}{2}\, \left(-1+m\right),\, 1,\, \frac{3}{2},\, -\text{Tan}[c+d\, x]^2,\, -\frac{a^2\, \text{Tan}[c+d\, x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,(-1+m),\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\,(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$

$$\left.\text{Tan}[c+d\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\Bigg)+\left(3\,a^2\,A\,\left(a^2-b^2\right)\,\text{Tan}[c+d\,x]\right.$$

$$\left(-\frac{1}{3}\,(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\,1+\frac{1}{2}\,(-1+m),\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\right.$$

$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]+\frac{1}{3\,\left(-a^2+b^2\right)}2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,(-1+m),\,2,\,\frac{5}{2},\right.$$

$$\left.\left.-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\,\left(1+\text{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Bigg)\Bigg/$$

$$\left(b\,\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,(-1+m),\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,(-1+m),\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\,(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$

$$\left.\text{Tan}[c+d\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\Bigg)-$$

$$\left(3\,a^3\,\left(a^2-b^2\right)\,B\,\text{Tan}[c+d\,x]\,\left(-\frac{1}{3}\,(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\,1+\frac{1}{2}\,(-1+m),\,1,\,\frac{5}{2},\right.\right.\right.$$

$$\left.-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]+\frac{1}{3\,\left(-a^2+b^2\right)}$$

$$2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,(-1+m),\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]$$

$$\left.\left.\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\,\left(1+\text{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Bigg/$$

$$\left(b^2\,\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,(-1+m),\,1,\,\frac{3}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,(-1+m),\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\,(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1+m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$

$$\left.\text{Tan}[c+d\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[c+d\,x]^2\right)\right)\Bigg)+$$

$$\left(3\,a^4\,\left(a^2-b^2\right)\,C\,\text{Tan}[c+d\,x]\,\left(-\frac{1}{3}\,(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\,1+\frac{1}{2}\,(-1+m),\,1,\,\frac{5}{2},\right.\right.\right.$$

$$\left.-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]+\frac{1}{3\,\left(-a^2+b^2\right)}$$

$$2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,(-1+m),\,2,\,\frac{5}{2},\,-\text{Tan}[c+d\,x]^2,\,\frac{a^2\,\text{Tan}[c+d\,x]^2}{-a^2+b^2}\right]$$

$$\text{Sec}[c+d x]^2 \text{Tan}[c+d x]\Big) \left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Big) \Big/$$

$$\Big(b^3 \Big(-3 \left(a^2-b^2\right) \text{AppellF1}\Big[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\Big(2 a^2 \text{AppellF1}\Big[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\left(a^2-b^2\right)(-1+m) \text{AppellF1}\Big[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Big)$$

$$\text{Tan}[c+d x]^2\Big) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\Big) +$$

$$\Big(3 a A \left(a^2-b^2\right) m \text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[c+d x]^2 \text{Tan}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-1-\frac{m}{2}}\Big) \Big/$$

$$\Big(\Big(-3 \left(a^2-b^2\right) \text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\Big(2 a^2 \text{AppellF1}\Big[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\left(a^2-b^2\right) m \text{AppellF1}\Big[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Big)$$

$$\text{Tan}[c+d x]^2\Big) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\Big) -$$

$$\Big(3 a^2 \left(a^2-b^2\right) B m \text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\Big]$$

$$\text{Sec}[c+d x]^2 \text{Tan}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-1-\frac{m}{2}}\Big) \Big/$$

$$\Big(b \Big(-3 \left(a^2-b^2\right) \text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\Big(2 a^2 \text{AppellF1}\Big[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\left(a^2-b^2\right) m \text{AppellF1}\Big[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Big)$$

$$\text{Tan}[c+d x]^2\Big) \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\Big) +$$

$$\Big(3 a^3 \left(a^2-b^2\right) C m \text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\Big]$$

$$\text{Sec}[c+d x]^2 \text{Tan}[c+d x]^2 \left(1+\text{Tan}[c+d x]^2\right)^{-1-\frac{m}{2}}\Big) \Big/$$

$$\Big(b^2 \Big(-3 \left(a^2-b^2\right) \text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\Big(2 a^2 \text{AppellF1}\Big[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2},\ \frac{2+m}{2},\ 1,\ \frac{5}{2},\ -\text{Tan}[c+d x]^2,\ -\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg)\ \left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)-$$

$$\Bigg(3\,a\,A\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\ \frac{m}{2},\ 1,\ \frac{3}{2},\ -\text{Tan}[c+d x]^2,\ -\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[c+d x]^2\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\ \frac{m}{2},\ 1,\ \frac{3}{2},\ -\text{Tan}[c+d x]^2,\ -\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Bigg(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\ \frac{m}{2},\ 2,\ \frac{5}{2},\ -\text{Tan}[c+d x]^2,\ -\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2},\ \frac{2+m}{2},\ 1,\ \frac{5}{2},\ -\text{Tan}[c+d x]^2,\ -\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg)\ \left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)+$$

$$\Bigg(3\,a^2\left(a^2-b^2\right) B\,\text{AppellF1}\left[\frac{1}{2},\ \frac{m}{2},\ 1,\ \frac{3}{2},\ -\text{Tan}[c+d x]^2,\ \frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]$$

$$\text{Sec}[c+d x]^2\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg)\Bigg/$$

$$\Bigg(b\,\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\ \frac{m}{2},\ 1,\ \frac{3}{2},\ -\text{Tan}[c+d x]^2,\ -\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Bigg(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\ \frac{m}{2},\ 2,\ \frac{5}{2},\ -\text{Tan}[c+d x]^2,\ -\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2},\ \frac{2+m}{2},\ 1,\ \frac{5}{2},\ -\text{Tan}[c+d x]^2,\ -\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[c+d x]^2\Bigg)\ \left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)-$$

$$\Bigg(3\,a^3\left(a^2-b^2\right) C\,\text{AppellF1}\left[\frac{1}{2},\ \frac{m}{2},\ 1,\ \frac{3}{2},\ -\text{Tan}[c+d x]^2,\ \frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]$$

$$\text{Sec}[c+d x]^2\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Bigg)\Bigg/$$

$$\Bigg(b^2\,\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\ \frac{m}{2},\ 1,\ \frac{3}{2},\ -\text{Tan}[c+d x]^2,\ -\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+$$

$$\Bigg(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\ \frac{m}{2},\ 2,\ \frac{5}{2},\ -\text{Tan}[c+d x]^2,\ -\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right) m$$

$$\text{AppellF1}\left[\frac{3}{2},\ \frac{2+m}{2},\ 1,\ \frac{5}{2},\ -\text{Tan}[c+d x]^2,\ -\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\Bigg)\ \text{Tan}[c+d x]^2\Bigg)$$

$$\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Bigg)-\Bigg(3\,a\,A\left(a^2-b^2\right)\text{Tan}[c+d x]$$

$$\Bigg(-\frac{1}{3} m\,\text{AppellF1}\left[\frac{3}{2},\ 1+\frac{m}{2},\ 1,\ \frac{5}{2},\ -\text{Tan}[c+d x]^2,\ -\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\ \text{Sec}[c+d x]^2$$

$$\text{Tan}[c+d x]-\frac{1}{3\left(a^2-b^2\right)}2 a^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,$$
$$-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\Big)\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Big)\Big/$$
$$\Big(\Big(-3\left(a^2-b^2\right)\text{AppellF1}\Big[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]+$$
$$\Big(2 a^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]+\left(a^2-b^2\right) m$$
$$\text{AppellF1}\Big[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Big)\,\text{Tan}[c+d x]^2\Big)$$
$$\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Big)+\Big(3 a^2\left(a^2-b^2\right) B\,\text{Tan}[c+d x]$$
$$\Big(-\frac{1}{3} m\,\text{AppellF1}\Big[\frac{3}{2},1+\frac{m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\Big]\,\text{Sec}[c+d x]^2$$
$$\text{Tan}[c+d x]+\frac{1}{3\left(-a^2+b^2\right)}2 a^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,$$
$$\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\Big]\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\Big)\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Big)\Big/$$
$$\Big(b\,\Big(-3\left(a^2-b^2\right)\text{AppellF1}\Big[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]+$$
$$\Big(2 a^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]+\left(a^2-b^2\right) m$$
$$\text{AppellF1}\Big[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Big)\,\text{Tan}[c+d x]^2\Big)$$
$$\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Big)-\Big(3 a^3\left(a^2-b^2\right) C\,\text{Tan}[c+d x]$$
$$\Big(-\frac{1}{3} m\,\text{AppellF1}\Big[\frac{3}{2},1+\frac{m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\Big]\,\text{Sec}[c+d x]^2$$
$$\text{Tan}[c+d x]+\frac{1}{3\left(-a^2+b^2\right)}2 a^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,$$
$$\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\Big]\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\Big)\left(1+\text{Tan}[c+d x]^2\right)^{-m/2}\Big)\Big/$$
$$\Big(b^2\,\Big(-3\left(a^2-b^2\right)\text{AppellF1}\Big[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]+$$
$$\Big(2 a^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]+$$
$$\left(a^2-b^2\right) m\,\text{AppellF1}\Big[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Big)$$
$$\text{Tan}[c+d x]^2\Big)\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\Big)+\frac{1}{b}C\,\text{Sec}[c+d x]^2$$
$$\Big(-\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{2}+\frac{m}{2},\frac{3}{2},-\text{Tan}[c+d x]^2\Big]+\left(1+\text{Tan}[c+d x]^2\right)^{-\frac{3}{2}-\frac{m}{2}}\Big)+\frac{1}{b}$$

$$B\,\mathrm{Sec}[c+d\,x]^2\left(-\mathrm{Hypergeometric2F1}\left[\frac{1}{2},1+\frac{m}{2},\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2\right]+\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{-1-\frac{m}{2}}\right)-$$

$$\frac{1}{b^2}$$

$$a\,C\,\mathrm{Sec}[c+d\,x]^2$$

$$\left(-\mathrm{Hypergeometric2F1}\left[\frac{1}{2},1+\frac{m}{2},\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2\right]+\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{-1-\frac{m}{2}}\right)+\frac{1}{b}A$$

$$\mathrm{Sec}[c+d\,x]^2$$

$$\left(-\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}+\frac{m}{2},\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2\right]+\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{-\frac{1}{2}-\frac{m}{2}}\right)-\frac{1}{b^2}a$$

$$B\,\mathrm{Sec}[c+d\,x]^2$$

$$\left(-\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}+\frac{m}{2},\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2\right]+\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{-\frac{1}{2}-\frac{m}{2}}\right)+\frac{1}{b^3}a^2$$

$$C\,\mathrm{Sec}[c+d\,x]^2$$

$$\left(-\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}+\frac{m}{2},\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2\right]+\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{-\frac{1}{2}-\frac{m}{2}}\right)-$$

$$\left(3\,a^2\,A\,\left(a^2-b^2\right)\,\mathrm{AppellF1}\left[\frac{1}{2},\frac{1}{2}\,(-1+m),1,\frac{3}{2},-\mathrm{Tan}[c+d\,x]^2,\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{-a^2+b^2}\right]\right.$$

$$\mathrm{Tan}[c+d\,x]\,\left(1+\mathrm{Tan}[c+d\,x]^2\right)^{\frac{1}{2}-\frac{m}{2}}$$

$$\left(2\left(2\,a^2\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1}{2}\,(-1+m),2,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left.\left(a^2-b^2\right)\,(-1+m)\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$

$$\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]-3\,\left(a^2-b^2\right)\,\left(-\frac{1}{3}\,(-1+m)\,\mathrm{AppellF1}\left[\frac{3}{2},1+\frac{1}{2}\,(-1+m),\right.\right.$$

$$1,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]-\frac{1}{3\,\left(a^2-b^2\right)}$$

$$2\,a^2\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1}{2}\,(-1+m),2,\frac{5}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\mathrm{Sec}[c+d\,x]^2$$

$$\left.\mathrm{Tan}[c+d\,x]\right)+\mathrm{Tan}[c+d\,x]^2\,\left(2\,a^2\,\left(-\frac{3}{5}\,(-1+m)\,\mathrm{AppellF1}\left[\frac{5}{2},1+\frac{1}{2}\,(-1+m),\right.\right.\right.$$

$$2,\frac{7}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]-$$

$$\frac{1}{5\,\left(a^2-b^2\right)}12\,a^2\,\mathrm{AppellF1}\left[\frac{5}{2},\frac{1}{2}\,(-1+m),3,\frac{7}{2},-\mathrm{Tan}[c+d\,x]^2,\right.$$

$$\left.\left.-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\right)+\left(a^2-b^2\right)\,(-1+m)$$

$$\left(-\frac{1}{5\,\left(a^2-b^2\right)}6\,a^2\,\mathrm{AppellF1}\left[\frac{5}{2},\frac{1+m}{2},2,\frac{7}{2},-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right.$$

$$\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]-\frac{3}{5}\,(1+m)\,\mathrm{AppellF1}\left[\frac{5}{2},1+\frac{1+m}{2},1,\frac{7}{2},\right.$$

$$\left.\left.\left.\left.\left.-\mathrm{Tan}[c+d\,x]^2,-\frac{a^2\,\mathrm{Tan}[c+d\,x]^2}{a^2-b^2}\right]\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\right)\right)\right)\right)\right)\Big/$$

$$\left(b\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)\text{Tan}[c+d x]^2\right)^2\left(-b^2+a^2\left(1+\text{Tan}[c+d x]^2\right)\right)\right)+$$

$$\left(3 a^3\left(a^2-b^2\right)B\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[c+d x]^2,\frac{a^2\,\text{Tan}[c+d x]^2}{-a^2+b^2}\right]\text{Tan}[c+d x]\left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right.$$
$$\left(2\left(2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)\right.$$
$$\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]-3\left(a^2-b^2\right)\left(-\frac{1}{3}(-1+m)\,\text{AppellF1}\left[\frac{3}{2},1+\frac{1}{2}(-1+m),1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]-\frac{1}{3\left(a^2-b^2\right)}\right.$$
$$\left.2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\right)+\text{Tan}[c+d x]^2\left(2 a^2\left(-\frac{3}{5}(-1+m)\,\text{AppellF1}\left[\frac{5}{2},1+\frac{1}{2}(-1+m),\right.\right.\right.$$
$$2,\frac{7}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\Bigg]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]-\frac{1}{5\left(a^2-b^2\right)}12 a^2\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}(-1+m),3,\frac{7}{2},-\text{Tan}[c+d x]^2,\right.$$
$$\left.\left.-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\right)+\left(a^2-b^2\right)(-1+m)$$
$$\left(-\frac{1}{5\left(a^2-b^2\right)}6 a^2\,\text{AppellF1}\left[\frac{5}{2},\frac{1+m}{2},2,\frac{7}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right.$$
$$\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]-\frac{3}{5}(1+m)\,\text{AppellF1}\left[\frac{5}{2},1+\frac{1+m}{2},1,\frac{7}{2},\right.$$
$$\left.\left.\left.\left.\left.-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\right)\right)\right)\right)\Bigg/$$

$$\left(b^2\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)\right.$$
$$\left.(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[c+d x]^2,-\frac{a^2\,\text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[c+d x]^2\right)^2 \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\right) -$$

$$\left(3 a^4 \left(a^2-b^2\right) C \,\text{AppellF1}\left[\frac{1}{2}, \frac{1}{2} (-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\right] \text{Tan}[c+d x] \left(1+\text{Tan}[c+d x]^2\right)^{\frac{1}{2}-\frac{m}{2}} \right.$$

$$\left(2 \left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2} (-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) (-1+m) \text{AppellF1}\left[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right) \right.$$

$$\text{Sec}[c+d x]^2 \text{Tan}[c+d x] - 3 \left(a^2-b^2\right) \left(-\frac{1}{3} (-1+m) \text{AppellF1}\left[\frac{3}{2}, 1+\frac{1}{2} (-1+m), 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x] - \frac{1}{3 \left(a^2-b^2\right)} \right.$$

$$\left. 2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2} (-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\right) + \text{Tan}[c+d x]^2 \left(2 a^2 \left(-\frac{3}{5} (-1+m) \text{AppellF1}\left[\frac{5}{2}, 1+\frac{1}{2} (-1+m), 2, \frac{7}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x] - \right.\right.$$

$$\left.\frac{1}{5 \left(a^2-b^2\right)} 12 a^2 \text{AppellF1}\left[\frac{5}{2}, \frac{1}{2} (-1+m), 3, \frac{7}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\right) + \left(a^2-b^2\right) (-1+m)$$

$$\left(-\frac{1}{5 \left(a^2-b^2\right)} 6 a^2 \text{AppellF1}\left[\frac{5}{2}, \frac{1+m}{2}, 2, \frac{7}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x] - \frac{3}{5} (1+m) \text{AppellF1}\left[\frac{5}{2}, 1+\frac{1+m}{2}, 1, \frac{7}{2}, \right.\right.$$

$$\left.\left.\left.\left.\left. -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\right)\right)\right)\right)\right) \Big/$$

$$\left(b^3 \left(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2} (-1+m), 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \right.\right.$$

$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2} (-1+m), 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) (-1+m) \text{AppellF1}\left[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[c+d x]^2\right)^2 \left(-b^2+a^2 \left(1+\text{Tan}[c+d x]^2\right)\right)\right) +$$

$$\left(3 a A \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\right] \text{Tan}[c+d x] \left(1+\text{Tan}[c+d x]^2\right)^{-m/2} \right.$$

$$\left(2\left(2a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]\right)\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]-3\left(a^2-b^2\right)\left(-\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},1,\frac{5}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]-\frac{1}{3\left(a^2-b^2\right)}2a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]\right)+\text{Tan}[c+dx]^2\left(2a^2\left(-\frac{3}{5}m\,\text{AppellF1}\left[\frac{5}{2},1+\frac{m}{2},2,\frac{7}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]-\frac{1}{5\left(a^2-b^2\right)}12a^2\,\text{AppellF1}\left[\frac{5}{2},\frac{m}{2},3,\frac{7}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]\right)+\left(a^2-b^2\right)m\left(-\frac{1}{5\left(a^2-b^2\right)}6a^2\,\text{AppellF1}\left[\frac{5}{2},\frac{2+m}{2},2,\frac{7}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]-\frac{3}{5}(2+m)\,\text{AppellF1}\left[\frac{5}{2},1+\frac{2+m}{2},1,\frac{7}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]\right)\right)\right)\right)\Big/$$

$$\left(\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]+\left(2a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]\right)\text{Tan}[c+dx]^2\right)^2\left(-b^2+a^2\left(1+\text{Tan}[c+dx]^2\right)\right)\right)-\left(3a^2\left(a^2-b^2\right)B\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+dx]^2,\frac{a^2\,\text{Tan}[c+dx]^2}{-a^2+b^2}\right]\text{Tan}[c+dx]\left(1+\text{Tan}[c+dx]^2\right)^{-m/2}\right.$$

$$\left(2\left(2a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]\right)\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]-3\left(a^2-b^2\right)\left(-\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},1,\frac{5}{2},-\text{Tan}[c+dx]^2,-\frac{a^2\,\text{Tan}[c+dx]^2}{a^2-b^2}\right]\text{Sec}[c+dx]^2\,\text{Tan}[c+dx]-\frac{1}{3\left(a^2-b^2\right)}2a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},\right.\right.\right.$$

$$-\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\Big) +$$

$$\text{Tan}[c+d x]^2 \Big(2 a^2 \Big(-\frac{3}{5} m \text{AppellF1}\Big[\frac{5}{2}, 1+\frac{m}{2}, 2, \frac{7}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[c+d x]^2 \text{Tan}[c+d x] - \frac{1}{5 (a^2-b^2)} 12 a^2 \text{AppellF1}\Big[\frac{5}{2}, \frac{m}{2}, 3, \frac{7}{2},$$

$$-\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\Big) + (a^2-b^2) m$$

$$\Big(-\frac{1}{5 (a^2-b^2)} 6 a^2 \text{AppellF1}\Big[\frac{5}{2}, \frac{2+m}{2}, 2, \frac{7}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[c+d x]^2 \text{Tan}[c+d x] - \frac{3}{5} (2+m) \text{AppellF1}\Big[\frac{5}{2}, 1+\frac{2+m}{2}, 1, \frac{7}{2},$$

$$-\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\Big)\Big)\Big)\Big)\Big) \Big/$$

$$\Big(b \Big(-3 (a^2-b^2) \text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] +$$

$$\Big(2 a^2 \text{AppellF1}\Big[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] + (a^2-b^2) m$$

$$\text{AppellF1}\Big[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Big) \text{Tan}[c+d x]^2\Big)^2$$

$$\big(-b^2 + a^2 (1+\text{Tan}[c+d x]^2)\big)\Big) + \Big(3 a^3 (a^2-b^2) C \text{AppellF1}\Big[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2},$$

$$-\text{Tan}[c+d x]^2, \frac{a^2 \text{Tan}[c+d x]^2}{-a^2+b^2}\Big] \text{Tan}[c+d x] (1+\text{Tan}[c+d x]^2)^{-m/2}$$

$$\Big(2 \Big(2 a^2 \text{AppellF1}\Big[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] + (a^2-b^2) m \text{AppellF1}\Big[$$

$$\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big]\Big) \text{Sec}[c+d x]^2 \text{Tan}[c+d x] -$$

$$3 (a^2-b^2) \Big(-\frac{1}{3} m \text{AppellF1}\Big[\frac{3}{2}, 1+\frac{m}{2}, 1, \frac{5}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[c+d x]^2 \text{Tan}[c+d x] - \frac{1}{3 (a^2-b^2)} 2 a^2 \text{AppellF1}\Big[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2},$$

$$-\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\Big) +$$

$$\text{Tan}[c+d x]^2 \Big(2 a^2 \Big(-\frac{3}{5} m \text{AppellF1}\Big[\frac{5}{2}, 1+\frac{m}{2}, 2, \frac{7}{2}, -\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[c+d x]^2 \text{Tan}[c+d x] - \frac{1}{5 (a^2-b^2)} 12 a^2 \text{AppellF1}\Big[\frac{5}{2}, \frac{m}{2}, 3, \frac{7}{2},$$

$$-\text{Tan}[c+d x]^2, -\frac{a^2 \text{Tan}[c+d x]^2}{a^2-b^2}\Big] \text{Sec}[c+d x]^2 \text{Tan}[c+d x]\Big) + (a^2-b^2) m$$

$$\left(-\frac{1}{5\left(a^2-b^2\right)}6\,a^2\,\text{AppellF1}\left[\frac{5}{2},\frac{2+m}{2},2,\frac{7}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right.$$
$$\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]-\frac{3}{5}\,(2+m)\,\text{AppellF1}\left[\frac{5}{2},1+\frac{2+m}{2},1,\frac{7}{2},\right.$$
$$\left.\left.\left.\left.-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)\right)\right)\right)\Big/$$
$$\left(b^2\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)\right.$$
$$\left.m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[c+d\,x]^2,-\frac{a^2\,\text{Tan}[c+d\,x]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\left.\text{Tan}[c+d\,x]^2\right)^2\left(-b^2+a^2\left(1+\text{Tan}[c+d\,x]^2\right)\right)\right)\right)$$

Problem 1159: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^m\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\left(a+b\,\text{Cos}[c+d\,x]\right)^2}\,dx$$

Optimal (type 6, 564 leaves, 9 steps):

$$\frac{1}{b^2\left(a^2-b^2\right)^2 d}\left(A\,b^4\,m+a^3\,b\,B\,m-a\,b^3\,B\,(1+m)-a^4\,C\,(1+m)+a^2\,b^2\,(A-A\,m+C\,(2+m))\right)$$
$$\text{AppellF1}\left[\frac{1}{2},\frac{1-m}{2},1,\frac{3}{2},\text{Sin}[c+d\,x]^2,-\frac{b^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]$$
$$\text{Cos}[c+d\,x]^{-1+m}\left(\text{Cos}[c+d\,x]^2\right)^{\frac{1-m}{2}}\text{Sin}[c+d\,x]-\frac{1}{a\,b\left(a^2-b^2\right)^2 d}$$
$$\left(A\,b^4\,m+a^3\,b\,B\,m-a\,b^3\,B\,(1+m)-a^4\,C\,(1+m)+a^2\,b^2\,(A-A\,m+C\,(2+m))\right)$$
$$\text{AppellF1}\left[\frac{1}{2},-\frac{m}{2},1,\frac{3}{2},\text{Sin}[c+d\,x]^2,-\frac{b^2\,\text{Sin}[c+d\,x]^2}{a^2-b^2}\right]\text{Cos}[c+d\,x]^m$$
$$\left(\text{Cos}[c+d\,x]^2\right)^{-m/2}\text{Sin}[c+d\,x]+\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Cos}[c+d\,x]^{1+m}\,\text{Sin}[c+d\,x]}{a\left(a^2-b^2\right)d\left(a+b\,\text{Cos}[c+d\,x]\right)}+$$
$$\left(\left(a\,b\,B\,m-a^2\,C\,(1+m)+b^2\,(C-A\,m)\right)\text{Cos}[c+d\,x]^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\right.\right.$$
$$\left.\left.\frac{3+m}{2},\text{Cos}[c+d\,x]^2\right]\text{Sin}[c+d\,x]\right)\Big/\left(b^2\left(a^2-b^2\right)d\,(1+m)\sqrt{\text{Sin}[c+d\,x]^2}\right)+$$
$$\left(\left(A\,b^2-a\,(b\,B-a\,C)\right)(1+m)\,\text{Cos}[c+d\,x]^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},\text{Cos}[c+d\,x]^2\right]\right.$$
$$\left.\text{Sin}[c+d\,x]\right)\Big/\left(a\,b\left(a^2-b^2\right)d\,(2+m)\sqrt{\text{Sin}[c+d\,x]^2}\right)$$

Result (type 6, 25777 leaves): Display of huge result suppressed!

Problem 1160: Result unnecessarily involves higher level functions.

$$\int (a + a \operatorname{Cos}[c + d x]) \left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{9/2}\, dx$$

Optimal (type 4, 205 leaves, 8 steps):

$$-\frac{1}{5 d} 2 a (3 A + 5 C) \sqrt{\operatorname{Cos}[c + d x]}\ \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} + \frac{1}{21 d} 2 a (5 A + 7 C) \sqrt{\operatorname{Cos}[c + d x]}\ \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} + \frac{2 a (3 A + 5 C) \sqrt{\operatorname{Sec}[c + d x]}\ \operatorname{Sin}[c + d x]}{5 d} + \frac{2 a (5 A + 7 C) \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{21 d} + \frac{2 a A \operatorname{Sec}[c + d x]^{5/2} \operatorname{Sin}[c + d x]}{5 d} + \frac{2 a A \operatorname{Sec}[c + d x]^{7/2} \operatorname{Sin}[c + d x]}{7 d}$$

Result (type 5, 384 leaves):

$$\frac{1}{210 d} a\, e^{-i (2 c + d x)} (1 + \operatorname{Cos}[c + d x]) \operatorname{Csc}[c] \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2 \Bigg(-21 \sqrt{2} (3 A + 5 C) \left(-1 + e^{2 i c}\right) \sqrt{\frac{e^{i (c + d x)}}{1 + e^{2 i (c + d x)}}} \sqrt{1 + e^{2 i (c + d x)}}\ \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c + d x)}\right] + \frac{1}{\left(1 + e^{2 i (c + d x)}\right)^3} \left(-1 + e^{2 i c}\right) \Big(-35 C \left(1 + e^{2 i (c + d x)}\right)^2 \left(-3 - e^{i (c + d x)} - 3 e^{2 i (c + d x)} + e^{3 i (c + d x)}\right) + A \left(63 + 25 e^{i (c + d x)} + 231 e^{2 i (c + d x)} + 85 e^{3 i (c + d x)} + 189 e^{4 i (c + d x)} - 85 e^{5 i (c + d x)} + 21 e^{6 i (c + d x)} - 25 e^{7 i (c + d x)}\right) - 5 i (5 A + 7 C) e^{i (c + d x)} \left(1 + e^{2 i (c + d x)}\right)^3 \sqrt{\operatorname{Cos}[c + d x]}\ \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right]\Big) \sqrt{\operatorname{Sec}[c + d x]}\Bigg)$$

Problem 1161: Result unnecessarily involves higher level functions.

$$\int (a + a \operatorname{Cos}[c + d x]) \left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{7/2}\, dx$$

Optimal (type 4, 172 leaves, 7 steps):

$$-\frac{1}{5d}2a(3A+5C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}+\frac{2a(A+3C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{3d}+\frac{2a(3A+5C)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{5d}+\frac{2aA\,\text{Sec}[c+dx]^{3/2}\text{Sin}[c+dx]}{3d}+\frac{2aA\,\text{Sec}[c+dx]^{5/2}\text{Sin}[c+dx]}{5d}$$

Result (type 5, 273 leaves):

$$\frac{1}{30d\left(1+e^{2i(c+dx)}\right)^2}a\,e^{-i(2c+dx)}\left(-1+e^{2ic}\right)(1+\text{Cos}[c+dx])\,\text{Csc}[c]\Big(9A+15C+5Ae^{i(c+dx)}+24Ae^{2i(c+dx)}+30Ce^{2i(c+dx)}+3Ae^{4i(c+dx)}+15Ce^{4i(c+dx)}-5Ae^{5i(c+dx)}-5i(A+3C)e^{i(c+dx)}\left(1+e^{2i(c+dx)}\right)^2\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]-3(3A+5C)\left(1+e^{2i(c+dx)}\right)^{5/2}\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\Big)\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\sqrt{\text{Sec}[c+dx]}$$

Problem 1162: Result unnecessarily involves higher level functions.

$$\int(a+a\,\text{Cos}[c+dx])\left(A+C\,\text{Cos}[c+dx]^2\right)\text{Sec}[c+dx]^{5/2}\,dx$$

Optimal (type 4, 135 leaves, 6 steps):

$$-\frac{2a(A-C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{d}+\frac{2a(A+3C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{3d}+\frac{2aA\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{d}+\frac{2aA\,\text{Sec}[c+dx]^{3/2}\text{Sin}[c+dx]}{3d}$$

Result (type 5, 193 leaves):

$$\frac{1}{3d}a\,e^{-i(2c+dx)}\text{Sec}[c+dx]^{3/2}\Big(-3A+3C-3A\,\text{Cos}[2(c+dx)]+3C\,\text{Cos}[2(c+dx)]+2i(A+3C)\text{Cos}[c+dx]^{3/2}\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]+3(A-C)e^{-2i(c+dx)}\left(1+e^{2i(c+dx)}\right)^{3/2}\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]+2iA\,\text{Sin}[c+dx]+3iA\,\text{Sin}[2(c+dx)]\Big)(-i\,\text{Cos}[2c+dx]+\text{Sin}[2c+dx])$$

Problem 1163: Result unnecessarily involves higher level functions.

$$\int (a + a\,\text{Cos}[c + d\,x])\,(A + C\,\text{Cos}[c + d\,x]^2)\,\text{Sec}[c + d\,x]^{3/2}\,dx$$

Optimal (type 4, 135 leaves, 6 steps):

$$-\frac{2\,a\,(A - C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{d} + \frac{2\,a\,(3\,A + C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{3\,d} + \frac{2\,a\,C\,\text{Sin}[c + d\,x]}{3\,d\,\sqrt{\text{Sec}[c + d\,x]}} + \frac{2\,a\,A\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{d}$$

Result (type 5, 184 leaves):

$$-\frac{1}{3\,d}a\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\text{Sec}[c + d\,x]}\,\left(6\,i\,A\,\text{Cos}[c + d\,x] - 6\,i\,C\,\text{Cos}[c + d\,x] + 2\,(3\,A + C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right] - 6\,i\,(A - C)\,e^{-i\,(c+d\,x)}\,\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right] + 6\,A\,\text{Sin}[c + d\,x] + C\,\text{Sin}[2\,(c + d\,x)]\right)\,(-\text{Cos}[2\,c + d\,x] - i\,\text{Sin}[2\,c + d\,x])$$

Problem 1164: Result unnecessarily involves higher level functions.

$$\int (a + a\,\text{Cos}[c + d\,x])\,(A + C\,\text{Cos}[c + d\,x]^2)\,\sqrt{\text{Sec}[c + d\,x]}\,dx$$

Optimal (type 4, 141 leaves, 6 steps):

$$\frac{2\,a\,(5\,A + 3\,C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{5\,d} + \frac{2\,a\,(3\,A + C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{3\,d} + \frac{2\,a\,C\,\text{Sin}[c + d\,x]}{5\,d\,\text{Sec}[c + d\,x]^{3/2}} + \frac{2\,a\,C\,\text{Sin}[c + d\,x]}{3\,d\,\sqrt{\text{Sec}[c + d\,x]}}$$

Result (type 5, 183 leaves):

$$\frac{1}{30\,d}a\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\text{Sec}[c + d\,x]}\,\left(20\,(3\,A + C)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right] + 12\,i\,(5\,A + 3\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right] + 2\,\text{Cos}[c + d\,x]\,(-6\,i\,(5\,A + 3\,C) + 10\,C\,\text{Sin}[c + d\,x] + 3\,C\,\text{Sin}[2\,(c + d\,x)])\right)\,(\text{Cos}[2\,c + d\,x] + i\,\text{Sin}[2\,c + d\,x])$$

Problem 1165: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a \operatorname{Cos}[c+d x]) \left(A+C \operatorname{Cos}[c+d x]^2\right)}{\sqrt{\operatorname{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 174 leaves, 7 steps):

$$\frac{2 a (5 A+3 C) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\operatorname{Sec}[c+d x]}}{5 d}+\frac{1}{21 d} 2 a (7 A+5 C) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\operatorname{Sec}[c+d x]}+\frac{2 a C \operatorname{Sin}[c+d x]}{7 d \operatorname{Sec}[c+d x]^{5/2}}+\frac{2 a C \operatorname{Sin}[c+d x]}{5 d \operatorname{Sec}[c+d x]^{3/2}}+\frac{2 a (7 A+5 C) \operatorname{Sin}[c+d x]}{21 d \sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 5, 202 leaves):

$$\frac{1}{420 d} a e^{-i (2 c+d x)} \sqrt{\operatorname{Sec}[c+d x]} \left(40 (7 A+5 C) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]+168 i (5 A+3 C) e^{-i (c+d x)} \sqrt{1+e^{2 i (c+d x)}} \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]+2 \operatorname{Cos}[c+d x] (-84 i (5 A+3 C)+5 (28 A+23 C) \operatorname{Sin}[c+d x]+42 C \operatorname{Sin}[2 (c+d x)]+15 C \operatorname{Sin}[3 (c+d x)])\right) (\operatorname{Cos}[2 c+d x]+i \operatorname{Sin}[2 c+d x])$$

Problem 1166: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a \operatorname{Cos}[c+d x]) \left(A+C \operatorname{Cos}[c+d x]^2\right)}{\operatorname{Sec}[c+d x]^{3/2}} \, dx$$

Optimal (type 4, 205 leaves, 8 steps):

$$\frac{2 a (9 A+7 C) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\operatorname{Sec}[c+d x]}}{15 d}+\frac{1}{21 d} 2 a (7 A+5 C) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\operatorname{Sec}[c+d x]}+\frac{2 a C \operatorname{Sin}[c+d x]}{9 d \operatorname{Sec}[c+d x]^{7/2}}+\frac{2 a C \operatorname{Sin}[c+d x]}{7 d \operatorname{Sec}[c+d x]^{5/2}}+\frac{2 a (9 A+7 C) \operatorname{Sin}[c+d x]}{45 d \operatorname{Sec}[c+d x]^{3/2}}+\frac{2 a (7 A+5 C) \operatorname{Sin}[c+d x]}{21 d \sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 5, 184 leaves):

$$\frac{1}{2520\,d}a\sqrt{\text{Sec}[c+d\,x]}\left(240\,(7\,A+5\,C)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]+\right.$$
$$336\,i\,(9\,A+7\,C)\,e^{-i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+$$
$$2\,\text{Cos}[c+d\,x]\,\left(-1512\,i\,A-1176\,i\,C+30\,(28\,A+23\,C)\,\text{Sin}[c+d\,x]+\right.$$
$$\left.\left.14\,(18\,A+19\,C)\,\text{Sin}[2\,(c+d\,x)]+90\,C\,\text{Sin}[3\,(c+d\,x)]+35\,C\,\text{Sin}[4\,(c+d\,x)]\right)\right)$$

Problem 1167: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^2\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{11/2}\,dx$$

Optimal (type 4, 270 leaves, 10 steps):

$$-\frac{1}{15\,d}16\,a^2\,(2\,A+3\,C)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{1}{21\,d}4\,a^2\,(5\,A+7\,C)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{16\,a^2\,(2\,A+3\,C)\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d}+\frac{4\,a^2\,(5\,A+7\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{21\,d}+$$
$$\frac{2\,a^2\,(19\,A+21\,C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{105\,d}+$$
$$\frac{8\,A\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{63\,d}+$$
$$\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{9\,d}$$

Result (type 5, 635 leaves):

$$-\frac{1}{15 d}4\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,(a+a\,\mathrm{Cos}[c+dx])^2\,\mathrm{Csc}[c]$$
$$\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4-\frac{1}{5d}2\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,(a+a\,\mathrm{Cos}[c+dx])^2\,\mathrm{Csc}[c]$$
$$\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4+\frac{1}{21 d}5\,A\sqrt{\mathrm{Cos}[c+dx]}\,(a+a\,\mathrm{Cos}[c+dx])^2$$
$$\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\mathrm{Sec}[c+dx]}+\frac{1}{3d}$$
$$C\sqrt{\mathrm{Cos}[c+dx]}\,(a+a\,\mathrm{Cos}[c+dx])^2\,\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\mathrm{Sec}[c+dx]}+$$
$$(a+a\,\mathrm{Cos}[c+dx])^2\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\mathrm{Sec}[c+dx]}\left(\frac{4(2A+3C)\,\mathrm{Cos}[dx]\,\mathrm{Csc}[c]}{15 d}+\right.$$
$$\frac{A\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]^4\,\mathrm{Sin}[dx]}{18 d}+\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]^3\,(7A\,\mathrm{Sin}[c]+18A\,\mathrm{Sin}[dx])}{126 d}+\frac{1}{630 d}$$
$$\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]^2\,(90A\,\mathrm{Sin}[c]+112A\,\mathrm{Sin}[dx]+63C\,\mathrm{Sin}[dx])+\frac{1}{630 d}\mathrm{Sec}[c]\,\mathrm{Sec}[c+dx]$$
$$\left.(112A\,\mathrm{Sin}[c]+63C\,\mathrm{Sin}[c]+150A\,\mathrm{Sin}[dx]+210C\,\mathrm{Sin}[dx])+\frac{(5A+7C)\,\mathrm{Tan}[c]}{21 d}\right)$$

Problem 1168: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (a+a\,\mathrm{Cos}[c+dx])^2\left(A+C\,\mathrm{Cos}[c+dx]^2\right)\mathrm{Sec}[c+dx]^{9/2}\,dx$$

Optimal (type 4, 237 leaves, 9 steps):

$$-\frac{1}{5d}4a^2(3A+5C)\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\mathrm{Sec}[c+dx]}+$$
$$\frac{1}{21d}8a^2(3A+7C)\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\mathrm{Sec}[c+dx]}+$$
$$\frac{4a^2(3A+5C)\sqrt{\mathrm{Sec}[c+dx]}\,\mathrm{Sin}[c+dx]}{5d}+\frac{2a^2(33A+35C)\,\mathrm{Sec}[c+dx]^{3/2}\,\mathrm{Sin}[c+dx]}{105 d}+$$
$$\frac{8A\left(a^2+a^2\,\mathrm{Cos}[c+dx]\right)\mathrm{Sec}[c+dx]^{5/2}\,\mathrm{Sin}[c+dx]}{35 d}+$$
$$\frac{2A(a+a\,\mathrm{Cos}[c+dx])^2\,\mathrm{Sec}[c+dx]^{7/2}\,\mathrm{Sin}[c+dx]}{7 d}$$

Result (type 5, 591 leaves):

$$-\frac{1}{5\sqrt{2}\,d}3\,A\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4-\frac{1}{\sqrt{2}\,d}C\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4+\frac{1}{7\,d}2\,A\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+a\,\mathrm{Cos}[c+d\,x])^2$$
$$\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Sec}[c+d\,x]}+\frac{1}{3\,d}$$
$$2\,C\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Sec}[c+d\,x]}+$$
$$(a+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Sec}[c+d\,x]}\left(\frac{(3\,A+5\,C)\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}[c]}{5\,d}+\right.$$
$$\frac{A\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Sin}[d\,x]}{14\,d}+\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2\,(5\,A\,\mathrm{Sin}[c]+14\,A\,\mathrm{Sin}[d\,x])}{70\,d}+$$
$$\left.\frac{\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]\,(42\,A\,\mathrm{Sin}[c]+60\,A\,\mathrm{Sin}[d\,x]+35\,C\,\mathrm{Sin}[d\,x])}{210\,d}+\frac{(12\,A+7\,C)\,\mathrm{Tan}[c]}{42\,d}\right)$$

Problem 1169: Result unnecessarily involves higher level functions.

$$\int (a+a\,\mathrm{Cos}[c+d\,x])^2\,\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\mathrm{Sec}[c+d\,x]^{7/2}\,dx$$

Optimal (type 4, 196 leaves, 8 steps):

$$-\frac{16\,a^2\,A\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{5\,d}+$$
$$\frac{4\,a^2\,(A+3\,C)\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,d}+$$
$$\frac{2\,a^2\,(17\,A+15\,C)\sqrt{\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{15\,d}+$$
$$\frac{8\,A\,\left(a^2+a^2\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{15\,d}+$$
$$\frac{2\,A\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 293 leaves):

$$\frac{1}{60\,d}\,a^2\,(1+\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4 \left(-\frac{1}{-1+e^{2\,i\,c}}4\,i\,\sqrt{2}\,e^{-i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\left(12\,A\,\left(1+e^{2\,i\,(c+d\,x)}\right)+\right.\right.$$
$$12\,A\,\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+5\,(A+3\,C)$$
$$\left.e^{i\,(c+d\,x)}\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]\right)+$$
$$\sqrt{\text{Sec}[c+d\,x]}\,\left(3\,(16\,A+5\,C-5\,C\,\text{Cos}[2\,c])\,\text{Cos}[d\,x]\,\text{Csc}[c]+30\,C\,\text{Cos}[c]\,\text{Sin}[d\,x]+\right.$$
$$\left.\left.2\,A\,(10+3\,\text{Sec}[c+d\,x])\,\text{Tan}[c+d\,x]\right)\right)$$

Problem 1170: Result unnecessarily involves higher level functions.

$$\int (a+a\,\text{Cos}[c+d\,x])^2\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{5/2}\,dx$$

Optimal (type 4, 196 leaves, 8 steps):

$$-\frac{4\,a^2\,(A-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{d}+$$
$$\frac{8\,a^2\,(A+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,d}-$$
$$\frac{2\,a^2\,(5\,A-C)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{8\,A\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+$$
$$\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 181 leaves):

$$\frac{1}{6\,d}\,a^2\,\text{Sec}[c+d\,x]^{3/2}\,\left(12\,i\,A-12\,i\,C+12\,i\,A\,\text{Cos}[2\,(c+d\,x)]-\right.$$
$$12\,i\,C\,\text{Cos}[2\,(c+d\,x)]+16\,(A+C)\,\text{Cos}[c+d\,x]^{3/2}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]-$$
$$12\,i\,(A-C)\,e^{-2\,i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)^{3/2}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+$$
$$\left.4\,A\,\text{Sin}[c+d\,x]+C\,\text{Sin}[c+d\,x]+12\,A\,\text{Sin}[2\,(c+d\,x)]+C\,\text{Sin}[3\,(c+d\,x)]\right)$$

Problem 1171: Result unnecessarily involves higher level functions.

$$\int (a+a\,\text{Cos}[c+d\,x])^2\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{3/2}\,dx$$

Optimal (type 4, 200 leaves, 8 steps):

$$\frac{16 a^2 C \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{5 d}+$$
$$\frac{4 a^2 (3 A+C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{3 d}-$$
$$\frac{2 a^2 (15 A-7 C) \text{Sin}[c+d x]}{15 d \sqrt{\text{Sec}[c+d x]}}-\frac{2 (5 A-C) \left(a^2+a^2 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{5 d \sqrt{\text{Sec}[c+d x]}}+$$
$$\frac{2 A (a+a \text{Cos}[c+d x])^2 \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{d}$$

Result (type 5, 175 leaves):

$$\left(a^2 \left(-96 i C+\frac{192 i C\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]}{\sqrt{1+e^{2 i (c+d x)}}}-\right.\right.$$
$$\frac{80 i (3 A+C) e^{i (c+d x)} \text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2 i (c+d x)}\right]}{\sqrt{1+e^{2 i (c+d x)}}}+40 C \text{Sin}[c+d x]+$$
$$\left.\left.3 C \text{Sec}[c+d x] \text{Sin}[3 (c+d x)]+60 A \text{Tan}[c+d x]+3 C \text{Tan}[c+d x]\right)\right) \Big/ \left(30 d \sqrt{\text{Sec}[c+d x]}\right)$$

Problem 1172: Result unnecessarily involves higher level functions.

$$\int (a+a \text{Cos}[c+d x])^2 \left(A+C \text{Cos}[c+d x]^2\right) \sqrt{\text{Sec}[c+d x]}\, dx$$

Optimal (type 4, 204 leaves, 8 steps):

$$\frac{1}{5 d} 4 a^2 (5 A+3 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}+$$
$$\frac{1}{21 d} 8 a^2 (7 A+3 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \sqrt{\text{Sec}[c+d x]}+$$
$$\frac{2 a^2 (35 A+33 C) \text{Sin}[c+d x]}{105 d \sqrt{\text{Sec}[c+d x]}}+\frac{2 C (a+a \text{Cos}[c+d x])^2 \text{Sin}[c+d x]}{7 d \sqrt{\text{Sec}[c+d x]}}+$$
$$\frac{8 C \left(a^2+a^2 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{35 d \sqrt{\text{Sec}[c+d x]}}$$

Result (type 5, 203 leaves):

$$\frac{1}{420 d} a^2 e^{-i (2 c+d x)} \sqrt{\text{Sec}[c+d x]}$$
$$\left(160 (7 A+3 C) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]+336 i (5 A+3 C) e^{-i (c+d x)}\right.$$
$$\sqrt{1+e^{2 i (c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]+2 \text{Cos}[c+d x]$$
$$\left.(-840 i A-504 i C+5 (28 A+51 C) \text{Sin}[c+d x]+84 C \text{Sin}[2 (c+d x)]+15 C \text{Sin}[3 (c+d x)])\right)$$
$$(\text{Cos}[2 c+d x]+i \text{Sin}[2 c+d x])$$

Problem 1173: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a \cos[c + d x])^2 (A + C \cos[c + d x]^2)}{\sqrt{\sec[c + d x]}} \, dx$$

Optimal (type 4, 237 leaves, 9 steps):

$$\frac{1}{15 d} 16 a^2 (3 A + 2 C) \sqrt{\cos[c + d x]} \, \text{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\sec[c + d x]} + \frac{1}{21 d} 4 a^2 (7 A + 5 C) \sqrt{\cos[c + d x]} \, \text{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\sec[c + d x]} + \frac{2 a^2 (21 A + 19 C) \sin[c + d x]}{105 d \sec[c + d x]^{3/2}} + \frac{2 C (a + a \cos[c + d x])^2 \sin[c + d x]}{9 d \sec[c + d x]^{3/2}} + \frac{8 C (a^2 + a^2 \cos[c + d x]) \sin[c + d x]}{63 d \sec[c + d x]^{3/2}} + \frac{4 a^2 (7 A + 5 C) \sin[c + d x]}{21 d \sqrt{\sec[c + d x]}}$$

Result (type 5, 220 leaves):

$$\frac{1}{2520 d} a^2 e^{-i (2 c + d x)} \sqrt{\sec[c + d x]} \left(480 (7 A + 5 C) \sqrt{\cos[c + d x]} \, \text{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] + 2688 i (3 A + 2 C) e^{-i (c + d x)} \sqrt{1 + e^{2 i (c + d x)}} \, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c + d x)}\right] + 2 \cos[c + d x] \left(-4032 i A - 2688 i C + 60 (28 A + 23 C) \sin[c + d x] + 14 (18 A + 37 C) \sin[2 (c + d x)] + 180 C \sin[3 (c + d x)] + 35 C \sin[4 (c + d x)]\right)\right) (\cos[2 c + d x] + i \sin[2 c + d x])$$

Problem 1174: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(a + a \cos[c + d x])^2 (A + C \cos[c + d x]^2)}{\sec[c + d x]^{3/2}} \, dx$$

Optimal (type 4, 270 leaves, 10 steps):

$$\frac{1}{15 d} 4 a^2 (9 A + 7 C) \sqrt{\cos[c + d x]} \, \text{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\sec[c + d x]} + \frac{1}{231 d} 8 a^2 (33 A + 25 C) \sqrt{\cos[c + d x]} \, \text{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\sec[c + d x]} + \frac{2 a^2 (99 A + 89 C) \sin[c + d x]}{693 d \sec[c + d x]^{5/2}} + \frac{2 C (a + a \cos[c + d x])^2 \sin[c + d x]}{11 d \sec[c + d x]^{5/2}} + \frac{8 C (a^2 + a^2 \cos[c + d x]) \sin[c + d x]}{99 d \sec[c + d x]^{5/2}} + \frac{4 a^2 (9 A + 7 C) \sin[c + d x]}{45 d \sec[c + d x]^{3/2}} + \frac{8 a^2 (33 A + 25 C) \sin[c + d x]}{231 d \sqrt{\sec[c + d x]}}$$

Result (type 5, 730 leaves):

$$\frac{1}{5\sqrt{2}\,d}3\,A\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4+\frac{1}{15\sqrt{2}\,d}7\,C\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4+\frac{1}{7\,d}2\,A\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2$$
$$\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Sec}[c+d\,x]}+\frac{1}{231\,d}$$
$$50\,C\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Sec}[c+d\,x]}+$$
$$\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Sec}[c+d\,x]}$$
$$\left(-\frac{(198\,A+149\,C+234\,A\,\text{Cos}[2\,c]+187\,C\,\text{Cos}[2\,c])\,\text{Cos}[d\,x]\,\text{Csc}[c]}{720\,d}+\right.$$
$$\frac{(2376\,A+2185\,C)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{14784\,d}+\frac{(36\,A+43\,C)\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{720\,d}+$$
$$\frac{(11\,A+27\,C)\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{1232\,d}+\frac{C\,\text{Cos}[5\,d\,x]\,\text{Sin}[5\,c]}{144\,d}+$$
$$\frac{C\,\text{Cos}[6\,d\,x]\,\text{Sin}[6\,c]}{704\,d}+\frac{(234\,A+187\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{360\,d}+$$
$$\frac{(2376\,A+2185\,C)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{14784\,d}+\frac{(36\,A+43\,C)\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{720\,d}+$$
$$\left.\frac{(11\,A+27\,C)\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{1232\,d}+\frac{C\,\text{Cos}[5\,c]\,\text{Sin}[5\,d\,x]}{144\,d}+\frac{C\,\text{Cos}[6\,c]\,\text{Sin}[6\,d\,x]}{704\,d}\right)$$

Problem 1175: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{13/2}\,dx$$

Optimal (type 4, 319 leaves, 11 steps):

$$-\frac{1}{5d}4a^3(5A+7C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}+\frac{1}{231d}4a^3(105A+143C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}+\frac{4a^3(5A+7C)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{5d}+\frac{4a^3(105A+143C)\ \text{Sec}[c+dx]^{3/2}\ \text{Sin}[c+dx]}{231d}+\frac{8a^3(35A+44C)\ \text{Sec}[c+dx]^{5/2}\ \text{Sin}[c+dx]}{385d}+\frac{2(35A+33C)\left(a^3+a^3\text{Cos}[c+dx]\right)\text{Sec}[c+dx]^{7/2}\ \text{Sin}[c+dx]}{231d}+\frac{4A\left(a^2+a^2\text{Cos}[c+dx]\right)^2\text{Sec}[c+dx]^{9/2}\ \text{Sin}[c+dx]}{33ad}+\frac{2A\left(a+a\text{Cos}[c+dx]\right)^3\text{Sec}[c+dx]^{11/2}\ \text{Sin}[c+dx]}{11d}$$

Result (type 5, 677 leaves):

$$-\frac{1}{2\sqrt{2}\,d}A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\left(a+a\text{Cos}[c+dx]\right)^3\text{Csc}[c]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6-\frac{1}{10\sqrt{2}\,d}7C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\left(a+a\text{Cos}[c+dx]\right)^3\text{Csc}[c]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6+\frac{1}{22d}5A\sqrt{\text{Cos}[c+dx]}\left(a+a\text{Cos}[c+dx]\right)^3\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Sec}[c+dx]}+\frac{1}{42d}13C\sqrt{\text{Cos}[c+dx]}\left(a+a\text{Cos}[c+dx]\right)^3\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Sec}[c+dx]}+\left(a+a\text{Cos}[c+dx]\right)^3\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Sec}[c+dx]}\left(\frac{(5A+7C)\ \text{Cos}[dx]\ \text{Csc}[c]}{10d}+\frac{A\,\text{Sec}[c]\ \text{Sec}[c+dx]^5\ \text{Sin}[dx]}{44d}+\frac{\text{Sec}[c]\ \text{Sec}[c+dx]^4\left(3A\,\text{Sin}[c]+11A\,\text{Sin}[dx]\right)}{132d}+\frac{1}{924d}\text{Sec}[c]\ \text{Sec}[c+dx]^3\left(77A\,\text{Sin}[c]+126A\,\text{Sin}[dx]+33C\,\text{Sin}[dx]\right)+\frac{1}{4620d}\text{Sec}[c]\ \text{Sec}[c+dx]^2\left(630A\,\text{Sin}[c]+165C\,\text{Sin}[c]+770A\,\text{Sin}[dx]+693C\,\text{Sin}[dx]\right)+\frac{1}{4620d}\text{Sec}[c]\ \text{Sec}[c+dx]\left(770A\,\text{Sin}[c]+693C\,\text{Sin}[c]+1050A\,\text{Sin}[dx]+1430C\,\text{Sin}[dx]\right)+\frac{(105A+143C)\ \text{Tan}[c]}{462d}\right)$$

Problem 1176: Result unnecessarily involves higher level functions and more

than twice size of optimal antiderivative.

$$\int (a + a \operatorname{Cos}[c + d x])^3 (A + C \operatorname{Cos}[c + d x]^2) \operatorname{Sec}[c + d x]^{11/2} \, dx$$

Optimal (type 4, 286 leaves, 10 steps):

$$-\frac{1}{15 d} 4 a^3 (17 A + 27 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} + \frac{1}{21 d} 4 a^3 (11 A + 21 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} + \frac{4 a^3 (17 A + 27 C) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{15 d} + \frac{8 a^3 (16 A + 21 C) \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{105 d} + \frac{2 (73 A + 63 C) (a^3 + a^3 \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^{5/2} \operatorname{Sin}[c + d x]}{315 d} + \frac{4 A (a^2 + a^2 \operatorname{Cos}[c + d x])^2 \operatorname{Sec}[c + d x]^{7/2} \operatorname{Sin}[c + d x]}{21 a d} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^3 \operatorname{Sec}[c + d x]^{9/2} \operatorname{Sin}[c + d x]}{9 d}$$

Result (type 5, 635 leaves):

$$-\frac{1}{30 \sqrt{2} d} 17 A e^{-i (2 c + d x)} \sqrt{\frac{e^{i (c + d x)}}{1 + e^{2 i (c + d x)}}} (a + a \operatorname{Cos}[c + d x])^3 \operatorname{Csc}[c] \left(1 + e^{2 i (c + d x)} + (-1 + e^{2 i c}) \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) \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 - \frac{1}{10 \sqrt{2} d} 9 C e^{-i (2 c + d x)} \sqrt{\frac{e^{i (c + d x)}}{1 + e^{2 i (c + d x)}}} (a + a \operatorname{Cos}[c + d x])^3 \operatorname{Csc}[c] \left(1 + e^{2 i (c + d x)} + (-1 + e^{2 i c}) \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) \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 + \frac{1}{42 d} 11 A \sqrt{\operatorname{Cos}[c + d x]} (a + a \operatorname{Cos}[c + d x])^3 \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \sqrt{\operatorname{Sec}[c + d x]} + \frac{1}{2 d} C \sqrt{\operatorname{Cos}[c + d x]} (a + a \operatorname{Cos}[c + d x])^3 \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \sqrt{\operatorname{Sec}[c + d x]} + (a + a \operatorname{Cos}[c + d x])^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \sqrt{\operatorname{Sec}[c + d x]} \left(\frac{(17 A + 27 C) \operatorname{Cos}[d x] \operatorname{Csc}[c]}{30 d} + \frac{A \operatorname{Sec}[c] \operatorname{Sec}[c + d x]^4 \operatorname{Sin}[d x]}{36 d} + \frac{\operatorname{Sec}[c] \operatorname{Sec}[c + d x]^3 (7 A \operatorname{Sin}[c] + 27 A \operatorname{Sin}[d x])}{252 d} + \frac{1}{1260 d} \operatorname{Sec}[c] \operatorname{Sec}[c + d x]^2 (135 A \operatorname{Sin}[c] + 238 A \operatorname{Sin}[d x] + 63 C \operatorname{Sin}[d x]) + \frac{1}{1260 d} \operatorname{Sec}[c] \operatorname{Sec}[c + d x] (238 A \operatorname{Sin}[c] + 63 C \operatorname{Sin}[c] + 330 A \operatorname{Sin}[d x] + 315 C \operatorname{Sin}[d x]) + \frac{(22 A + 21 C) \operatorname{Tan}[c]}{84 d}\right)$$

Problem 1177: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (a + a \operatorname{Cos}[c + d x])^3 \left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{9/2} \, dx$$

Optimal (type 4, 253 leaves, 9 steps):

$$-\frac{1}{5 d} 4 a^3 (7 A + 5 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} + \frac{1}{21 d} 4 a^3 (13 A + 35 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} + \frac{8 a^3 (53 A + 70 C) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{105 d} + \frac{2 (7 A + 5 C) \left(a^3 + a^3 \operatorname{Cos}[c + d x]\right) \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{15 d} + \frac{12 A \left(a^2 + a^2 \operatorname{Cos}[c + d x]\right)^2 \operatorname{Sec}[c + d x]^{5/2} \operatorname{Sin}[c + d x]}{35 a d} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^3 \operatorname{Sec}[c + d x]^{7/2} \operatorname{Sin}[c + d x]}{7 d}$$

Result (type 5, 614 leaves):

$$-\frac{1}{10\sqrt{2}\,d}7\,A\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6-\frac{1}{2\sqrt{2}\,d}C\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6+\frac{1}{42\,d}13\,A\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3$$
$$\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Sec}[c+d\,x]}+\frac{1}{6\,d}$$
$$5\,C\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Sec}[c+d\,x]}+$$
$$(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Sec}[c+d\,x]}$$
$$\left(-\frac{(-28\,A-25\,C+5\,C\,\text{Cos}[2\,c])\,\text{Cos}[d\,x]\,\text{Csc}[c]}{40\,d}+\frac{C\,\text{Cos}[c]\,\text{Sin}[d\,x]}{4\,d}+\right.$$
$$\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{28\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(5\,A\,\text{Sin}[c]+21\,A\,\text{Sin}[d\,x])}{140\,d}+$$
$$\left.\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(63\,A\,\text{Sin}[c]+130\,A\,\text{Sin}[d\,x]+35\,C\,\text{Sin}[d\,x])}{420\,d}+\frac{(26\,A+7\,C)\,\text{Tan}[c]}{84\,d}\right)$$

Problem 1178: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int(a+a\,\text{Cos}[c+d\,x])^3\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^{7/2}\,dx$$

Optimal (type 4, 253 leaves, 9 steps):

$$-\frac{1}{5\,d}4\,a^3\,(9\,A-5\,C)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{1}{3\,d}4\,a^3\,(3\,A+5\,C)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}-$$
$$\frac{4\,a^3\,(21\,A+5\,C)\,\text{Sin}[c+d\,x]}{15\,d\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,(11\,A+5\,C)\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d}+$$
$$\frac{4\,A\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)^2\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,a\,d}+$$
$$\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 604 leaves):

$$-\frac{1}{10\sqrt{2}\,d}9\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2\,i\,(c+dx)}}}\,(a+a\,\text{Cos}[c+dx])^3\,\text{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+dx)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+dx)}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6+\frac{1}{2\sqrt{2}\,d}C\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2\,i\,(c+dx)}}}\,(a+a\,\text{Cos}[c+dx])^3\,\text{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+dx)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+dx)}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6+\frac{1}{2d}A\sqrt{\text{Cos}[c+dx]}\,(a+a\,\text{Cos}[c+dx])^3$$
$$\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Sec}[c+dx]}+\frac{1}{6d}$$
$$5\,C\sqrt{\text{Cos}[c+dx]}\,(a+a\,\text{Cos}[c+dx])^3\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Sec}[c+dx]}+$$
$$(a+a\,\text{Cos}[c+dx])^3\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Sec}[c+dx]}\left(-\frac{(-36\,A+5\,C+15\,C\,\text{Cos}[2c])\,\text{Cos}[dx]\,\text{Csc}[c]}{40\,d}+\right.$$
$$\frac{C\,\text{Cos}[2dx]\,\text{Sin}[2c]}{24\,d}+\frac{3\,C\,\text{Cos}[c]\,\text{Sin}[dx]}{4\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+dx]^2\,\text{Sin}[dx]}{20\,d}+$$
$$\left.\frac{\text{Sec}[c]\,\text{Sec}[c+dx]\,(A\,\text{Sin}[c]+5\,A\,\text{Sin}[dx])}{20\,d}+\frac{C\,\text{Cos}[2c]\,\text{Sin}[2dx]}{24\,d}+\frac{A\,\text{Tan}[c]}{4\,d}\right)$$

Problem 1179: Result unnecessarily involves higher level functions.

$$\int(a+a\,\text{Cos}[c+dx])^3\,\left(A+C\,\text{Cos}[c+dx]^2\right)\,\text{Sec}[c+dx]^{5/2}\,dx$$

Optimal (type 4, 251 leaves, 9 steps):

$$-\frac{1}{5d}4\,a^3\,(5A-9C)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}+$$
$$\frac{1}{3d}4\,a^3\,(5A+3C)\sqrt{\text{Cos}[c+dx]}\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}-$$
$$\frac{8\,a^3\,(10A-3C)\,\text{Sin}[c+dx]}{15\,d\sqrt{\text{Sec}[c+dx]}}-\frac{2\,(35A-3C)\,\left(a^3+a^3\,\text{Cos}[c+dx]\right)\,\text{Sin}[c+dx]}{15\,d\sqrt{\text{Sec}[c+dx]}}+$$
$$\frac{4\,A\,\left(a^2+a^2\,\text{Cos}[c+dx]\right)^2\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{a\,d}+$$
$$\frac{2\,A\,(a+a\,\text{Cos}[c+dx])^3\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{3\,d}$$

Result (type 5, 245 leaves):

$$\frac{1}{60\,d}a^3\,e^{-i\,(2\,c+d\,x)}\,\mathrm{Sec}[c+d\,x]^{3/2}\Big(120\,i\,A-216\,i\,C+120\,i\,A\,\mathrm{Cos}[2\,(c+d\,x)]-216\,i\,C\,\mathrm{Cos}[2\,(c+d\,x)]+80\,(5\,A+3\,C)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),2\Big]-24\,i\,(5\,A-9\,C)\,e^{-2\,i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)^{3/2}\,\mathrm{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\Big]+40\,A\,\mathrm{Sin}[c+d\,x]+30\,C\,\mathrm{Sin}[c+d\,x]+180\,A\,\mathrm{Sin}[2\,(c+d\,x)]+6\,C\,\mathrm{Sin}[2\,(c+d\,x)]+30\,C\,\mathrm{Sin}[3\,(c+d\,x)]+3\,C\,\mathrm{Sin}[4\,(c+d\,x)]\Big)\,(\mathrm{Cos}[2\,c+d\,x]+i\,\mathrm{Sin}[2\,c+d\,x])$$

Problem 1180: Result unnecessarily involves higher level functions.

$$\int (a+a\,\mathrm{Cos}[c+d\,x])^3\,\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^{3/2}\,dx$$

Optimal (type 4, 257 leaves, 9 steps):

$$\frac{1}{5\,d}4\,a^3\,(5\,A+7\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\Big[\frac{1}{2}\,(c+d\,x),2\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}+\frac{1}{21\,d}4\,a^3\,(35\,A+13\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),2\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}-\frac{4\,a^3\,(35\,A-41\,C)\,\mathrm{Sin}[c+d\,x]}{105\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}-\frac{2\,(7\,A-C)\,\left(a^2+a^2\,\mathrm{Cos}[c+d\,x]\right)^2\,\mathrm{Sin}[c+d\,x]}{7\,a\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}-\frac{2\,(35\,A-11\,C)\,\left(a^3+a^3\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Sin}[c+d\,x]}{35\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}+\frac{2\,A\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{d}$$

Result (type 5, 231 leaves):

$$\frac{1}{420\,d}a^3\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\Big(-1680\,i\,A\,\mathrm{Cos}[c+d\,x]-2352\,i\,C\,\mathrm{Cos}[c+d\,x]+80\,(35\,A+13\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),2\Big]+336\,i\,(5\,A+7\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\Big]+840\,A\,\mathrm{Sin}[c+d\,x]+126\,C\,\mathrm{Sin}[c+d\,x]+140\,A\,\mathrm{Sin}[2\,(c+d\,x)]+550\,C\,\mathrm{Sin}[2\,(c+d\,x)]+126\,C\,\mathrm{Sin}[3\,(c+d\,x)]+15\,C\,\mathrm{Sin}[4\,(c+d\,x)]\Big)\,(\mathrm{Cos}[2\,c+d\,x]+i\,\mathrm{Sin}[2\,c+d\,x])$$

Problem 1181: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (a+a\,\mathrm{Cos}[c+d\,x])^3\,\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 253 leaves, 9 steps):

$$\frac{1}{15 d} 4 a^3 (27 A + 17 C) \sqrt{\mathrm{Cos}[c + d x]}\ \mathrm{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\mathrm{Sec}[c + d x]} + \frac{1}{21 d} 4 a^3 (21 A + 11 C) \sqrt{\mathrm{Cos}[c + d x]}\ \mathrm{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\mathrm{Sec}[c + d x]} + \frac{8 a^3 (21 A + 16 C) \mathrm{Sin}[c + d x]}{105 d \sqrt{\mathrm{Sec}[c + d x]}} + \frac{2 C (a + a \mathrm{Cos}[c + d x])^3 \mathrm{Sin}[c + d x]}{9 d \sqrt{\mathrm{Sec}[c + d x]}} + \frac{4 C (a^2 + a^2 \mathrm{Cos}[c + d x])^2 \mathrm{Sin}[c + d x]}{21 a d \sqrt{\mathrm{Sec}[c + d x]}} + \frac{2 (63 A + 73 C) (a^3 + a^3 \mathrm{Cos}[c + d x]) \mathrm{Sin}[c + d x]}{315 d \sqrt{\mathrm{Sec}[c + d x]}}$$

Result (type 5, 684 leaves):

$$\frac{1}{10 \sqrt{2} d} 9 A e^{-i (2 c + d x)} \sqrt{\frac{e^{i (c + d x)}}{1 + e^{2 i (c + d x)}}} (a + a \mathrm{Cos}[c + d x])^3 \mathrm{Csc}[c] \left(1 + e^{2 i (c + d x)} + (-1 + e^{2 i c}) \sqrt{1 + e^{2 i (c + d x)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c + d x)}\right]\right) \mathrm{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 + \frac{1}{30 \sqrt{2} d} 17 C e^{-i (2 c + d x)} \sqrt{\frac{e^{i (c + d x)}}{1 + e^{2 i (c + d x)}}} (a + a \mathrm{Cos}[c + d x])^3 \mathrm{Csc}[c] \left(1 + e^{2 i (c + d x)} + (-1 + e^{2 i c}) \sqrt{1 + e^{2 i (c + d x)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c + d x)}\right]\right) \mathrm{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 + \frac{1}{2 d} A \sqrt{\mathrm{Cos}[c + d x]} (a + a \mathrm{Cos}[c + d x])^3 \mathrm{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \mathrm{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \sqrt{\mathrm{Sec}[c + d x]} + \frac{1}{42 d} 11 C \sqrt{\mathrm{Cos}[c + d x]} (a + a \mathrm{Cos}[c + d x])^3 \mathrm{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \mathrm{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \sqrt{\mathrm{Sec}[c + d x]} + (a + a \mathrm{Cos}[c + d x])^3 \mathrm{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \sqrt{\mathrm{Sec}[c + d x]} \left(-\frac{1}{2880 d} (1278 A + 743 C + 1314 A \mathrm{Cos}[2 c] + 889 C \mathrm{Cos}[2 c]) \mathrm{Cos}[d x] \mathrm{Csc}[c] + \frac{(42 A + 53 C) \mathrm{Cos}[2 d x] \mathrm{Sin}[2 c]}{336 d} + \frac{(36 A + 151 C) \mathrm{Cos}[3 d x] \mathrm{Sin}[3 c]}{2880 d} + \frac{3 C \mathrm{Cos}[4 d x] \mathrm{Sin}[4 c]}{224 d} + \frac{C \mathrm{Cos}[5 d x] \mathrm{Sin}[5 c]}{576 d} + \frac{(1314 A + 889 C) \mathrm{Cos}[c] \mathrm{Sin}[d x]}{1440 d} + \frac{(42 A + 53 C) \mathrm{Cos}[2 c] \mathrm{Sin}[2 d x]}{336 d} + \frac{(36 A + 151 C) \mathrm{Cos}[3 c] \mathrm{Sin}[3 d x]}{2880 d} + \frac{3 C \mathrm{Cos}[4 c] \mathrm{Sin}[4 d x]}{224 d} + \frac{C \mathrm{Cos}[5 c] \mathrm{Sin}[5 d x]}{576 d}\right)$$

Problem 1182: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a \mathrm{Cos}[c + d x])^3 (A + C \mathrm{Cos}[c + d x]^2)}{\sqrt{\mathrm{Sec}[c + d x]}} \, dx$$

Optimal (type 4, 286 leaves, 10 steps):

$$\frac{1}{5\,d}4\,a^3\,(7\,A+5\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x)\,,\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,+$$
$$\frac{1}{231\,d}4\,a^3\,(143\,A+105\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x)\,,\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,+$$
$$\frac{8\,a^3\,(44\,A+35\,C)\,\mathrm{Sin}[c+d\,x]}{385\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}+\frac{2\,C\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sin}[c+d\,x]}{11\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}+$$
$$\frac{4\,C\,(a^2+a^2\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sin}[c+d\,x]}{33\,a\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}+$$
$$\frac{2\,(33\,A+35\,C)\,(a^3+a^3\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sin}[c+d\,x]}{231\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}+\frac{4\,a^3\,(143\,A+105\,C)\,\mathrm{Sin}[c+d\,x]}{231\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}$$

Result (type 5, 208 leaves):

$$\frac{1}{18\,480\,d}a^3\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(320\,(143\,A+105\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x)\,,\,2\right]+\right.$$
$$14\,784\,i\,(7\,A+5\,C)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right]+$$
$$2\,\mathrm{Cos}[c+d\,x]\,\left(-51\,744\,i\,A-36\,960\,i\,C+10\,(2354\,A+1953\,C)\,\mathrm{Sin}[c+d\,x]+\right.$$
$$308\,(18\,A+25\,C)\,\mathrm{Sin}[2\,(c+d\,x)]+660\,A\,\mathrm{Sin}[3\,(c+d\,x)]+$$
$$\left.\left.2835\,C\,\mathrm{Sin}[3\,(c+d\,x)]+770\,C\,\mathrm{Sin}[4\,(c+d\,x)]+105\,C\,\mathrm{Sin}[5\,(c+d\,x)]\right)\right)$$

Problem 1183: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\mathrm{Cos}[c+d\,x])^3\,(A+C\,\mathrm{Cos}[c+d\,x]^2)}{\mathrm{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 319 leaves, 11 steps):

$$\frac{1}{195\,d}4\,a^3\,(221\,A+175\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x)\,,\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,+$$
$$\frac{1}{231\,d}4\,a^3\,(121\,A+95\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x)\,,\,2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,+$$
$$\frac{40\,a^3\,(143\,A+118\,C)\,\mathrm{Sin}[c+d\,x]}{9009\,d\,\mathrm{Sec}[c+d\,x]^{5/2}}+\frac{2\,C\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sin}[c+d\,x]}{13\,d\,\mathrm{Sec}[c+d\,x]^{5/2}}+$$
$$\frac{12\,C\,(a^2+a^2\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sin}[c+d\,x]}{143\,a\,d\,\mathrm{Sec}[c+d\,x]^{5/2}}+\frac{2\,(143\,A+145\,C)\,(a^3+a^3\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sin}[c+d\,x]}{1287\,d\,\mathrm{Sec}[c+d\,x]^{5/2}}+$$
$$\frac{4\,a^3\,(221\,A+175\,C)\,\mathrm{Sin}[c+d\,x]}{585\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}+\frac{4\,a^3\,(121\,A+95\,C)\,\mathrm{Sin}[c+d\,x]}{231\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}$$

Result (type 5, 776 leaves):

$$\frac{1}{30\sqrt{2}\,d}17\,A\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6+\frac{1}{78\sqrt{2}\,d}35\,C\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6+\frac{1}{42\,d}11\,A\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+a\,\mathrm{Cos}[c+d\,x])^3$$
$$\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\mathrm{Sec}[c+d\,x]}+\frac{1}{462\,d}$$
$$95\,C\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\mathrm{Sec}[c+d\,x]}+$$
$$(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\mathrm{Sec}[c+d\,x]}$$
$$\left(-\frac{1}{299520\,d}(77272\,A+59375\,C+92456\,A\,\mathrm{Cos}[2\,c]+75025\,C\,\mathrm{Cos}[2\,c])\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}[c]+\right.$$
$$\frac{(4664\,A+4267\,C)\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{29568\,d}+\frac{(7852\,A+9005\,C)\,\mathrm{Cos}[3\,d\,x]\,\mathrm{Sin}[3\,c]}{149760\,d}+$$
$$\frac{(33\,A+59\,C)\,\mathrm{Cos}[4\,d\,x]\,\mathrm{Sin}[4\,c]}{2464\,d}+\frac{(52\,A+245\,C)\,\mathrm{Cos}[5\,d\,x]\,\mathrm{Sin}[5\,c]}{29952\,d}+$$
$$\frac{3\,C\,\mathrm{Cos}[6\,d\,x]\,\mathrm{Sin}[6\,c]}{1408\,d}+\frac{C\,\mathrm{Cos}[7\,d\,x]\,\mathrm{Sin}[7\,c]}{3328\,d}+$$
$$\frac{(92456\,A+75025\,C)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{149760\,d}+\frac{(4664\,A+4267\,C)\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{29568\,d}+$$
$$\frac{(7852\,A+9005\,C)\,\mathrm{Cos}[3\,c]\,\mathrm{Sin}[3\,d\,x]}{149760\,d}+\frac{(33\,A+59\,C)\,\mathrm{Cos}[4\,c]\,\mathrm{Sin}[4\,d\,x]}{2464\,d}+$$
$$\left.\frac{(52\,A+245\,C)\,\mathrm{Cos}[5\,c]\,\mathrm{Sin}[5\,d\,x]}{29952\,d}+\frac{3\,C\,\mathrm{Cos}[6\,c]\,\mathrm{Sin}[6\,d\,x]}{1408\,d}+\frac{C\,\mathrm{Cos}[7\,c]\,\mathrm{Sin}[7\,d\,x]}{3328\,d}\right)$$

Problem 1184: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^{7/2}}{a+a\,\mathrm{Cos}[c+d\,x]}\,dx$$

Optimal (type 4, 232 leaves, 8 steps):

$$-\frac{1}{5\,a\,d}3\,(7\,A+5\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}\,-$$

$$\frac{(5\,A+3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,a\,d}+$$

$$\frac{3\,(7\,A+5\,C)\,\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{5\,a\,d}-\frac{(5\,A+3\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,a\,d}+$$

$$\frac{(7\,A+5\,C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,a\,d}-\frac{(A+C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 666 leaves) :

$$-\left(\left(\left(21\,A\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2\,i\,(c+d x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5\sqrt{2}\,d\,\left(a+a\,\text{Cos}[c+d x]\right)\right)\right)-$$

$$\left(3\,C\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2\,i\,(c+d x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(\sqrt{2}\,d\,\left(a+a\,\text{Cos}[c+d x]\right)\right)-$$

$$\left(5\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{\text{Cos}[c+d x]}\,\text{Csc}\left[\frac{c}{2}\right]\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c]\right)\Big/\left(3\,d\,\left(a+a\,\text{Cos}[c+d x]\right)\right)-$$

$$\left(C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{\text{Cos}[c+d x]}\,\text{Csc}\left[\frac{c}{2}\right]\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c]\right)\Big/\left(d\,\left(a+a\,\text{Cos}[c+d x]\right)\right)+$$

$$\frac{1}{a+a\,\text{Cos}[c+d x]}\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{\text{Sec}[c+d x]}\left(\frac{3\,(7A+5C)\,\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5\,d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(A\,\text{Sin}\left[\frac{d x}{2}\right]+C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{d}+\frac{4\,A\,\text{Sec}[c]\,\text{Sec}[c+d x]^2\,\text{Sin}[d x]}{5\,d}+\frac{4\,\text{Sec}[c]\,\text{Sec}[c+d x]\,\left(3\,A\,\text{Sin}[c]-5\,A\,\text{Sin}[d x]\right)}{15\,d}-\frac{2\,\left(2A+5A\,\text{Cos}[c]+3\,C\,\text{Cos}[c]\right)\text{Sec}[c]\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)$$

Problem 1185: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]^{5/2}}{a+a\,\text{Cos}[c+d x]}\,dx$$

Optimal (type 4, 190 leaves, 7 steps):

$$\frac{(3A+C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\,d}+\frac{(5A+3C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{3\,a\,d}-\frac{(3A+C)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{a\,d}+\frac{(5A+3C)\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{3\,a\,d}-\frac{(A+C)\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{d\,(a+a\,\text{Cos}[c+dx])}$$

Result (type 5, 628 leaves):

$$\left(3\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(\sqrt{2}\,d\,(a+a\,\text{Cos}[c+dx])\right)+$$
$$\left(C\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(\sqrt{2}\,d\,(a+a\,\text{Cos}[c+dx])\right)+$$
$$\left(5\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c]\right)\Big/\left(3\,d\,(a+a\,\text{Cos}[c+dx])\right)+$$
$$\left(C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c]\right)\Big/\left(d\,(a+a\,\text{Cos}[c+dx])\right)+$$
$$\frac{1}{a+a\,\text{Cos}[c+dx]}\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Sec}[c+dx]}\left(-\frac{(3A+C)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d}+\frac{4\,A\,\text{Sec}[c]\,\text{Sec}[c+dx]\,\text{Sin}[dx]}{3\,d}+\frac{2\,(2A+5A\,\text{Cos}[c]+3C\,\text{Cos}[c])\,\text{Sec}[c]\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)$$

Problem 1186: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{3/2}}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 4, 153 leaves, 6 steps):

$$-\frac{(3\,A+C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a\,d}-\frac{(A-C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a\,d}+\frac{(3\,A+C)\,\sqrt{\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{a\,d}-\frac{(A+C)\,\sqrt{\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 376 leaves):

$$\frac{1}{2\,a\,d\,(1+\text{Cos}[c+d\,x])}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\left(-6\,\sqrt{2}\,A\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\,\text{Csc}[c]\right.$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)-$$
$$2\,\sqrt{2}\,C\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\,\text{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)-$$
$$4\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{\text{Sec}[c+d\,x]}\,+$$
$$4\,C\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{\text{Sec}[c+d\,x]}\,+$$
$$\left.2\,\sqrt{\text{Sec}[c+d\,x]}\,\left(2\,(3\,A+C)\,\text{Cos}[d\,x]\,\text{Csc}[c]-2\,(A+C)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)$$

Problem 1187: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\sqrt{\text{Sec}[c+d\,x]}}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 4, 123 leaves, 5 steps):

$$\frac{(A+3C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\,d}+\frac{(A-C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\,d}-\frac{(A+C)\ \text{Sin}[c+dx]}{d\,(a+a\,\text{Cos}[c+dx])\sqrt{\text{Sec}[c+dx]}}$$

Result (type 5, 401 leaves):

$$\frac{1}{2\,a\,d\,(1+\text{Cos}[c+dx])}\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2\left(2\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Csc}[c]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)+6\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Csc}[c]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)-\frac{1}{\sqrt{\text{Sec}[c+dx]}}2\left((A+2C)\ \text{Cos}\left[\frac{1}{2}(c-dx)\right]+C\,\text{Cos}\left[\frac{1}{2}(3c+dx)\right]\right)\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+dx)\right]+4A\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}-4C\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}\right)$$

Problem 1188: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+dx]^2}{(a+a\,\text{Cos}[c+dx])\sqrt{\text{Sec}[c+dx]}}\,dx$$

Optimal (type 4, 162 leaves, 6 steps):

$$-\frac{(A+3C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\,d}+\frac{(3A+5C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{3\,a\,d}-\frac{(A+C)\ \text{Sin}[c+dx]}{d\,(a+a\,\text{Cos}[c+dx])\ \text{Sec}[c+dx]^{3/2}}+\frac{(3A+5C)\ \text{Sin}[c+dx]}{3\,a\,d\sqrt{\text{Sec}[c+dx]}}$$

Result (type 5, 645 leaves):

$$-\left(\left(\left(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]^2\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(\sqrt{2}\,d\,(a+a\,\mathrm{Cos}[c+dx])\right)\right)-\left(3\,C\, 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]^2\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(\sqrt{2}\,d\,(a+a\,\mathrm{Cos}[c+dx])\right)+\left(A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\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\,(a+a\,\mathrm{Cos}[c+dx])\right)+\left(5\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\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(3\,d\,(a+a\,\mathrm{Cos}[c+dx])\right)+\frac{1}{a+a\,\mathrm{Cos}[c+dx]}\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\mathrm{Sec}[c+dx]}\left(\frac{(A+2C+C\,\mathrm{Cos}[2c])\,\mathrm{Cos}[dx]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{d}+\frac{2\,C\,\mathrm{Cos}[2dx]\,\mathrm{Sin}[2c]}{3d}-\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+C\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{d}-\frac{4\,C\,\mathrm{Cos}[c]\,\mathrm{Sin}[dx]}{d}+\frac{2\,C\,\mathrm{Cos}[2c]\,\mathrm{Sin}[2dx]}{3d}-\frac{2\,(A+C)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{d}\right)$$

Problem 1189: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\mathrm{Cos}[c+dx]^2}{(a+a\,\mathrm{Cos}[c+dx])\,\mathrm{Sec}[c+dx]^{3/2}}\,dx$$

Optimal (type 4, 199 leaves, 7 steps):

$$\frac{3\,(5A+7C)\,\sqrt{\text{Cos}[c+d x]}\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{5 a d}-\frac{(3A+5C)\,\sqrt{\text{Cos}[c+d x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{3 a d}-\frac{(A+C)\,\text{Sin}[c+d x]}{d\,(a+a\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]^{5/2}}+\frac{(5A+7C)\,\text{Sin}[c+d x]}{5 a d\,\text{Sec}[c+d x]^{3/2}}-\frac{(3A+5C)\,\text{Sin}[c+d x]}{3 a d\,\sqrt{\text{Sec}[c+d x]}}$$

Result (type 5, 438 leaves):

$$\frac{1}{60 a d\,(1+\text{Cos}[c+d x])}\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\left(180\sqrt{2}\,A\,e^{-i(2c+d x)}\sqrt{\frac{e^{i(c+d x)}}{1+e^{2i(c+d x)}}}\,\text{Csc}[c]\left(1+e^{2i(c+d x)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+d x)}\right]\right)+252\sqrt{2}\,C\,e^{-i(2c+d x)}\sqrt{\frac{e^{i(c+d x)}}{1+e^{2i(c+d x)}}}\,\text{Csc}[c]\left(1+e^{2i(c+d x)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+d x)}\right]\right)-120 A\sqrt{\text{Cos}[c+d x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}-200 C\sqrt{\text{Cos}[c+d x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}-\frac{1}{\sqrt{\text{Sec}[c+d x]}}2\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{1}{2}(c+d x)\right]\left((60A+83C)\,\text{Cos}\left[\frac{1}{2}(c-d x)\right]+(30A+43C)\,\text{Cos}\left[\frac{1}{2}(3c+d x)\right]+C\,\text{Sin}[c]\left(7\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]-3\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]\right)\right)\right)$$

Problem 1190: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d x]^2}{(a+a\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]^{5/2}}\,dx$$

Optimal (type 4, 232 leaves, 8 steps):

$$-\frac{1}{5\,a\,d}3\,\left(5\,A+7\,C\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,\left(c+d\,x\right),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}\,+$$
$$\frac{5\,\left(7\,A+9\,C\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{21\,a\,d}-$$
$$\frac{\left(A+C\right)\,\text{Sin}[c+d\,x]}{d\,\left(a+a\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^{7/2}}+\frac{\left(7\,A+9\,C\right)\,\text{Sin}[c+d\,x]}{7\,a\,d\,\text{Sec}[c+d\,x]^{5/2}}-$$
$$\frac{\left(5\,A+7\,C\right)\,\text{Sin}[c+d\,x]}{5\,a\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{5\,\left(7\,A+9\,C\right)\,\text{Sin}[c+d\,x]}{21\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 751 leaves) :

$$
-\left(\left(\left(3\,A\,e^{-i\,(2c+d x)}\,\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\;\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\right.\right.\right.
$$

$$
\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)
$$

$$
\left.\left.\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(\sqrt{2}\;d\;\left(a+a\,\text{Cos}[c+d x]\right)\right)\right)-
$$

$$
\left(21\,C\,e^{-i\,(2c+d x)}\,\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\;\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\right.
$$

$$
\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)
$$

$$
\left.\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5\,\sqrt{2}\;d\;\left(a+a\,\text{Cos}[c+d x]\right)\right)+
$$

$$
\left(5\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{\text{Cos}[c+d x]}\;\text{Csc}\left[\frac{c}{2}\right]\;\text{EllipticF}\left[\frac{1}{2}\left(c+d x\right),2\right]\right.
$$

$$
\left.\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\;\text{Sin}[c]\right)\Big/\left(3\,d\,\left(a+a\,\text{Cos}[c+d x]\right)\right)+
$$

$$
\left(15\,C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{\text{Cos}[c+d x]}\;\text{Csc}\left[\frac{c}{2}\right]\;\text{EllipticF}\left[\frac{1}{2}\left(c+d x\right),2\right]\right.
$$

$$
\left.\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\;\text{Sin}[c]\right)\Big/\left(7\,d\,\left(a+a\,\text{Cos}[c+d x]\right)\right)+
$$

$$
\frac{1}{a+a\,\text{Cos}[c+d x]}\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\sqrt{\text{Sec}[c+d x]}
$$

$$
\left(\frac{1}{20\,d}\left(40\,A+51\,C+20\,A\,\text{Cos}[2\,c]+33\,C\,\text{Cos}[2\,c]\right)\text{Cos}[d\,x]\;\text{Csc}\left[\frac{c}{2}\right]\;\text{Sec}\left[\frac{c}{2}\right]+\right.
$$

$$
\frac{\left(14\,A+27\,C\right)\,\text{Cos}[2\,d\,x]\;\text{Sin}[2\,c]}{21\,d}-\frac{C\,\text{Cos}[3\,d\,x]\;\text{Sin}[3\,c]}{5\,d}+
$$

$$
\frac{C\,\text{Cos}[4\,d\,x]\;\text{Sin}[4\,c]}{14\,d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\,\left(A\,\text{Sin}\left[\frac{d x}{2}\right]+C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{d}-
$$

$$
\frac{\left(20\,A+33\,C\right)\,\text{Cos}[c]\;\text{Sin}[d\,x]}{5\,d}+\frac{\left(14\,A+27\,C\right)\,\text{Cos}[2\,c]\;\text{Sin}[2\,d\,x]}{21\,d}-
$$

$$
\left.\frac{C\,\text{Cos}[3\,c]\;\text{Sin}[3\,d\,x]}{5\,d}+\frac{C\,\text{Cos}[4\,c]\;\text{Sin}[4\,d\,x]}{14\,d}-\frac{2\,\left(A+C\right)\,\text{Tan}\left[\frac{c}{2}\right]}{d}\right)
$$

Problem 1191: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\left(A + C \,\text{Cos}[c + d\,x]^2\right) \,\text{Sec}[c + d\,x]^{5/2}}{\left(a + a \,\text{Cos}[c + d\,x]\right)^2} \, dx$$

Optimal (type 4, 229 leaves, 8 steps):

$$\frac{(7\,A + C)\,\sqrt{\text{Cos}[c + d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{a^2\,d} + \frac{2\,(5\,A + C)\,\sqrt{\text{Cos}[c + d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{3\,a^2\,d} - \frac{(7\,A + C)\,\sqrt{\text{Sec}[c + d\,x]}\,\,\text{Sin}[c + d\,x]}{a^2\,d} + \frac{2\,(5\,A + C)\,\text{Sec}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x]}{3\,a^2\,d} - \frac{(7\,A + C)\,\text{Sec}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x]}{3\,a^2\,d\,\left(1 + \text{Cos}[c + d\,x]\right)} - \frac{(A + C)\,\text{Sec}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x]}{3\,d\,\left(a + a\,\text{Cos}[c + d\,x]\right)^2}$$

Result (type 5, 709 leaves):

$$\left(7\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(d\left(a+a\,\text{Cos}[c+dx]\right)^2\right)+$$

$$\left(\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(d\left(a+a\,\text{Cos}[c+dx]\right)^2\right)+$$

$$\left(20\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c]\right)\Big/\left(3d\left(a+a\,\text{Cos}[c+dx]\right)^2\right)+$$

$$\left(4\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c]\right)\Big/\left(3d\left(a+a\,\text{Cos}[c+dx]\right)^2\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Sec}[c+dx]}\right.$$

$$\left(-\frac{2(7A+C)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\right.$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(4\,A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+$$

$$\frac{8\,A\,\text{Sec}[c]\,\text{Sec}[c+dx]\,\text{Sin}[dx]}{3d}+\frac{8\left(A+5\,A\,\text{Cos}[c]+C\,\text{Cos}[c]\right)\text{Sec}[c]\,\text{Tan}\left[\frac{c}{2}\right]}{3d}+$$

$$\left.\left.\frac{2(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+dx]\right)^2$$

Problem 1192: Result unnecessarily involves higher level functions.

$$\int\frac{\left(A+C\,\text{Cos}[c+dx]^2\right)\text{Sec}[c+dx]^{3/2}}{\left(a+a\,\text{Cos}[c+dx]\right)^2}\,dx$$

Optimal (type 4, 195 leaves, 7 steps):

$$-\frac{4\,A\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^2\,d}-\frac{(5\,A-C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d}+\frac{4\,A\,\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{a^2\,d}-\frac{(5\,A-C)\,\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Cos}[c+d\,x])}-\frac{(A+C)\,\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 286 leaves):

$$-\frac{1}{12\,a^2\,d\,(1+\text{Cos}[c+d\,x])^2}\,e^{-3\,i\,(c+d\,x)}\,\left(1+e^{i\,(c+d\,x)}\right)\Bigg((5\,A-C)\,e^{i\,(c+d\,x)}\left(1+e^{i\,(c+d\,x)}\right)^3\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]-i\,\Big(12\,A+31\,A\,e^{i\,(c+d\,x)}+C\,e^{i\,(c+d\,x)}+29\,A\,e^{2\,i\,(c+d\,x)}-C\,e^{2\,i\,(c+d\,x)}+19\,A\,e^{3\,i\,(c+d\,x)}+C\,e^{3\,i\,(c+d\,x)}+5\,A\,e^{4\,i\,(c+d\,x)}-C\,e^{4\,i\,(c+d\,x)}-12\,A\,\left(1+e^{i\,(c+d\,x)}\right)^3\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\Big)\Bigg)\sqrt{\text{Sec}[c+d\,x]}$$

Problem 1193: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\sqrt{\text{Sec}[c+d\,x]}}{(a+a\,\text{Cos}[c+d\,x])^2}\,dx$$

Optimal (type 4, 165 leaves, 6 steps):

$$\frac{(A-C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^2\,d}+\frac{2\,(A+C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d}-\frac{(A-C)\,\text{Sin}[c+d\,x]}{a^2\,d\,(1+\text{Cos}[c+d\,x])\,\sqrt{\text{Sec}[c+d\,x]}}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 681 leaves):

$$\Bigg(\sqrt{2}\ A\ e^{-i\ (2\ c+d\ x)}\ \sqrt{\frac{e^{i\ (c+d\ x)}}{1+e^{2\ i\ (c+d\ x)}}}\ \text{Cos}\Big[\frac{c}{2}+\frac{d\ x}{2}\Big]^4\ \text{Csc}\Big[\frac{c}{2}\Big]\ \Big(1+e^{2\ i\ (c+d\ x)}+\big(-1+e^{2\ i\ c}\big)\ \sqrt{1+e^{2\ i\ (c+d\ x)}}\ \text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\ i\ (c+d\ x)}\Big]\Big)\ \text{Sec}\Big[\frac{c}{2}\Big]\Bigg)\Big/\Big(d\ \big(a+a\ \text{Cos}[c+d\ x]\big)^2\Big)-$$

$$\Bigg(\sqrt{2}\ C\ e^{-i\ (2\ c+d\ x)}\ \sqrt{\frac{e^{i\ (c+d\ x)}}{1+e^{2\ i\ (c+d\ x)}}}\ \text{Cos}\Big[\frac{c}{2}+\frac{d\ x}{2}\Big]^4\ \text{Csc}\Big[\frac{c}{2}\Big]\ \Big(1+e^{2\ i\ (c+d\ x)}+\big(-1+e^{2\ i\ c}\big)\ \sqrt{1+e^{2\ i\ (c+d\ x)}}\ \text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\ i\ (c+d\ x)}\Big]\Big)\ \text{Sec}\Big[\frac{c}{2}\Big]\Bigg)\Big/\Big(d\ \big(a+a\ \text{Cos}[c+d\ x]\big)^2\Big)+$$

$$\Big(4\ A\ \text{Cos}\Big[\frac{c}{2}+\frac{d\ x}{2}\Big]^4\ \sqrt{\text{Cos}[c+d\ x]}\ \text{Csc}\Big[\frac{c}{2}\Big]\ \text{EllipticF}\Big[\frac{1}{2}\ (c+d\ x),2\Big]\ \text{Sec}\Big[\frac{c}{2}\Big]\ \sqrt{\text{Sec}[c+d\ x]}\ \text{Sin}[c]\Big)\Big/\Big(3\ d\ \big(a+a\ \text{Cos}[c+d\ x]\big)^2\Big)+$$

$$\Big(4\ C\ \text{Cos}\Big[\frac{c}{2}+\frac{d\ x}{2}\Big]^4\ \sqrt{\text{Cos}[c+d\ x]}\ \text{Csc}\Big[\frac{c}{2}\Big]\ \text{EllipticF}\Big[\frac{1}{2}\ (c+d\ x),2\Big]\ \text{Sec}\Big[\frac{c}{2}\Big]\ \sqrt{\text{Sec}[c+d\ x]}\ \text{Sin}[c]\Big)\Big/\Big(3\ d\ \big(a+a\ \text{Cos}[c+d\ x]\big)^2\Big)+\Bigg(\text{Cos}\Big[\frac{c}{2}+\frac{d\ x}{2}\Big]^4\ \sqrt{\text{Sec}[c+d\ x]}$$

$$\Bigg(-\frac{2\ (A-C)\ \text{Cos}[d\ x]\ \text{Csc}\big[\frac{c}{2}\big]\ \text{Sec}\big[\frac{c}{2}\big]}{d}+\frac{8\ \text{Sec}\big[\frac{c}{2}\big]\ \text{Sec}\big[\frac{c}{2}+\frac{d\ x}{2}\big]\ \big(A\ \text{Sin}\big[\frac{d\ x}{2}\big]-2\ C\ \text{Sin}\big[\frac{d\ x}{2}\big]\big)}{3\ d}+\frac{2\ \text{Sec}\big[\frac{c}{2}\big]\ \text{Sec}\big[\frac{c}{2}+\frac{d\ x}{2}\big]^3\ \big(A\ \text{Sin}\big[\frac{d\ x}{2}\big]+C\ \text{Sin}\big[\frac{d\ x}{2}\big]\big)}{3\ d}+\frac{8\ (A-2\ C)\ \text{Tan}\big[\frac{c}{2}\big]}{3\ d}+\frac{2\ (A+C)\ \text{Sec}\big[\frac{c}{2}+\frac{d\ x}{2}\big]^2\ \text{Tan}\big[\frac{c}{2}\big]}{3\ d}\Bigg)\Bigg)\Big/\big(a+a\ \text{Cos}[c+d\ x]\big)^2$$

Problem 1194: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+C\ \text{Cos}[c+d\ x]^2}{\big(a+a\ \text{Cos}[c+d\ x]\big)^2\ \sqrt{\text{Sec}[c+d\ x]}}\ dx$$

Optimal (type 4, 166 leaves, 6 steps):

$$\frac{4\,C\,\sqrt{\mathrm{Cos}[c+d\,x]}\ \mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{a^2\,d}+\frac{(A-5\,C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\ \mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,a^2\,d}-\frac{(A+C)\,\mathrm{Sin}[c+d\,x]}{3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^{3/2}}+\frac{(A-5\,C)\,\mathrm{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\mathrm{Cos}[c+d\,x])\,\sqrt{\mathrm{Sec}[c+d\,x]}}$$

Result (type 5, 539 leaves):

$$\Bigg(4\sqrt{2}\,C\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\ \mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\ \mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\Bigg)\Big/\left(d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\right)+$$

$$\left(2\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Cos}[c+d\,x]}\ \mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\sqrt{\mathrm{Sec}[c+d\,x]}\ \mathrm{Sin}[c]\right)\Big/\left(3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\right)-$$

$$\left(10\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Cos}[c+d\,x]}\ \mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\sqrt{\mathrm{Sec}[c+d\,x]}\ \mathrm{Sin}[c]\right)\Big/\left(3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^2\right)+$$

$$\Bigg(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Sec}[c+d\,x]}\,\Bigg(-\frac{2\,C\,(3+\mathrm{Cos}[2\,c])\,\mathrm{Cos}[d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{d}-\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+7\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{8\,C\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{d}+\frac{4\,(A+7\,C)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}-\frac{2\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\Bigg)\Bigg)\Big/(a+a\,\mathrm{Cos}[c+d\,x])^2$$

Problem 1195: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\mathrm{Cos}[c+d\,x]^2}{(a+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 201 leaves, 7 steps):

$$-\frac{(A+7C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a^2 d}+\frac{2(A+5C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{3a^2 d}-\frac{(A+C)\ \text{Sin}[c+dx]}{3d\,(a+a\,\text{Cos}[c+dx])^2\,\text{Sec}[c+dx]^{5/2}}-\frac{(A+7C)\ \text{Sin}[c+dx]}{3a^2 d\,(1+\text{Cos}[c+dx])\,\text{Sec}[c+dx]^{3/2}}+\frac{2(A+5C)\ \text{Sin}[c+dx]}{3a^2 d\sqrt{\text{Sec}[c+dx]}}$$

Result (type 5, 738 leaves) :

$$-\left(\left(\left(\sqrt{2}\, A\, e^{-i\,(2c+d x)} \sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i\,(c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right]\right) \Big/ \left(d\,(a+a\,\text{Cos}[c+d x])^2\right)\right) -$$

$$\left(7\sqrt{2}\, C\, e^{-i\,(2c+d x)} \sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i\,(c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right]\right) \Big/ \left(d\,(a+a\,\text{Cos}[c+d x])^2\right) +$$

$$\left(4 A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right] \sqrt{\text{Sec}[c+d x]}\, \text{Sin}[c]\right) \Big/ \left(3 d\,(a+a\,\text{Cos}[c+d x])^2\right) +$$

$$\left(20 C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right] \sqrt{\text{Sec}[c+d x]}\, \text{Sin}[c]\right) \Big/ \left(3 d\,(a+a\,\text{Cos}[c+d x])^2\right) +$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \sqrt{\text{Sec}[c+d x]} \left(\frac{2\,(A+5C+2C\,\text{Cos}[2c])\,\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d} + \frac{4C\,\text{Cos}[2 d x]\,\text{Sin}[2c]}{3d} + \frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(A\,\text{Sin}\left[\frac{d x}{2}\right]+C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3d} - \frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(2A\,\text{Sin}\left[\frac{d x}{2}\right]+5C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3d} - \frac{16C\,\text{Cos}[c]\,\text{Sin}[d x]}{d} + \frac{4C\,\text{Cos}[2c]\,\text{Sin}[2 d x]}{3d} - \frac{8\,(2A+5C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d} + \frac{2\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right) \Big/ (a+a\,\text{Cos}[c+d x])^2$$

Problem 1196: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+C\,\text{Cos}[c+d x]^2}{(a+a\,\text{Cos}[c+d x])^2\,\text{Sec}[c+d x]^{5/2}}\,dx$$

Optimal (type 4, 236 leaves, 8 steps):

$$\frac{4\,(5\,A+14\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{5\,a^2\,d}-\frac{5\,(A+3\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^{7/2}}-\frac{(A+3\,C)\,\text{Sin}[c+d\,x]}{a^2\,d\,(1+\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{5/2}}+\frac{4\,(5\,A+14\,C)\,\text{Sin}[c+d\,x]}{15\,a^2\,d\,\text{Sec}[c+d\,x]^{3/2}}-\frac{5\,(A+3\,C)\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 791 leaves):

$$\left(4\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(d\left(a+a\,\text{Cos}[c+dx]\right)^2\right)+$$

$$\left(56\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5d\left(a+a\,\text{Cos}[c+dx]\right)^2\right)-$$

$$\left(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c]\right)\Big/\left(3d\left(a+a\,\text{Cos}[c+dx]\right)^2\right)-$$

$$\left(10\,C\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c]\right)\Big/\left(d\left(a+a\,\text{Cos}[c+dx]\right)^2\right)+$$

$$\frac{1}{\left(a+a\,\text{Cos}[c+dx]\right)^2}\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\sqrt{\text{Sec}[c+dx]}\left(-\frac{1}{10d}\left(60A+151C+20A\,\text{Cos}[2c]+73C\,\text{Cos}[2c]\right)\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]-\frac{8C\,\text{Cos}[2dx]\,\text{Sin}[2c]}{3d}+\frac{2C\,\text{Cos}[3dx]\,\text{Sin}[3c]}{5d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(7A\,\text{Sin}\left[\frac{dx}{2}\right]+13C\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{2(20A+73C)\,\text{Cos}[c]\,\text{Sin}[dx]}{5d}-\frac{8C\,\text{Cos}[2c]\,\text{Sin}[2dx]}{3d}+\frac{2C\,\text{Cos}[3c]\,\text{Sin}[3dx]}{5d}+\frac{4(7A+13C)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}-\frac{2(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)$$

Problem 1197: Result unnecessarily involves higher level functions and more

than twice size of optimal antiderivative.

$$\int \frac{\left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{5/2}}{\left(a + a \operatorname{Cos}[c + d x]\right)^3} \, dx$$

Optimal (type 4, 282 leaves, 9 steps):

$$\frac{(119 A + 9 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{10 a^3 d} + \frac{(11 A + C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{2 a^3 d} - \frac{(119 A + 9 C) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{10 a^3 d} + \frac{(11 A + C) \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{2 a^3 d} - \frac{(A + C) \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{5 d \left(a + a \operatorname{Cos}[c + d x]\right)^3} - \frac{2 A \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{3 a d \left(a + a \operatorname{Cos}[c + d x]\right)^2} - \frac{(119 A + 9 C) \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{30 d \left(a^3 + a^3 \operatorname{Cos}[c + d x]\right)}$$

Result (type 5, 802 leaves):

$$\left(119 \sqrt{2}\, A\, e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right]\right) \Big/ \left(5 d \left(a+a \text{Cos}[c+d x]\right)^3\right)+$$

$$\left(9 \sqrt{2}\, C\, e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right) \text{Sec}\left[\frac{c}{2}\right]\right) \Big/ \left(5 d \left(a+a \text{Cos}[c+d x]\right)^3\right)+$$

$$\left(22 A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right] \sqrt{\text{Sec}[c+d x]}\, \text{Sin}[c]\right) \Big/ \left(d \left(a+a \text{Cos}[c+d x]\right)^3\right)+$$

$$\left(2 C \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+d x),2\right] \text{Sec}\left[\frac{c}{2}\right] \sqrt{\text{Sec}[c+d x]}\, \text{Sin}[c]\right) \Big/ \left(d \left(a+a \text{Cos}[c+d x]\right)^3\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \sqrt{\text{Sec}[c+d x]}\right.$$

$$\left(-\frac{2 (119 A+9 C) \text{Cos}[d x] \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]}{5 d}+\frac{2 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \left(A \text{Sin}\left[\frac{d x}{2}\right]+C \text{Sin}\left[\frac{d x}{2}\right]\right)}{5 d}+\right.$$

$$\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(13 A \text{Sin}\left[\frac{d x}{2}\right]+3 C \text{Sin}\left[\frac{d x}{2}\right]\right)}{15 d}+$$

$$\frac{4 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(29 A \text{Sin}\left[\frac{d x}{2}\right]+3 C \text{Sin}\left[\frac{d x}{2}\right]\right)}{3 d}+\frac{16 A \text{Sec}[c] \text{Sec}[c+d x] \text{Sin}[d x]}{3 d}+$$

$$\frac{4 (4 A+33 A \text{Cos}[c]+3 C \text{Cos}[c]) \text{Sec}[c] \text{Tan}\left[\frac{c}{2}\right]}{3 d}+\frac{4 (13 A+3 C) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Tan}\left[\frac{c}{2}\right]}{15 d}+$$

$$\left.\left.\frac{2 (A+C) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Tan}\left[\frac{c}{2}\right]}{5 d}\right)\right) \Big/ \left(a+a \text{Cos}[c+d x]\right)^3$$

Problem 1198: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\left(A + C\,\text{Cos}[c + d\,x]^2\right)\,\text{Sec}[c + d\,x]^{3/2}}{\left(a + a\,\text{Cos}[c + d\,x]\right)^3}\,dx$$

Optimal (type 4, 259 leaves, 8 steps):

$$-\frac{(49\,A - C)\,\sqrt{\text{Cos}[c + d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{10\,a^3\,d} - \frac{(13\,A - C)\,\sqrt{\text{Cos}[c + d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{6\,a^3\,d} + \frac{(49\,A - C)\,\sqrt{\text{Sec}[c + d\,x]}\,\,\text{Sin}[c + d\,x]}{10\,a^3\,d} - \frac{(A + C)\,\sqrt{\text{Sec}[c + d\,x]}\,\,\text{Sin}[c + d\,x]}{5\,d\,\left(a + a\,\text{Cos}[c + d\,x]\right)^3} - \frac{2\,(4\,A - C)\,\sqrt{\text{Sec}[c + d\,x]}\,\,\text{Sin}[c + d\,x]}{15\,a\,d\,\left(a + a\,\text{Cos}[c + d\,x]\right)^2} - \frac{(13\,A - C)\,\sqrt{\text{Sec}[c + d\,x]}\,\,\text{Sin}[c + d\,x]}{6\,d\,\left(a^3 + a^3\,\text{Cos}[c + d\,x]\right)}$$

Result (type 5, 777 leaves):

$$-\left(\left(\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(\sqrt{2}\,C\,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(2\,C\,\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(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Sec}[c+dx]}\left(\frac{2\,(49A-C)\,\mathrm{Cos}[dx]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{5d}-\frac{8\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(4\,A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-C\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{15d}-\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(13\,A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-C\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-\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]+C\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{5d}-\frac{4\,(13A-C)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3d}-\frac{8\,(4A-C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15d}-\frac{2\,(A+C)\,\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 1199: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+C\,\mathrm{Cos}[c+dx]^2\right)\sqrt{\mathrm{Sec}[c+dx]}}{\left(a+a\,\mathrm{Cos}[c+dx]\right)^3}\,dx$$

Optimal (type 4, 224 leaves, 7 steps):

$$\frac{(9\,A-C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}+\frac{(3\,A+C)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{6\,a^3\,d}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3\,\sqrt{\text{Sec}[c+d\,x]}}-\frac{2\,(3\,A-2\,C)\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2\,\sqrt{\text{Sec}[c+d\,x]}}-\frac{(9\,A-C)\,\text{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 772 leaves):

$$\left(9\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5d\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\right)-$$

$$\left(\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5d\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\right)+$$

$$\left(2A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\sqrt{\mathrm{Sec}[c+dx]}\,\mathrm{Sin}[c]\right)\Big/\left(d\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\right)+$$

$$\left(2C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\sqrt{\mathrm{Sec}[c+dx]}\,\mathrm{Sin}[c]\right)\Big/\left(3d\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\right)+\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Sec}[c+dx]}\right.$$

$$\left(-\frac{2(9A-C)\,\mathrm{Cos}[dx]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{5d}+\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(3A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-7C\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{15d}+\right.$$

$$\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+C\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{5d}+$$

$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(3A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+C\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{4(3A+C)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3d}+$$

$$\left.\left.\frac{4(3A-7C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15d}+\frac{2(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5d}\right)\right)\Big/\left(a+a\,\mathrm{Cos}[c+dx]\right)^3$$

Problem 1200: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\mathrm{Cos}[c+dx]^2}{\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\sqrt{\mathrm{Sec}[c+dx]}}\,dx$$

Optimal (type 4, 220 leaves, 7 steps):

$$\frac{(A-9C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{10a^3d}+\frac{(A+3C)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{6a^3d}-\frac{(A+C)\,\text{Sin}[c+dx]}{5d\,(a+a\,\text{Cos}[c+dx])^3\,\text{Sec}[c+dx]^{3/2}}+\frac{2\,(2A-3C)\,\text{Sin}[c+dx]}{15ad\,(a+a\,\text{Cos}[c+dx])^2\sqrt{\text{Sec}[c+dx]}}-\frac{(A-9C)\,\text{Sin}[c+dx]}{10d\,(a^3+a^3\,\text{Cos}[c+dx])\sqrt{\text{Sec}[c+dx]}}$$

Result (type 5, 767 leaves):

$$\left(\sqrt{2}\ A\, e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5 d\left(a+a\,\text{Cos}[c+d x]\right)^3\right)-$$

$$\left(9\sqrt{2}\ C\, e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5 d\left(a+a\,\text{Cos}[c+d x]\right)^3\right)+$$

$$\left(2 A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c]\right)\Big/\left(3 d\left(a+a\,\text{Cos}[c+d x]\right)^3\right)+$$

$$\left(2 C\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\sqrt{\text{Cos}[c+d x]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c]\right)\Big/\left(d\left(a+a\,\text{Cos}[c+d x]\right)^3\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\sqrt{\text{Sec}[c+d x]}\right.$$

$$\left(-\frac{2(A-9C)\,\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5 d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(A\,\text{Sin}\left[\frac{d x}{2}\right]-9 C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3 d}-\right.$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d x}{2}\right]+C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{5 d}+$$

$$\frac{8\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d x}{2}\right]+6 C\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{15 d}+\frac{4(A-9C)\,\text{Tan}\left[\frac{c}{2}\right]}{3 d}+$$

$$\left.\left.\frac{8(A+6C)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15 d}-\frac{2(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5 d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d x]\right)^3$$

Problem 1201: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d x]^2}{\left(a+a\,\text{Cos}[c+d x]\right)^3\text{Sec}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 218 leaves, 7 steps):

$$-\frac{(A-49\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}+\frac{(A-13\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{6\,a^3\,d}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^{5/2}}+\frac{2\,(A-4\,C)\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^{3/2}}+\frac{(A-13\,C)\,\text{Sin}[c+d\,x]}{6\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 793 leaves):

$$-\left(\left(\left(\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\right.\right.\right.$$
$$\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)$$
$$\left.\mathrm{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5\,d\,\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\right)+$$
$$\left(49\sqrt{2}\,C\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)$$
$$\left.\mathrm{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5\,d\,\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\right)+$$
$$\left(2\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\right.$$
$$\left.\mathrm{Sec}\left[\frac{c}{2}\right]\sqrt{\mathrm{Sec}[c+dx]}\,\mathrm{Sin}[c]\right)\Big/\left(3\,d\,\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\right)-$$
$$\left(26\,C\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\right.$$
$$\left.\mathrm{Sec}\left[\frac{c}{2}\right]\sqrt{\mathrm{Sec}[c+dx]}\,\mathrm{Sin}[c]\right)\Big/\left(3\,d\,\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\right)+$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Sec}[c+dx]}\left(-\frac{2\left(-A+39\,C+10\,C\,\mathrm{Cos}[2c]\right)\mathrm{Cos}[dx]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{5\,d}+\right.\right.$$
$$\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+C\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{5\,d}-$$
$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(7\,A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+17\,C\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{15\,d}+$$
$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+23\,C\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{3\,d}+\frac{16\,C\,\mathrm{Cos}[c]\,\mathrm{Sin}[dx]}{d}+$$
$$\frac{4\,(A+23\,C)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}-\frac{4\,(7\,A+17\,C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}+$$
$$\left.\left.\left.\frac{2\,(A+C)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\right)$$

Problem 1202: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A + C \operatorname{Cos}[c + d x]^2}{\left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}[c + d x]^{5/2}} \, dx$$

Optimal (type 4, 249 leaves, 8 steps):

$$-\frac{1}{10 a^3 d}\left(9 A + 119 C\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} \left(c + d x\right), 2\right] \sqrt{\operatorname{Sec}[c + d x]} + \frac{\left(A + 11 C\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} \left(c + d x\right), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{2 a^3 d} - \frac{\left(A + C\right) \operatorname{Sin}[c + d x]}{5 d \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}[c + d x]^{7/2}} - \frac{2 C \operatorname{Sin}[c + d x]}{3 a d \left(a + a \operatorname{Cos}[c + d x]\right)^2 \operatorname{Sec}[c + d x]^{5/2}} - \frac{\left(9 A + 119 C\right) \operatorname{Sin}[c + d x]}{30 d \left(a^3 + a^3 \operatorname{Cos}[c + d x]\right) \operatorname{Sec}[c + d x]^{3/2}} + \frac{\left(A + 11 C\right) \operatorname{Sin}[c + d x]}{2 a^3 d \sqrt{\operatorname{Sec}[c + d x]}}$$

Result (type 5, 826 leaves):

$$-\left(\left(\left(9\sqrt{2}\,A\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\operatorname{Csc}\left[\frac{c}{2}\right]\right.\right.\right.$$

$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$

$$\left.\left.\operatorname{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5\,d\,\left(a+a\operatorname{Cos}[c+d\,x]\right)^3\right)\right)-$$

$$\left(119\sqrt{2}\,C\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\operatorname{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$

$$\left.\operatorname{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5\,d\,\left(a+a\operatorname{Cos}[c+d\,x]\right)^3\right)+$$

$$\left(2\,A\operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\operatorname{Cos}[c+d\,x]}\,\operatorname{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\right.$$

$$\left.\operatorname{Sec}\left[\frac{c}{2}\right]\sqrt{\operatorname{Sec}[c+d\,x]}\,\operatorname{Sin}[c]\right)\Big/\left(d\,\left(a+a\operatorname{Cos}[c+d\,x]\right)^3\right)+$$

$$\left(22\,C\operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\operatorname{Cos}[c+d\,x]}\,\operatorname{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\operatorname{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left.\sqrt{\operatorname{Sec}[c+d\,x]}\,\operatorname{Sin}[c]\right)\Big/\left(d\,\left(a+a\operatorname{Cos}[c+d\,x]\right)^3\right)+\frac{1}{\left(a+a\operatorname{Cos}[c+d\,x]\right)^3}$$

$$\operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\operatorname{Sec}[c+d\,x]}\,\left(\frac{2\,\left(9\,A+89\,C+30\,C\operatorname{Cos}[2\,c]\right)\operatorname{Cos}[d\,x]\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}\right]}{5\,d}+\right.$$

$$\frac{8\,C\operatorname{Cos}[2\,d\,x]\operatorname{Sin}[2\,c]}{3\,d}-\frac{2\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\operatorname{Sin}\left[\frac{d\,x}{2}\right]+C\operatorname{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$

$$\frac{8\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(6\,A\operatorname{Sin}\left[\frac{d\,x}{2}\right]+11\,C\operatorname{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-$$

$$\frac{4\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(9\,A\operatorname{Sin}\left[\frac{d\,x}{2}\right]+43\,C\operatorname{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-$$

$$\frac{48\,C\operatorname{Cos}[c]\operatorname{Sin}[d\,x]}{d}+\frac{8\,C\operatorname{Cos}[2\,c]\operatorname{Sin}[2\,d\,x]}{3\,d}-\frac{4\,(9\,A+43\,C)\operatorname{Tan}\left[\frac{c}{2}\right]}{3\,d}+$$

$$\left.\frac{8\,(6\,A+11\,C)\operatorname{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\operatorname{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{2\,(A+C)\operatorname{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\operatorname{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

Problem 1203: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A + C \operatorname{Cos}[c + d x]^2}{(a + a \operatorname{Cos}[c + d x])^3 \operatorname{Sec}[c + d x]^{7/2}} \, dx$$

Optimal (type 4, 290 leaves, 9 steps):

$$\frac{7 (7 A + 33 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{10 a^3 d} - \frac{(13 A + 63 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{6 a^3 d} - \frac{(A + C) \operatorname{Sin}[c + d x]}{5 d (a + a \operatorname{Cos}[c + d x])^3 \operatorname{Sec}[c + d x]^{9/2}} - \frac{2 (A + 6 C) \operatorname{Sin}[c + d x]}{15 a d (a + a \operatorname{Cos}[c + d x])^2 \operatorname{Sec}[c + d x]^{7/2}} - \frac{(13 A + 63 C) \operatorname{Sin}[c + d x]}{10 d (a^3 + a^3 \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^{5/2}} + \frac{7 (7 A + 33 C) \operatorname{Sin}[c + d x]}{30 a^3 d \operatorname{Sec}[c + d x]^{3/2}} - \frac{(13 A + 63 C) \operatorname{Sin}[c + d x]}{6 a^3 d \sqrt{\operatorname{Sec}[c + d x]}}$$

Result (type 5, 870 leaves):

$$\left(49 \sqrt{2} A e^{-i (2 c + d x)} \sqrt{\frac{e^{i (c + d x)}}{1 + e^{2 i (c + d x)}}} \operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \operatorname{Csc}\left[\frac{c}{2}\right] \left(1 + e^{2 i (c + d x)} + \left(-1 + e^{2 i c}\right) \sqrt{1 + e^{2 i (c + d x)}} \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c + d x)}\right]\right) \operatorname{Sec}\left[\frac{c}{2}\right]\right) \Big/ \left(5 d (a + a \operatorname{Cos}[c + d x])^3\right) + \left(231 \sqrt{2} C e^{-i (2 c + d x)} \sqrt{\frac{e^{i (c + d x)}}{1 + e^{2 i (c + d x)}}} \operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \operatorname{Csc}\left[\frac{c}{2}\right] \left(1 + e^{2 i (c + d x)} + \left(-1 + e^{2 i c}\right) \sqrt{1 + e^{2 i (c + d x)}} \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c + d x)}\right]\right) \operatorname{Sec}\left[\frac{c}{2}\right]\right) \Big/ \left(5 d (a + a \operatorname{Cos}[c + d x])^3\right) - \left(26 A \operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \operatorname{Sec}\left[\frac{c}{2}\right] \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c]\right) \Big/ \left(3 d (a + a \operatorname{Cos}[c + d x])^3\right) - \left(42 C \operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \operatorname{Sec}\left[\frac{c}{2}\right] \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c]\right) \Big/ \left(d (a + a \operatorname{Cos}[c + d x])^3\right) + \frac{1}{(a + a \operatorname{Cos}[c + d x])^3} \operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \sqrt{\operatorname{Sec}[c + d x]}$$

$$\left(-\frac{1}{5\,d}\left(78\,A+329\,C+20\,A\,\text{Cos}[2\,c]+133\,C\,\text{Cos}[2\,c]\right)\,\text{Cos}[d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]-\right.$$
$$\frac{8\,C\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{d}+\frac{4\,C\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{5\,d}+$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$
$$\frac{92\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+3\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(17\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+27\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+\frac{4\,(20\,A+133\,C)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{5\,d}-$$
$$\frac{8\,C\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{d}+\frac{4\,C\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{5\,d}+\frac{92\,(A+3\,C)\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}-$$
$$\left.\frac{4\,(17\,A+27\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{2\,(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

Problem 1207: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{5/2}\,dx$$

Optimal (type 3, 136 leaves, 5 steps):

$$\frac{2\,\sqrt{a}\,C\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}+$$
$$\frac{2\,a\,A\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{2\,A\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 3, 473 leaves):

$$\frac{1}{6\,d\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}\,i\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\,\text{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\,\text{Sec}[c+d\,x]^{3/2}\,\left(\text{Cos}\left[\frac{d\,x}{2}\right]+i\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)$$
$$\left(6\,C\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]\,\text{Cos}[c+d\,x]^2-\right.$$
$$3\,C\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]$$
$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right)\right]-$$
$$\left(\text{Cos}\left[\frac{d\,x}{2}\right]-i\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\,\left(3\,C\,\text{Cos}\left[\frac{d\,x}{2}\right]\right.$$
$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right)\right]+$$
$$3\,i\,C\,\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right)\right]$$
$$\left.\left.\text{Sin}\left[\frac{d\,x}{2}\right]+4\,i\,\sqrt{2}\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)\,\text{Sin}\left[\frac{3}{2}\,\left(c+d\,x\right)\right]\right)\right)$$

Problem 1208: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{3/2}\,dx$$

Optimal (type 3, 137 leaves, 5 steps):

$$\frac{\sqrt{a}\,\,C\,\text{ArcSin}\left[\frac{\sqrt{a}\,\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}}{d}-$$
$$\frac{a\,\left(2\,A-C\right)\,\text{Sin}[c+d\,x]}{d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{d}$$

Result (type 3, 620 leaves):

$$\frac{1}{4\,d\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}$$

$$\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\ \text{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\left(-i\,C\,\text{Cos}\left[c+\frac{d\,x}{2}\right]\right.$$

$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]-i$$

$$C\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]$$

$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]+$$

$$2\,i\,C\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right]$$

$$\text{Cos}[c+d\,x]\,\left(\text{Cos}\left[\frac{d\,x}{2}\right]+i\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)-$$

$$C\,\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$

$$\text{Sin}\left[c+\frac{d\,x}{2}\right]+8\,\sqrt{2}\,A\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-$$

$$2\,\sqrt{2}\,C\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+$$

$$2\,\sqrt{2}\,C\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\text{Sin}\left[\frac{3}{2}\,\left(c+d\,x\right)\right]+$$

$$C\,\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$

$$\left.\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]\right)$$

Problem 1209: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\sqrt{\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 144 leaves, 5 steps):

$$\frac{\sqrt{a}\,\left(8\,A+3\,C\right)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{4\,d}+$$

$$\frac{a\,C\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{C\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 489 leaves):

$$\frac{1}{8\sqrt{2}\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}}\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(-i\,(8\,A+3\,C)\,\text{Cos}\left[\frac{d\,x}{2}\right]\right.$$

$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]+$$

$$i\,(8\,A+3\,C)\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right]$$

$$\left(\text{Cos}\left[\frac{d\,x}{2}\right]+i\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+8\,A\,\text{Log}\left[\right.$$

$$\left.2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]+$$

$$3\,C\,\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$

$$\text{Sin}\left[\frac{d\,x}{2}\right]+4\,\sqrt{2}\,C\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$\left.2\,\sqrt{2}\,C\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\right)$$

Problem 1210: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 189 leaves, 6 steps):

$$\frac{\sqrt{a}\,(8\,A+5\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{8\,d}+$$

$$\frac{a\,C\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}}+$$

$$\frac{C\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a\,(8\,A+5\,C)\,\text{Sin}[c+d\,x]}{8\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 573 leaves):

$$\frac{1}{48\sqrt{2}\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}}$$

$$\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\,\text{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\,\left(-3\,i\,\left(8\,A+5\,C\right)\,\text{Cos}\left[\frac{d\,x}{2}\right]\right.$$

$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]+$$

$$3\,i\,\left(8\,A+5\,C\right)\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]$$

$$\left(\text{Cos}\left[\frac{d\,x}{2}\right]+i\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+24\,A\,\text{Log}\left[\right.$$

$$\left.2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]+$$

$$15\,C\,\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$

$$\text{Sin}\left[\frac{d\,x}{2}\right]+48\,\sqrt{2}\,A\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+$$

$$28\,\sqrt{2}\,C\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+$$

$$6\,\sqrt{2}\,C\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{3}{2}\,\left(c+d\,x\right)\right]+$$

$$\left.4\,\sqrt{2}\,C\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{5}{2}\,\left(c+d\,x\right)\right]\right)$$

Problem 1211: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 234 leaves, 7 steps):

$$\frac{\sqrt{a}\,\,\left(48\,A+35\,C\right)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}}{64\,d}+$$

$$\frac{a\,C\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\,\text{Sec}[c+d\,x]^{5/2}}+\frac{C\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{4\,d\,\text{Sec}[c+d\,x]^{5/2}}+$$

$$\frac{a\,\left(48\,A+35\,C\right)\,\text{Sin}[c+d\,x]}{96\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a\,\left(48\,A+35\,C\right)\,\text{Sin}[c+d\,x]}{64\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 1065 leaves):

$$\frac{1}{128}\left(48\,A+35\,C\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\,\left(\frac{1}{2}\,i\,\text{Sin}\left[\frac{c}{2}\right]\,\left(-\left(\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{Log}\left[\right.\right.\right.\right.\right.$$

$$\left.2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$

$$\left(\text{Cos}\left[\frac{c}{2}\right]-\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\text{i}\,d\,x}\left(\left(1+e^{2\,\text{i}\,d\,x}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\,\text{i}\,d\,x}\right)\text{Sin}[c]\right)}\Bigg)\Bigg/$$

$$\left(d\sqrt{2\left(1+e^{2\,\text{i}\,d\,x}\right)\text{Cos}[c]+2\,\text{i}\left(-1+e^{2\,\text{i}\,d\,x}\right)\text{Sin}[c]}\right)\Bigg)-$$

$$\Bigg(2\,\text{i}\,e^{\frac{\text{i}\,d\,x}{2}}\,\text{ArcTanh}\Big[\left(\text{Cos}\left[\frac{c}{2}\right]+\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,\text{i}\,d\,x}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\,\text{i}\,d\,x}\right)\text{Sin}[c]}\Big]$$

$$\left(\text{Cos}\left[\frac{c}{2}\right]+\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\text{i}\,d\,x}\left(\left(1+e^{2\,\text{i}\,d\,x}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\,\text{i}\,d\,x}\right)\text{Sin}[c]\right)}\Bigg)\Bigg/$$

$$\left(d\sqrt{2\left(1+e^{2\,\text{i}\,d\,x}\right)\text{Cos}[c]+2\,\text{i}\left(-1+e^{2\,\text{i}\,d\,x}\right)\text{Sin}[c]}\right)\Bigg)+$$

$$\frac{1}{2}\,\text{Cos}\left[\frac{c}{2}\right]\Bigg(-\Bigg(\Bigg(2\,\text{i}\,e^{\frac{\text{i}\,d\,x}{2}}\,\text{Log}\Big[2\Big(e^{\text{i}\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+\text{i}\,e^{\text{i}\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+$$

$$\sqrt{\left(1+e^{2\,\text{i}\,d\,x}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\,\text{i}\,d\,x}\right)\text{Sin}[c]}\Big)\Big]$$

$$\left(\text{Cos}\left[\frac{c}{2}\right]-\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\text{i}\,d\,x}\left(\left(1+e^{2\,\text{i}\,d\,x}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\,\text{i}\,d\,x}\right)\text{Sin}[c]\right)}\Bigg)\Bigg/$$

$$\left(d\sqrt{2\left(1+e^{2\,\text{i}\,d\,x}\right)\text{Cos}[c]+2\,\text{i}\left(-1+e^{2\,\text{i}\,d\,x}\right)\text{Sin}[c]}\right)\Bigg)+$$

$$\Bigg(2\,\text{i}\,e^{\frac{\text{i}\,d\,x}{2}}\,\text{ArcTanh}\Big[\left(\text{Cos}\left[\frac{c}{2}\right]+\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,\text{i}\,d\,x}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\,\text{i}\,d\,x}\right)\text{Sin}[c]}\Big]$$

$$\left(\text{Cos}\left[\frac{c}{2}\right]+\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\text{i}\,d\,x}\left(\left(1+e^{2\,\text{i}\,d\,x}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\,\text{i}\,d\,x}\right)\text{Sin}[c]\right)}\Bigg)\Bigg/$$

$$\left(d\sqrt{2\left(1+e^{2\,\text{i}\,d\,x}\right)\text{Cos}[c]+2\,\text{i}\left(-1+e^{2\,\text{i}\,d\,x}\right)\text{Sin}[c]}\right)\Bigg)\Bigg)+$$

$$\sqrt{a\,(1+\text{Cos}[c+d\,x])}\;\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]$$

$$\sqrt{\text{Sec}[c+d\,x]}$$

$$\Bigg(-\frac{(48\,A+41\,C)\,\text{Cos}\left[\frac{d\,x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{384\,d}+$$

$$\frac{(12\,A+11\,C)\,\text{Cos}\left[\frac{3\,d\,x}{2}\right]\text{Sin}\left[\frac{3\,c}{2}\right]}{48\,d}+$$

$$\frac{(16\,A+15\,C)\,\text{Cos}\left[\frac{5\,d\,x}{2}\right]\text{Sin}\left[\frac{5\,c}{2}\right]}{128\,d}+$$

$$\frac{C\,\text{Cos}\left[\frac{7\,d\,x}{2}\right]\text{Sin}\left[\frac{7\,c}{2}\right]}{48\,d}+$$

$$\frac{C\,\text{Cos}\left[\frac{9\,d\,x}{2}\right]\text{Sin}\left[\frac{9\,c}{2}\right]}{64\,d}-$$

$$\frac{(48\,A+41\,C)\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]}{384\,d}+$$

$$\frac{(12\,A+11\,C)\,\text{Cos}\left[\frac{3\,c}{2}\right]\text{Sin}\left[\frac{3\,d\,x}{2}\right]}{48\,d}+$$

$$\frac{(16\,A+15\,C)\,\text{Cos}\left[\frac{5\,c}{2}\right]\text{Sin}\left[\frac{5\,d\,x}{2}\right]}{128\,d}+$$

$$\left.\frac{C\,\text{Cos}\left[\frac{7c}{2}\right]\,\text{Sin}\left[\frac{7dx}{2}\right]}{48\,d}+\frac{C\,\text{Cos}\left[\frac{9c}{2}\right]\,\text{Sin}\left[\frac{9dx}{2}\right]}{64\,d}\right)$$

Problem 1215: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^{3/2}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{7/2}\,dx$$

Optimal (type 3, 183 leaves, 6 steps):

$$\frac{2\,a^{3/2}\,C\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}+$$
$$\frac{2\,a^2\,(4\,A+5\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}+$$
$$\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 3, 824 leaves):

$$\frac{1}{20\,d\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}}$$

$$\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\,\mathrm{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^{3}\,\sqrt{\mathrm{Sec}[c+d\,x]}$$

$$\left(5\,C\,e^{-\frac{1}{2}\,i\,d\,x}\,\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\,\right]\right.$$

$$\mathrm{Cos}\left[\frac{c}{2}\right]^{2}\,\left(i\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]-\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)+$$

$$5\,C\,e^{-\frac{1}{2}\,i\,d\,x}\,\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\,\right]$$

$$\mathrm{Sin}\left[\frac{c}{2}\right]^{2}\,\left(i\,\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]-\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)-5\,i\,C\,e^{-\frac{1}{2}\,i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]^{2}$$

$$\mathrm{Log}\left[2\,\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\,\right)\right]$$

$$\left(\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)-5\,i\,C\,e^{-\frac{1}{2}\,i\,d\,x}$$

$$\mathrm{Log}\left[2\,\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\,\right)\right]$$

$$\mathrm{Sin}\left[\frac{c}{2}\right]^{2}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]\right)+$$

$$24\,A\,\mathrm{Cos}\left[\frac{c}{2}\right]\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+$$

$$20\,C\,\mathrm{Cos}\left[\frac{c}{2}\right]\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+$$

$$24\,\sqrt{2}\,A\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\,\mathrm{Sin}\left[\frac{c}{2}\right]\,\sqrt{\mathrm{Cos}[c+d\,x]\,\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}+$$

$$20\,\sqrt{2}\,C\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\,\mathrm{Sin}\left[\frac{c}{2}\right]\,\sqrt{\mathrm{Cos}[c+d\,x]\,\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}+$$

$$12\,\sqrt{2}\,A\,\mathrm{Sec}[c+d\,x]\,\sqrt{\mathrm{Cos}[c+d\,x]\,\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+$$

$$\left.4\,\sqrt{2}\,A\,\mathrm{Sec}[c+d\,x]^{2}\,\sqrt{\mathrm{Cos}[c+d\,x]\,\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}\,\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)$$

Problem 1216: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\,\left(A+C\,\mathrm{Cos}[c+d\,x]^{2}\right)\,\mathrm{Sec}[c+d\,x]^{5/2}\,dx$$

Optimal (type 3, 181 leaves, 6 steps):

$$\frac{3\,a^{3/2}\,C\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}-$$
$$\frac{a^2\,(8\,A-3\,C)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}+$$
$$\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 3, 869 leaves):

$$\frac{1}{24\,d\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}$$
$$\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\sqrt{\text{Sec}[c+d\,x]}$$
$$\left(9\,C\,e^{-\frac{1}{2}\,i\,d\,x}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]\right.$$
$$\text{Cos}\left[\frac{c}{2}\right]^2\,\left(i\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)+$$
$$9\,C\,e^{-\frac{1}{2}\,i\,d\,x}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]$$
$$\text{Sin}\left[\frac{c}{2}\right]^2\,\left(i\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-9\,i\,C\,e^{-\frac{1}{2}\,i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]^2$$
$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$
$$\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-9\,i\,C\,e^{-\frac{1}{2}\,i\,d\,x}$$
$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$
$$\text{Sin}\left[\frac{c}{2}\right]^2\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)+$$
$$40\,A\,\text{Cos}\left[\frac{c}{2}\right]\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\text{Sin}\left[\frac{d\,x}{2}\right]-$$
$$6\,C\,\text{Cos}\left[\frac{c}{2}\right]\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\text{Sin}\left[\frac{d\,x}{2}\right]+$$
$$40\,\sqrt{2}\,A\,\text{Cos}\left[\frac{d\,x}{2}\right]\,\text{Sin}\left[\frac{c}{2}\right]\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,-$$
$$6\,\sqrt{2}\,C\,\text{Cos}\left[\frac{d\,x}{2}\right]\,\text{Sin}\left[\frac{c}{2}\right]\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,+$$
$$6\,\sqrt{2}\,C\,\text{Cos}\left[\frac{3\,d\,x}{2}\right]\,\text{Sin}\left[\frac{3\,c}{2}\right]\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,+$$
$$6\,C\,\text{Cos}\left[\frac{3\,c}{2}\right]\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]+$$
$$\left.8\,\sqrt{2}\,A\,\text{Sec}[c+d\,x]\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 1217: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a + a \operatorname{Cos}[c + d x])^{3/2} \left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{3/2} \, dx$$

Optimal (type 3, 195 leaves, 6 steps):

$$\frac{a^{3/2} (8 A + 7 C) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}}{4 d} - \frac{a^2 (8 A - 5 C) \operatorname{Sin}[c + d x]}{4 d \sqrt{a + a \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}} - \frac{a (4 A - C) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{2 d \sqrt{\operatorname{Sec}[c + d x]}} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^{3/2} \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{d}$$

Result (type 3, 927 leaves):

$$\frac{1}{16\,d\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}$$

$$a\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\,\text{Sec}\Big[\frac{1}{2}\,\left(c+d\,x\right)\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\,\Big(-i\,\left(8\,A+7\,C\right)\,\text{Cos}\Big[c+\frac{d\,x}{2}\Big]$$

$$\text{Log}\Big[2\,\Big(e^{i\,d\,x}\,\text{Cos}\Big[\frac{c}{2}\Big]+i\,e^{i\,d\,x}\,\text{Sin}\Big[\frac{c}{2}\Big]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\Big)\Big]-$$

$$8\,i\,A\,\text{Cos}\Big[c+\frac{3\,d\,x}{2}\Big]\,\text{Log}\Big[2\,\Big(e^{i\,d\,x}\,\text{Cos}\Big[\frac{c}{2}\Big]+i\,e^{i\,d\,x}\,\text{Sin}\Big[\frac{c}{2}\Big]+$$

$$\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\Big)\Big]-7\,i\,C\,\text{Cos}\Big[c+\frac{3\,d\,x}{2}\Big]$$

$$\text{Log}\Big[2\,\Big(e^{i\,d\,x}\,\text{Cos}\Big[\frac{c}{2}\Big]+i\,e^{i\,d\,x}\,\text{Sin}\Big[\frac{c}{2}\Big]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\Big)\Big]+$$

$$2\,i\,\left(8\,A+7\,C\right)\,\text{ArcTanh}\Big[\Big(\text{Cos}\Big[\frac{c}{2}\Big]+i\,\text{Sin}\Big[\frac{c}{2}\Big]\Big)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\Big]$$

$$\text{Cos}[c+d\,x]\,\Big(\text{Cos}\Big[\frac{d\,x}{2}\Big]+i\,\text{Sin}\Big[\frac{d\,x}{2}\Big]\Big)-$$

$$8\,A\,\text{Log}\Big[2\,\Big(e^{i\,d\,x}\,\text{Cos}\Big[\frac{c}{2}\Big]+i\,e^{i\,d\,x}\,\text{Sin}\Big[\frac{c}{2}\Big]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\Big)\Big]$$

$$\text{Sin}\Big[c+\frac{d\,x}{2}\Big]-$$

$$7\,C\,\text{Log}\Big[2\,\Big(e^{i\,d\,x}\,\text{Cos}\Big[\frac{c}{2}\Big]+i\,e^{i\,d\,x}\,\text{Sin}\Big[\frac{c}{2}\Big]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\Big)\Big]$$

$$\text{Sin}\Big[c+\frac{d\,x}{2}\Big]+32\,\sqrt{2}\,A\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\Big[\frac{1}{2}\,\left(c+d\,x\right)\Big]-$$

$$10\,\sqrt{2}\,C\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\Big[\frac{1}{2}\,\left(c+d\,x\right)\Big]+$$

$$12\,\sqrt{2}\,C\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\Big[\frac{3}{2}\,\left(c+d\,x\right)\Big]+$$

$$2\,\sqrt{2}\,C\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\Big[\frac{5}{2}\,\left(c+d\,x\right)\Big]+$$

$$8\,A\,\text{Log}\Big[2\,\Big(e^{i\,d\,x}\,\text{Cos}\Big[\frac{c}{2}\Big]+i\,e^{i\,d\,x}\,\text{Sin}\Big[\frac{c}{2}\Big]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\Big)\Big]$$

$$\text{Sin}\Big[c+\frac{3\,d\,x}{2}\Big]+$$

$$7\,C\,\text{Log}\Big[2\,\Big(e^{i\,d\,x}\,\text{Cos}\Big[\frac{c}{2}\Big]+i\,e^{i\,d\,x}\,\text{Sin}\Big[\frac{c}{2}\Big]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\Big)\Big]$$

$$\text{Sin}\Big[c+\frac{3\,d\,x}{2}\Big]\Big)$$

Problem 1218: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\sqrt{\text{Sec}[c+d\,x]}\,\,dx$$

Optimal (type 3, 191 leaves, 6 steps):

$$\frac{a^{3/2}\,(24\,A+11\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{8\,d}+\frac{a^2\,(24\,A+19\,C)\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{a\,C\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{C\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 574 leaves):

$$\frac{1}{48\,\sqrt{2}\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}}$$
$$a\,\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\left(-3\,i\,(24\,A+11\,C)\,\text{Cos}\left[\frac{d\,x}{2}\right]\right.$$
$$\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\right]+$$
$$3\,i\,(24\,A+11\,C)\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\;\right]$$
$$\left(\text{Cos}\left[\frac{d\,x}{2}\right]+i\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+72\,A\,\text{Log}\Big[$$
$$2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\Big]\,\text{Sin}\left[\frac{d\,x}{2}\right]+$$
$$33\,C\,\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\right]$$
$$\text{Sin}\left[\frac{d\,x}{2}\right]+48\,\sqrt{2}\,A\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$52\,\sqrt{2}\,C\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$18\,\sqrt{2}\,C\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+$$
$$\left.4\,\sqrt{2}\,C\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{5}{2}\,(c+d\,x)\right]\right)$$

Problem 1219: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 238 leaves, 7 steps):

$$\frac{a^{3/2}\left(112\,A+75\,C\right)\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{64\,d}+$$

$$\frac{a^2\left(16\,A+13\,C\right)\text{Sin}[c+d\,x]}{32\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a\,C\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{8\,d\,\text{Sec}[c+d\,x]^{3/2}}+$$

$$\frac{C\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\text{Sin}[c+d\,x]}{4\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a^2\left(112\,A+75\,C\right)\text{Sin}[c+d\,x]}{64\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 1069 leaves):

$$\frac{1}{256}\left(112\,A+75\,C\right)\sqrt{\text{Cos}[c+d\,x]}\,\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\sqrt{\text{Sec}[c+d\,x]}\,\left(\frac{1}{2}\,i\,\text{Sin}\left[\frac{c}{2}\right]\left(-\left(\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\right]\right.\right.\right.\right.$$

$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i\,d\,x}\left(\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right)\Bigg/$$

$$\left.\left(d\,\sqrt{2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\right)-$$

$$\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right]\right.$$

$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i\,d\,x}\left(\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right)\Bigg/$$

$$\left.\left(d\,\sqrt{2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\right)+$$

$$\frac{1}{2}\,\text{Cos}\left[\frac{c}{2}\right]\left(-\left(\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.$$

$$\left.\left.\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\right]$$

$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i\,d\,x}\left(\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right)\Bigg/$$

$$\left.\left(d\,\sqrt{2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\right)+$$

$$\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right]\right.$$

$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i\,d\,x}\left(\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}\right)\Bigg/$$

$$\left.\left.\left(d\,\sqrt{2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\right)\right)+$$

$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3$$

$$\sqrt{\text{Sec}[c+d\,x]}$$

$$\left(-\frac{\left(80\,A+43\,C\right)\text{Cos}\left[\frac{d\,x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{256\,d}+\right.$$

$$\frac{3\left(4\,A+3\,C\right)\text{Cos}\left[\frac{3\,d\,x}{2}\right]\text{Sin}\left[\frac{3\,c}{2}\right]}{32\,d}+$$

$$\frac{(16 A + 23 C) \operatorname{Cos}\left[\frac{5 d x}{2}\right] \operatorname{Sin}\left[\frac{5 c}{2}\right]}{256 d} + \frac{C \operatorname{Cos}\left[\frac{7 d x}{2}\right] \operatorname{Sin}\left[\frac{7 c}{2}\right]}{32 d} + \frac{C \operatorname{Cos}\left[\frac{9 d x}{2}\right] \operatorname{Sin}\left[\frac{9 c}{2}\right]}{128 d} - \frac{(80 A + 43 C) \operatorname{Cos}\left[\frac{c}{2}\right] \operatorname{Sin}\left[\frac{d x}{2}\right]}{256 d} + \frac{3 (4 A + 3 C) \operatorname{Cos}\left[\frac{3 c}{2}\right] \operatorname{Sin}\left[\frac{3 d x}{2}\right]}{32 d} + \frac{(16 A + 23 C) \operatorname{Cos}\left[\frac{5 c}{2}\right] \operatorname{Sin}\left[\frac{5 d x}{2}\right]}{256 d} + \frac{C \operatorname{Cos}\left[\frac{7 c}{2}\right] \operatorname{Sin}\left[\frac{7 d x}{2}\right]}{32 d} + \frac{C \operatorname{Cos}\left[\frac{9 c}{2}\right] \operatorname{Sin}\left[\frac{9 d x}{2}\right]}{128 d}\Bigg)$$

Problem 1220: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a + a \operatorname{Cos}[c + d x])^{3/2} \left(A + C \operatorname{Cos}[c + d x]^2\right)}{\operatorname{Sec}[c + d x]^{3/2}} \, dx$$

Optimal (type 3, 285 leaves, 8 steps):

$$\frac{1}{128 d} a^{3/2} (176 A + 133 C) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c + d x]}{\sqrt{a + a \operatorname{Cos}[c + d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]} + \frac{a^2 (80 A + 67 C) \operatorname{Sin}[c + d x]}{240 d \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sec}[c + d x]^{5/2}} + \frac{3 a C \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{40 d \operatorname{Sec}[c + d x]^{5/2}} + \frac{C (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{5 d \operatorname{Sec}[c + d x]^{5/2}} + \frac{a^2 (176 A + 133 C) \operatorname{Sin}[c + d x]}{192 d \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sec}[c + d x]^{3/2}} + \frac{a^2 (176 A + 133 C) \operatorname{Sin}[c + d x]}{128 d \sqrt{a + a \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}}$$

Result (type 3, 1123 leaves):

$$\frac{1}{512} (176 A + 133 C) \sqrt{\operatorname{Cos}[c + d x]} \left(a (1 + \operatorname{Cos}[c + d x])\right)^{3/2} \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^3 \sqrt{\operatorname{Sec}[c + d x]} \left(\frac{1}{2} i \operatorname{Sin}\left[\frac{c}{2}\right] \left(-\left(\left(2 i e^{\frac{i d x}{2}} \operatorname{Log}\left[2 \left(e^{i d x} \operatorname{Cos}\left[\frac{c}{2}\right] + i e^{i d x} \operatorname{Sin}\left[\frac{c}{2}\right] + \sqrt{\left(1 + e^{2 i d x}\right) \operatorname{Cos}[c] + i \left(-1 + e^{2 i d x}\right) \operatorname{Sin}[c]}\right)\right]\right.\right.\right.\right.$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathbb{i}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\mathbb{i}\,d\,x}\left(\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Cos}[c]+\mathbb{i}\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Sin}[c]\right)}\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Cos}[c]+2\,\mathbb{i}\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Sin}[c]}\right)\Bigg)-$$
$$\Bigg(2\,\mathbb{i}\,e^{\frac{\mathbb{i}\,d\,x}{2}}\,\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathbb{i}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Cos}[c]+\mathbb{i}\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Sin}[c]}\,\right]$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathbb{i}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\mathbb{i}\,d\,x}\left(\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Cos}[c]+\mathbb{i}\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Sin}[c]\right)}\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Cos}[c]+2\,\mathbb{i}\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Sin}[c]}\right)\Bigg)+$$
$$\frac{1}{2}\mathrm{Cos}\left[\frac{c}{2}\right]\Bigg(-\Bigg(\Bigg(2\,\mathbb{i}\,e^{\frac{\mathbb{i}\,d\,x}{2}}\,\mathrm{Log}\Big[2\Big(e^{\mathbb{i}\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+\mathbb{i}\,e^{\mathbb{i}\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+$$
$$\sqrt{\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Cos}[c]+\mathbb{i}\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Sin}[c]}\,\Big)\Big]$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathbb{i}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\mathbb{i}\,d\,x}\left(\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Cos}[c]+\mathbb{i}\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Sin}[c]\right)}\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Cos}[c]+2\,\mathbb{i}\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Sin}[c]}\right)\Bigg)+$$
$$\Bigg(2\,\mathbb{i}\,e^{\frac{\mathbb{i}\,d\,x}{2}}\,\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathbb{i}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Cos}[c]+\mathbb{i}\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Sin}[c]}\,\right]$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathbb{i}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\mathbb{i}\,d\,x}\left(\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Cos}[c]+\mathbb{i}\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Sin}[c]\right)}\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Cos}[c]+2\,\mathbb{i}\left(-1+e^{2\,\mathbb{i}\,d\,x}\right)\mathrm{Sin}[c]}\right)\Bigg)\Bigg)+$$
$$\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3$$
$$\sqrt{\mathrm{Sec}[c+d\,x]}$$
$$\Bigg(-\frac{\left(1360\,A+1019\,C\right)\mathrm{Cos}\left[\frac{d\,x}{2}\right]\mathrm{Sin}\left[\frac{c}{2}\right]}{7680\,d}+$$
$$\frac{\left(280\,A+239\,C\right)\mathrm{Cos}\left[\frac{3\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{3\,c}{2}\right]}{960\,d}+$$
$$\frac{\left(48\,A+49\,C\right)\mathrm{Cos}\left[\frac{5\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{5\,c}{2}\right]}{512\,d}+$$
$$\frac{\left(10\,A+17\,C\right)\mathrm{Cos}\left[\frac{7\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{7\,c}{2}\right]}{480\,d}+$$
$$\frac{3\,C\,\mathrm{Cos}\left[\frac{9\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{9\,c}{2}\right]}{256\,d}+$$
$$\frac{C\,\mathrm{Cos}\left[\frac{11\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{11\,c}{2}\right]}{320\,d}-$$
$$\frac{\left(1360\,A+1019\,C\right)\mathrm{Cos}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{7680\,d}+$$
$$\frac{\left(280\,A+239\,C\right)\mathrm{Cos}\left[\frac{3\,c}{2}\right]\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]}{960\,d}+$$

$$\frac{(48 A+49 C) \operatorname{Cos}\left[\frac{5 c}{2}\right] \operatorname{Sin}\left[\frac{5 d x}{2}\right]}{512 d}+\frac{(10 A+17 C) \operatorname{Cos}\left[\frac{7 c}{2}\right] \operatorname{Sin}\left[\frac{7 d x}{2}\right]}{480 d}+\frac{3 C \operatorname{Cos}\left[\frac{9 c}{2}\right] \operatorname{Sin}\left[\frac{9 d x}{2}\right]}{256 d}+\left.\frac{C \operatorname{Cos}\left[\frac{11 c}{2}\right] \operatorname{Sin}\left[\frac{11 d x}{2}\right]}{320 d}\right)$$

Problem 1224: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a \operatorname{Cos}[c+d x])^{5/2} \left(A+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^{9/2} \, dx$$

Optimal (type 3, 230 leaves, 7 steps):

$$\frac{2 a^{5/2} C \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}}{d}+\frac{2 a^3 (32 A+49 C) \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{21 d \sqrt{a+a \operatorname{Cos}[c+d x]}}+\frac{2 a^2 (8 A+7 C) \sqrt{a+a \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]}{21 d}+\frac{2 a A (a+a \operatorname{Cos}[c+d x])^{3/2} \operatorname{Sec}[c+d x]^{5/2} \operatorname{Sin}[c+d x]}{7 d}+\frac{2 A (a+a \operatorname{Cos}[c+d x])^{5/2} \operatorname{Sec}[c+d x]^{7/2} \operatorname{Sin}[c+d x]}{7 d}$$

Result (type 3, 975 leaves):

$$\frac{1}{4} C \sqrt{\text{Cos}[c+d x]} \left(a \left(1+\text{Cos}[c+d x]\right)\right)^{5/2}$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \sqrt{\text{Sec}[c+d x]} \left(\frac{1}{2} \mathrm{i} \,\text{Sin}\left[\frac{c}{2}\right] \left(-\left(\left(2 \mathrm{i}\, e^{\frac{\mathrm{i} d x}{2}} \text{Log}\left[2 \left(e^{\mathrm{i} d x} \text{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\, e^{\mathrm{i} d x} \text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right)\right]\right.\right.\right.\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-\mathrm{i}\, \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-\mathrm{i} d x} \left(\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]\right)}\right) \Big/$$
$$\left.\left(d \sqrt{2 \left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+2 \mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right)\right) -$$
$$\left(2 \mathrm{i}\, e^{\frac{\mathrm{i} d x}{2}} \text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\, \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right]\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\, \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-\mathrm{i} d x} \left(\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]\right)}\right) \Big/$$
$$\left.\left(d \sqrt{2 \left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+2 \mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right)\right) +$$
$$\frac{1}{2} \text{Cos}\left[\frac{c}{2}\right] \left(-\left(\left(2 \mathrm{i}\, e^{\frac{\mathrm{i} d x}{2}} \text{Log}\left[2 \left(e^{\mathrm{i} d x} \text{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\, e^{\mathrm{i} d x} \text{Sin}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.$$
$$\left.\left.\sqrt{\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right)\right]$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-\mathrm{i}\, \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-\mathrm{i} d x} \left(\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]\right)}\right) \Big/$$
$$\left.\left(d \sqrt{2 \left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+2 \mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right)\right) +$$
$$\left(2 \mathrm{i}\, e^{\frac{\mathrm{i} d x}{2}} \text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\, \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right]\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\, \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-\mathrm{i} d x} \left(\left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+\mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]\right)}\right) \Big/$$
$$\left.\left.\left.\left(d \sqrt{2 \left(1+e^{2 \mathrm{i} d x}\right) \text{Cos}[c]+2 \mathrm{i} \left(-1+e^{2 \mathrm{i} d x}\right) \text{Sin}[c]}\right)\right)\right) +$$
$$\left(a \left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5$$
$$\sqrt{\text{Sec}[c+d x]}$$
$$\left(\frac{(23 A+28 C) \text{Cos}\left[\frac{d x}{2}\right] \text{Sin}\left[\frac{c}{2}\right]}{21 d}+\right.$$
$$\frac{(23 A+28 C) \text{Cos}\left[\frac{c}{2}\right] \text{Sin}\left[\frac{d x}{2}\right]}{21 d}+$$
$$\frac{2 A \,\text{Sec}[c+d x]^2 \text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]}{7 d}+$$
$$\frac{A \,\text{Sec}[c+d x]^3 \text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]}{14 d}+$$
$$\left.\frac{\text{Sec}[c+d x] \left(23 A \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+7 C \,\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}{42 d}\right)$$

Problem 1225: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^{5/2}\,(A+C\,\text{Cos}[c+d\,x]^2)\,\text{Sec}[c+d\,x]^{7/2}\,dx$$

Optimal (type 3, 230 leaves, 7 steps):

$$\frac{5\,a^{5/2}\,C\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}-\frac{a^3\,(64\,A+15\,C)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,a^2\,(8\,A+5\,C)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d}+\frac{2\,a\,A\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 3, 969 leaves):

$$\frac{5}{8}\,C\,\sqrt{\text{Cos}[c+d\,x]}\,(a\,(1+\text{Cos}[c+d\,x]))^{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{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\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((1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}\right)\Big/\left(d\,\sqrt{2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\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{(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{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-i\,d\,x}\,\left((1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}\right)\Big/\left(d\,\sqrt{2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\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{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\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((1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}\right)\Big/\left(d\,\sqrt{2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\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{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\right]\right.$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]\right)}\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]}\right)\Bigg)\Bigg)+$$
$$\left(a\left(1+\mathrm{Cos}[c+d x]\right)\right)^{5/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5$$
$$\sqrt{\mathrm{Sec}[c+d x]}$$
$$\left(\frac{(172 A+45 C)\,\mathrm{Cos}\left[\frac{d x}{2}\right]\mathrm{Sin}\left[\frac{c}{2}\right]}{120 d}+\frac{C\,\mathrm{Cos}\left[\frac{3 d x}{2}\right]\mathrm{Sin}\left[\frac{3 c}{2}\right]}{8 d}+\frac{(172 A+45 C)\,\mathrm{Cos}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{d x}{2}\right]}{120 d}+\frac{C\,\mathrm{Cos}\left[\frac{3 c}{2}\right]\mathrm{Sin}\left[\frac{3 d x}{2}\right]}{8 d}+\frac{7 A\,\mathrm{Sec}[c+d x]\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]}{15 d}+\frac{A\,\mathrm{Sec}[c+d x]^2\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]}{10 d}\right)$$

Problem 1226: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\mathrm{Cos}[c+d x])^{5/2}\left(A+C\,\mathrm{Cos}[c+d x]^2\right)\mathrm{Sec}[c+d x]^{5/2}\,dx$$

Optimal (type 3, 238 leaves, 7 steps):

$$\frac{a^{5/2}(8 A+19 C)\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d x]}{\sqrt{a+a\,\mathrm{Cos}[c+d x]}}\right]\sqrt{\mathrm{Cos}[c+d x]}\,\sqrt{\mathrm{Sec}[c+d x]}}{4 d}-$$
$$\frac{a^3(56 A-27 C)\,\mathrm{Sin}[c+d x]}{12 d\sqrt{a+a\,\mathrm{Cos}[c+d x]}\,\sqrt{\mathrm{Sec}[c+d x]}}-\frac{a^2(8 A-C)\sqrt{a+a\,\mathrm{Cos}[c+d x]}\,\mathrm{Sin}[c+d x]}{2 d\sqrt{\mathrm{Sec}[c+d x]}}+$$
$$\frac{10 a A\,(a+a\,\mathrm{Cos}[c+d x])^{3/2}\sqrt{\mathrm{Sec}[c+d x]}\,\mathrm{Sin}[c+d x]}{3 d}+$$
$$\frac{2 A\,(a+a\,\mathrm{Cos}[c+d x])^{5/2}\mathrm{Sec}[c+d x]^{3/2}\,\mathrm{Sin}[c+d x]}{3 d}$$

Result (type 3, 988 leaves):

$$\frac{1}{32}(8 A+19 C)\sqrt{\mathrm{Cos}[c+d x]}\,\left(a\left(1+\mathrm{Cos}[c+d x]\right)\right)^{5/2}$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\sqrt{\mathrm{Sec}[c+d x]}\,\left(\frac{1}{2}\,i\,\mathrm{Sin}\left[\frac{c}{2}\right]\left(-\left(\left(2\,i\,e^{\frac{i d x}{2}}\,\mathrm{Log}\left[\right.\right.\right.\right.\right.$$

$$2\left(e^{i d x}\operatorname{Cos}\left[\frac{c}{2}\right]+i\, e^{i d x}\operatorname{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\right)\Big]$$

$$\left(\operatorname{Cos}\left[\frac{c}{2}\right]-i\operatorname{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)}\Bigg)\Bigg/$$

$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\right)\Bigg)-$$

$$\Bigg(2 i\, e^{\frac{i d x}{2}}\operatorname{ArcTanh}\left[\left(\operatorname{Cos}\left[\frac{c}{2}\right]+i\operatorname{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\right]$$

$$\left(\operatorname{Cos}\left[\frac{c}{2}\right]+i\operatorname{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)}\Bigg)\Bigg/$$

$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\right)\Bigg)+$$

$$\frac{1}{2}\operatorname{Cos}\left[\frac{c}{2}\right]\Bigg(-\Bigg(\Bigg(2 i\, e^{\frac{i d x}{2}}\operatorname{Log}\Big[2\Big(e^{i d x}\operatorname{Cos}\left[\frac{c}{2}\right]+i\, e^{i d x}\operatorname{Sin}\left[\frac{c}{2}\right]+$$

$$\sqrt{\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\Big)\Big]$$

$$\left(\operatorname{Cos}\left[\frac{c}{2}\right]-i\operatorname{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)}\Bigg)\Bigg/$$

$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\right)\Bigg)+$$

$$\Bigg(2 i\, e^{\frac{i d x}{2}}\operatorname{ArcTanh}\left[\left(\operatorname{Cos}\left[\frac{c}{2}\right]+i\operatorname{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\right]$$

$$\left(\operatorname{Cos}\left[\frac{c}{2}\right]+i\operatorname{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)}\Bigg)\Bigg/$$

$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]}\right)\Bigg)\Bigg)+$$

$$\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^{5}$$

$$\sqrt{\operatorname{Sec}[c+d x]}$$

$$\Bigg(\frac{(128 A-27 C)\operatorname{Cos}\left[\frac{d x}{2}\right]\operatorname{Sin}\left[\frac{c}{2}\right]}{96 d}+$$

$$\frac{5 C\operatorname{Cos}\left[\frac{3 d x}{2}\right]\operatorname{Sin}\left[\frac{3 c}{2}\right]}{16 d}+$$

$$\frac{C\operatorname{Cos}\left[\frac{5 d x}{2}\right]\operatorname{Sin}\left[\frac{5 c}{2}\right]}{32 d}+$$

$$\frac{(128 A-27 C)\operatorname{Cos}\left[\frac{c}{2}\right]\operatorname{Sin}\left[\frac{d x}{2}\right]}{96 d}+$$

$$\frac{5 C\operatorname{Cos}\left[\frac{3 c}{2}\right]\operatorname{Sin}\left[\frac{3 d x}{2}\right]}{16 d}+$$

$$\frac{C\operatorname{Cos}\left[\frac{5 c}{2}\right]\operatorname{Sin}\left[\frac{5 d x}{2}\right]}{32 d}+$$

$$\frac{A\operatorname{Sec}[c+d x]\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]}{6 d}\Bigg)$$

Problem 1227: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a + a \operatorname{Cos}[c + d x])^{5/2} \left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{3/2} \, dx$$

Optimal (type 3, 242 leaves, 7 steps):

$$\frac{5 a^{5/2} (8 A + 5 C) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}}{8 d} - \frac{a^3 (24 A - 49 C) \operatorname{Sin}[c + d x]}{24 d \sqrt{a + a \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}} - \frac{a^2 (8 A - 3 C) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{4 d \sqrt{\operatorname{Sec}[c + d x]}} - \frac{a (6 A - C) (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{3 d \sqrt{\operatorname{Sec}[c + d x]}} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^{5/2} \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{d}$$

Result (type 3, 1015 leaves):

$$\frac{5}{64} (8 A + 5 C) \sqrt{\operatorname{Cos}[c + d x]} \left(a (1 + \operatorname{Cos}[c + d x])\right)^{5/2} \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^5 \sqrt{\operatorname{Sec}[c + d x]} \left(\frac{1}{2} i \operatorname{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} \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(\operatorname{Cos}\left[\frac{c}{2}\right] - i \operatorname{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\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) \Big/ \left(d \sqrt{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)\right) - \left(2 i e^{\frac{i d x}{2}} \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] \left(\operatorname{Cos}\left[\frac{c}{2}\right] + i \operatorname{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\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) \Big/ \left(d \sqrt{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)\right) + \frac{1}{2} \operatorname{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} \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(\operatorname{Cos}\left[\frac{c}{2}\right] - i \operatorname{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\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) \Big/ \left(d \sqrt{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)\right) + \left(2 i e^{\frac{i d x}{2}} \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] \left(\operatorname{Cos}\left[\frac{c}{2}\right] + i \operatorname{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\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) \Big/$$

$$\left(d\sqrt{2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\Bigg)\Bigg)+$$

$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\sqrt{\text{Sec}[c+d\,x]}\left(\frac{(72\,A-47\,C)\,\text{Cos}\left[\frac{d\,x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{192\,d}+\frac{(3\,A+8\,C)\,\text{Cos}\left[\frac{3\,d\,x}{2}\right]\text{Sin}\left[\frac{3\,c}{2}\right]}{24\,d}+\frac{5\,C\,\text{Cos}\left[\frac{5\,d\,x}{2}\right]\text{Sin}\left[\frac{5\,c}{2}\right]}{64\,d}+\frac{C\,\text{Cos}\left[\frac{7\,d\,x}{2}\right]\text{Sin}\left[\frac{7\,c}{2}\right]}{96\,d}+\frac{(72\,A-47\,C)\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]}{192\,d}+\frac{(3\,A+8\,C)\,\text{Cos}\left[\frac{3\,c}{2}\right]\text{Sin}\left[\frac{3\,d\,x}{2}\right]}{24\,d}+\frac{5\,C\,\text{Cos}\left[\frac{5\,c}{2}\right]\text{Sin}\left[\frac{5\,d\,x}{2}\right]}{64\,d}+\frac{C\,\text{Cos}\left[\frac{7\,c}{2}\right]\text{Sin}\left[\frac{7\,d\,x}{2}\right]}{96\,d}\right)$$

Problem 1228: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\left(A+C\,\text{Cos}[c+d\,x]^2\right)\sqrt{\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 238 leaves, 7 steps):

$$\frac{1}{64\,d}a^{5/2}\left(304\,A+163\,C\right)\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+\frac{a^3\left(432\,A+299\,C\right)\text{Sin}[c+d\,x]}{192\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{a^2\left(16\,A+17\,C\right)\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{32\,d\sqrt{\text{Sec}[c+d\,x]}}+\frac{5\,a\,C\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\text{Sin}[c+d\,x]}{24\,d\sqrt{\text{Sec}[c+d\,x]}}+\frac{C\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\text{Sin}[c+d\,x]}{4\,d\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 1069 leaves):

$$\frac{1}{512}\left(304\,A+163\,C\right)\sqrt{\text{Cos}[c+d\,x]}\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}$$

$$\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \sqrt{\mathrm{Sec}[c+d x]} \left(\frac{1}{2} i \,\mathrm{Sin}\left[\frac{c}{2}\right] \left(-\left(\left(2 i e^{\frac{i d x}{2}} \mathrm{Log}\left[2 \left(e^{i d x} \mathrm{Cos}\left[\frac{c}{2}\right]+i e^{i d x} \mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]}\right)\right] \left(\mathrm{Cos}\left[\frac{c}{2}\right]-i \,\mathrm{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)}\right) \Big/ \left(d \sqrt{2 \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]}\right)\right) - \left(2 i e^{\frac{i d x}{2}} \mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i \,\mathrm{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]}\right] \left(\mathrm{Cos}\left[\frac{c}{2}\right]+i \,\mathrm{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)}\right) \Big/ \left(d \sqrt{2 \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]}\right)\right) +$$

$$\frac{1}{2} \mathrm{Cos}\left[\frac{c}{2}\right] \left(-\left(\left(2 i e^{\frac{i d x}{2}} \mathrm{Log}\left[2 \left(e^{i d x} \mathrm{Cos}\left[\frac{c}{2}\right]+i e^{i d x} \mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]}\right)\right] \left(\mathrm{Cos}\left[\frac{c}{2}\right]-i \,\mathrm{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)}\right) \Big/ \left(d \sqrt{2 \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]}\right)\right) + \left(2 i e^{\frac{i d x}{2}} \mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i \,\mathrm{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]}\right] \left(\mathrm{Cos}\left[\frac{c}{2}\right]+i \,\mathrm{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)}\right) \Big/ \left(d \sqrt{2 \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]}\right)\right)\right) +$$

$$\left(a \left(1+\mathrm{Cos}[c+d x]\right)\right)^{5/2} \mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \sqrt{\mathrm{Sec}[c+d x]} \left(-\frac{(432 A+265 C) \mathrm{Cos}\left[\frac{d x}{2}\right] \mathrm{Sin}\left[\frac{c}{2}\right]}{1536 d}+\frac{5 (12 A+11 C) \mathrm{Cos}\left[\frac{3 d x}{2}\right] \mathrm{Sin}\left[\frac{3 c}{2}\right]}{192 d}+\frac{(16 A+47 C) \mathrm{Cos}\left[\frac{5 d x}{2}\right] \mathrm{Sin}\left[\frac{5 c}{2}\right]}{512 d}+\frac{5 C \mathrm{Cos}\left[\frac{7 d x}{2}\right] \mathrm{Sin}\left[\frac{7 c}{2}\right]}{192 d}+\frac{C \mathrm{Cos}\left[\frac{9 d x}{2}\right] \mathrm{Sin}\left[\frac{9 c}{2}\right]}{256 d}-\frac{(432 A+265 C) \mathrm{Cos}\left[\frac{c}{2}\right] \mathrm{Sin}\left[\frac{d x}{2}\right]}{1536 d}+\right.$$

$$\frac{5\,(12\,A+11\,C)\,\text{Cos}\left[\frac{3\,c}{2}\right]\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]}{192\,d}+\frac{(16\,A+47\,C)\,\text{Cos}\left[\frac{5\,c}{2}\right]\,\text{Sin}\left[\frac{5\,d\,x}{2}\right]}{512\,d}+\frac{5\,C\,\text{Cos}\left[\frac{7\,c}{2}\right]\,\text{Sin}\left[\frac{7\,d\,x}{2}\right]}{192\,d}+\frac{C\,\text{Cos}\left[\frac{9\,c}{2}\right]\,\text{Sin}\left[\frac{9\,d\,x}{2}\right]}{256\,d}\Bigg)$$

Problem 1229: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 285 leaves, 8 steps):

$$\frac{1}{128\,d}a^{5/2}\,(400\,A+283\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+\frac{a^3\,(1040\,A+787\,C)\,\text{Sin}[c+d\,x]}{960\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a^2\,(80\,A+79\,C)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{240\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a\,C\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{8\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{C\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a^3\,(400\,A+283\,C)\,\text{Sin}[c+d\,x]}{128\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 1123 leaves):

$$\frac{1}{1024}(400\,A+283\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\sqrt{\text{Sec}[c+d\,x]}\,\left(\frac{1}{2}\,i\,\text{Sin}\left[\frac{c}{2}\right]\,\left(-\left(\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right)\Big/\left(d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right)-\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right]\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right)\Big/\left(d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)+$$

$$\frac{1}{2}\text{Cos}\left[\frac{c}{2}\right]\left(-\left(\left(2\,\mathbb{i}\,e^{\frac{\mathbb{i}dx}{2}}\text{Log}\left[2\left(e^{\mathbb{i}dx}\text{Cos}\left[\frac{c}{2}\right]+\mathbb{i}\,e^{\mathbb{i}dx}\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\mathbb{i}dx}\right)\text{Cos}[c]+\mathbb{i}\left(-1+e^{2\mathbb{i}dx}\right)\text{Sin}[c]}\right)\right]\left(\text{Cos}\left[\frac{c}{2}\right]-\mathbb{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\mathbb{i}dx}\left(\left(1+e^{2\mathbb{i}dx}\right)\text{Cos}[c]+\mathbb{i}\left(-1+e^{2\mathbb{i}dx}\right)\text{Sin}[c]\right)}\right)\Big/\left(d\sqrt{2\left(1+e^{2\mathbb{i}dx}\right)\text{Cos}[c]+2\,\mathbb{i}\left(-1+e^{2\mathbb{i}dx}\right)\text{Sin}[c]}\right)\right)+\left(2\,\mathbb{i}\,e^{\frac{\mathbb{i}dx}{2}}\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+\mathbb{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\mathbb{i}dx}\right)\text{Cos}[c]+\mathbb{i}\left(-1+e^{2\mathbb{i}dx}\right)\text{Sin}[c]}\right]\left(\text{Cos}\left[\frac{c}{2}\right]+\mathbb{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\mathbb{i}dx}\left(\left(1+e^{2\mathbb{i}dx}\right)\text{Cos}[c]+\mathbb{i}\left(-1+e^{2\mathbb{i}dx}\right)\text{Sin}[c]\right)}\right)\Big/\left(d\sqrt{2\left(1+e^{2\mathbb{i}dx}\right)\text{Cos}[c]+2\,\mathbb{i}\left(-1+e^{2\mathbb{i}dx}\right)\text{Sin}[c]}\right)\right)+$$

$$\left(a\left(1+\text{Cos}[c+dx]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\sqrt{\text{Sec}[c+dx]}\left(-\frac{(3760\,A+2309\,C)\,\text{Cos}\left[\frac{dx}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{15\,360\,d}+\frac{(640\,A+509\,C)\,\text{Cos}\left[\frac{3dx}{2}\right]\text{Sin}\left[\frac{3c}{2}\right]}{1920\,d}+\frac{5\,(16\,A+19\,C)\,\text{Cos}\left[\frac{5dx}{2}\right]\text{Sin}\left[\frac{5c}{2}\right]}{1024\,d}+\frac{(5\,A+16\,C)\,\text{Cos}\left[\frac{7dx}{2}\right]\text{Sin}\left[\frac{7c}{2}\right]}{480\,d}+\frac{5\,C\,\text{Cos}\left[\frac{9dx}{2}\right]\text{Sin}\left[\frac{9c}{2}\right]}{512\,d}+\frac{C\,\text{Cos}\left[\frac{11dx}{2}\right]\text{Sin}\left[\frac{11c}{2}\right]}{640\,d}-\frac{(3760\,A+2309\,C)\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]}{15\,360\,d}+\frac{(640\,A+509\,C)\,\text{Cos}\left[\frac{3c}{2}\right]\text{Sin}\left[\frac{3dx}{2}\right]}{1920\,d}+\frac{5\,(16\,A+19\,C)\,\text{Cos}\left[\frac{5c}{2}\right]\text{Sin}\left[\frac{5dx}{2}\right]}{1024\,d}+\frac{(5\,A+16\,C)\,\text{Cos}\left[\frac{7c}{2}\right]\text{Sin}\left[\frac{7dx}{2}\right]}{480\,d}+\frac{5\,C\,\text{Cos}\left[\frac{9c}{2}\right]\text{Sin}\left[\frac{9dx}{2}\right]}{512\,d}+$$

$$\left.\frac{C\,\text{Cos}\left[\frac{11\,c}{2}\right]\,\text{Sin}\left[\frac{11\,d\,x}{2}\right]}{640\,d}\right)$$

Problem 1230: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 332 leaves, 9 steps):

$$\frac{1}{512\,d}a^{5/2}\,(1304\,A+1015\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+\frac{a^3\,(136\,A+109\,C)\,\text{Sin}[c+d\,x]}{192\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{5/2}}+\frac{a^2\,(24\,A+23\,C)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{96\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{a\,C\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{12\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{C\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{6\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{a^3\,(1304\,A+1015\,C)\,\text{Sin}[c+d\,x]}{768\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a^3\,(1304\,A+1015\,C)\,\text{Sin}[c+d\,x]}{512\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 1177 leaves):

$$\frac{1}{4096}(1304\,A+1015\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,(a\,(1+\text{Cos}[c+d\,x]))^{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]\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)-\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]\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)+$$

$$\left(2\,\mathrm{i}\,e^{\frac{\mathrm{i}\,d\,x}{2}}\,\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Cos}[c]+\mathrm{i}\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Sin}[c]}\,\right]\right.$$

$$\left.\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\mathrm{i}\,d\,x}\left(\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Cos}[c]+\mathrm{i}\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Sin}[c]\right)}\right)\Big/$$

$$\left.\left.\left(d\sqrt{2\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Cos}[c]+2\,\mathrm{i}\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Sin}[c]}\right)\right)\right)+$$

$$\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5$$

$$\sqrt{\mathrm{Sec}[c+d\,x]}$$

$$\left(-\frac{(2120\,A+1589\,C)\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\mathrm{Sin}\left[\frac{c}{2}\right]}{12\,288\,d}+\right.$$

$$\frac{11\,(20\,A+17\,C)\,\mathrm{Cos}\left[\frac{3\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{3\,c}{2}\right]}{768\,d}+$$

$$\frac{(1128\,A+1145\,C)\,\mathrm{Cos}\left[\frac{5\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{5\,c}{2}\right]}{12\,288\,d}+$$

$$\frac{(20\,A+29\,C)\,\mathrm{Cos}\left[\frac{7\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{7\,c}{2}\right]}{768\,d}+$$

$$\frac{(24\,A+83\,C)\,\mathrm{Cos}\left[\frac{9\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{9\,c}{2}\right]}{6144\,d}+$$

$$\frac{C\,\mathrm{Cos}\left[\frac{11\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{11\,c}{2}\right]}{256\,d}+$$

$$\frac{C\,\mathrm{Cos}\left[\frac{13\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{13\,c}{2}\right]}{1536\,d}-$$

$$\frac{(2120\,A+1589\,C)\,\mathrm{Cos}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{12\,288\,d}+$$

$$\frac{11\,(20\,A+17\,C)\,\mathrm{Cos}\left[\frac{3\,c}{2}\right]\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]}{768\,d}+$$

$$\frac{(1128\,A+1145\,C)\,\mathrm{Cos}\left[\frac{5\,c}{2}\right]\mathrm{Sin}\left[\frac{5\,d\,x}{2}\right]}{12\,288\,d}+$$

$$\frac{(20\,A+29\,C)\,\mathrm{Cos}\left[\frac{7\,c}{2}\right]\mathrm{Sin}\left[\frac{7\,d\,x}{2}\right]}{768\,d}+$$

$$\frac{(24\,A+83\,C)\,\mathrm{Cos}\left[\frac{9\,c}{2}\right]\mathrm{Sin}\left[\frac{9\,d\,x}{2}\right]}{6144\,d}+$$

$$\frac{C\,\mathrm{Cos}\left[\frac{11\,c}{2}\right]\mathrm{Sin}\left[\frac{11\,d\,x}{2}\right]}{256\,d}+$$

$$\left.\frac{C\,\mathrm{Cos}\left[\frac{13\,c}{2}\right]\mathrm{Sin}\left[\frac{13\,d\,x}{2}\right]}{1536\,d}\right)$$

Problem 1231: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A + C\,\text{Cos}[c + d\,x]^2\right)\,\text{Sec}[c + d\,x]^{11/2}}{\sqrt{a + a\,\text{Cos}[c + d\,x]}}\,dx$$

Optimal (type 3, 289 leaves, 9 steps):

$$-\frac{1}{\sqrt{a}\,d}\sqrt{2}\,(A + C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c + d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{a + a\,\text{Cos}[c + d\,x]}}\right]\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{\text{Sec}[c + d\,x]} + \frac{2\,(257\,A + 273\,C)\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{315\,d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}} - \frac{2\,(29\,A + 21\,C)\,\text{Sec}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x]}{315\,d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}} + \frac{2\,(19\,A + 21\,C)\,\text{Sec}[c + d\,x]^{5/2}\,\text{Sin}[c + d\,x]}{105\,d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}} - \frac{2\,A\,\text{Sec}[c + d\,x]^{7/2}\,\text{Sin}[c + d\,x]}{63\,d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}} + \frac{2\,A\,\text{Sec}[c + d\,x]^{9/2}\,\text{Sin}[c + d\,x]}{9\,d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}}$$

Result (type 3, 263 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\,(c + d\,x)\right]\left(\frac{1}{d}2\,i\,(A + C)\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1 + e^{2\,i\,(c+d\,x)}}}\,\sqrt{1 + e^{2\,i\,(c+d\,x)}}\left(\text{Log}\left[1 + e^{i\,(c+d\,x)}\right] - \text{Log}\left[1 - e^{i\,(c+d\,x)} + \sqrt{2}\,\sqrt{1 + e^{2\,i\,(c+d\,x)}}\right]\right) + \frac{1}{630\,d}\left(1279\,A + 1071\,C - 2\,(107\,A + 63\,C)\,\text{Cos}[c + d\,x] + 8\,(157\,A + 168\,C)\,\text{Cos}[2\,(c + d\,x)] - 58\,A\,\text{Cos}[3\,(c + d\,x)] - 42\,C\,\text{Cos}[3\,(c + d\,x)] + 257\,A\,\text{Cos}[4\,(c + d\,x)] + 273\,C\,\text{Cos}[4\,(c + d\,x)]\right)\text{Sec}[c + d\,x]^{9/2}\,\text{Sin}\left[\frac{1}{2}\,(c + d\,x)\right]\right)\right)\Big/\left(\sqrt{a\,(1 + \text{Cos}[c + d\,x])}\right)$$

Problem 1232: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A + C\,\text{Cos}[c + d\,x]^2\right)\,\text{Sec}[c + d\,x]^{9/2}}{\sqrt{a + a\,\text{Cos}[c + d\,x]}}\,dx$$

Optimal (type 3, 244 leaves, 8 steps):

$$\frac{1}{\sqrt{a}\,d}\sqrt{2}\,(A + C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c + d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{a + a\,\text{Cos}[c + d\,x]}}\right]\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{\text{Sec}[c + d\,x]} - \frac{2\,(43\,A + 35\,C)\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{105\,d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}} + \frac{2\,(31\,A + 35\,C)\,\text{Sec}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x]}{105\,d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}} - \frac{2\,A\,\text{Sec}[c + d\,x]^{5/2}\,\text{Sin}[c + d\,x]}{35\,d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}} + \frac{2\,A\,\text{Sec}[c + d\,x]^{7/2}\,\text{Sin}[c + d\,x]}{7\,d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}}$$

Result (type 3, 214 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(-\frac{1}{d}2\,i\,(A+C)\,e^{-\frac{1}{2}i(c+d x)}\sqrt{\frac{e^{i(c+d x)}}{1+e^{2i(c+d x)}}}\sqrt{1+e^{2i(c+d x)}}\left(\text{Log}\left[1+e^{i(c+d x)}\right]-\text{Log}\left[1-e^{i(c+d x)}+\sqrt{2}\sqrt{1+e^{2i(c+d x)}}\right]\right)+\frac{1}{105 d}4\left(73 A+35 C+24 A\,\text{Cos}[c+d x]+(43 A+35 C)\,\text{Cos}[2(c+d x)]\right)\text{Sec}[c+d x]^{7/2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]^3\right)\right)\Big/\left(\sqrt{a(1+\text{Cos}[c+d x])}\right)$$

Problem 1233: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(A+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]^{7/2}}{\sqrt{a+a\,\text{Cos}[c+d x]}}\,dx$$

Optimal (type 3, 201 leaves, 7 steps):

$$-\frac{1}{\sqrt{a}\,d}\sqrt{2}\,(A+C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{2}\sqrt{\text{Cos}[c+d x]}\sqrt{a+a\,\text{Cos}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}+\frac{2(13 A+15 C)\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{15 d\sqrt{a+a\,\text{Cos}[c+d x]}}-\frac{2 A\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{15 d\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{2 A\,\text{Sec}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{5 d\sqrt{a+a\,\text{Cos}[c+d x]}}$$

Result (type 3, 209 leaves):

$$\left(2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(15\,i\,(A+C)\,e^{-\frac{1}{2}i(c+d x)}\sqrt{\frac{e^{i(c+d x)}}{1+e^{2i(c+d x)}}}\sqrt{1+e^{2i(c+d x)}}\left(\text{Log}\left[1+e^{i(c+d x)}\right]-\text{Log}\left[1-e^{i(c+d x)}+\sqrt{2}\sqrt{1+e^{2i(c+d x)}}\right]\right)+\left(19 A+15 C-2 A\,\text{Cos}[c+d x]+(13 A+15 C)\,\text{Cos}[2(c+d x)]\right)\text{Sec}[c+d x]^{5/2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/\left(15 d\sqrt{a(1+\text{Cos}[c+d x])}\right)$$

Problem 1234: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(A+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]^{5/2}}{\sqrt{a+a\,\text{Cos}[c+d x]}}\,dx$$

Optimal (type 3, 156 leaves, 6 steps):

$$\frac{1}{\sqrt{a}\ d}\sqrt{2}\ (A+C)\ \text{ArcTan}\left[\frac{\sqrt{a}\ \text{Sin}[c+d x]}{\sqrt{2}\ \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+a\,\text{Cos}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}\ -\frac{2 A \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{3 d \sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{2 A\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{3 d \sqrt{a+a\,\text{Cos}[c+d x]}}$$

Result (type 3, 183 leaves):

$$-\left(\left(2\,i\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(3\,(A+C)\,e^{-\frac{1}{2} i (c+d x)}\sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\sqrt{1+e^{2 i (c+d x)}}\left(\text{Log}\left[1+e^{i (c+d x)}\right]-\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]\right)+4\,i\,A\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]^3\right)\right)\Big/\left(3 d \sqrt{a\,(1+\text{Cos}[c+d x])}\right)\right)$$

Problem 1235: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A+C\,\text{Cos}[c+d x]^2\right)\,\text{Sec}[c+d x]^{3/2}}{\sqrt{a+a\,\text{Cos}[c+d x]}}\,dx$$

Optimal (type 3, 175 leaves, 7 steps):

$$\frac{2\,C\,\text{ArcSin}\left[\frac{\sqrt{a}\ \text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}}{\sqrt{a}\ d}-\frac{1}{\sqrt{a}\ d}\sqrt{2}\ (A+C)\ \text{ArcTan}\left[\frac{\sqrt{a}\ \text{Sin}[c+d x]}{\sqrt{2}\ \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+a\,\text{Cos}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}\ +\frac{2 A \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{d \sqrt{a+a\,\text{Cos}[c+d x]}}$$

Result (type 3, 290 leaves):

$$\frac{1}{d\sqrt{a\,(1+\text{Cos}[c+d x])}}\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(\sqrt{2}\ e^{-\frac{1}{2} i (c+d x)}\sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\sqrt{1+e^{2 i (c+d x)}}\left(C d x-i\,C\,\text{ArcSinh}\left[e^{i (c+d x)}\right]+i\sqrt{2}\ (A+C)\ \text{Log}\left[1+e^{i (c+d x)}\right]+i\,C\,\text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-i\sqrt{2}\ A\,\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]-i\sqrt{2}\ C\,\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]\right)+4\,A\sqrt{\text{Sec}[c+d x]}\ \text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)$$

Problem 1236: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\sqrt{\text{Sec}[c+d\,x]}}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 173 leaves, 7 steps):

$$-\frac{C\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{\sqrt{a}\,d}+\frac{1}{\sqrt{a}\,d}\sqrt{2}\,(A+C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+\frac{C\,\text{Sin}[c+d\,x]}{d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 302 leaves):

$$\frac{1}{2\,d\,\sqrt{a\,(1+\text{Cos}[c+d\,x])}}\,\text{i}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(\sqrt{2}\,e^{-\frac{1}{2}\,\text{i}\,(c+d\,x)}\sqrt{\frac{e^{\text{i}\,(c+d\,x)}}{1+e^{2\,\text{i}\,(c+d\,x)}}}\sqrt{1+e^{2\,\text{i}\,(c+d\,x)}}\left(\text{i}\,C\,d\,x+C\,\text{ArcSinh}\left[e^{\text{i}\,(c+d\,x)}\right]-2\,\sqrt{2}\,(A+C)\,\text{Log}\left[1+e^{\text{i}\,(c+d\,x)}\right]-C\,\text{Log}\left[1+\sqrt{1+e^{2\,\text{i}\,(c+d\,x)}}\right]+2\,\sqrt{2}\,A\,\text{Log}\left[1-e^{\text{i}\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,\text{i}\,(c+d\,x)}}\right]+2\,\sqrt{2}\,C\,\text{Log}\left[1-e^{\text{i}\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,\text{i}\,(c+d\,x)}}\right]\right)+2\,\text{i}\,C\,\sqrt{\text{Sec}[c+d\,x]}\left(\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\right)\right)$$

Problem 1237: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+C\,\text{Cos}[c+d\,x]^2}{\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 223 leaves, 8 steps):

$$\frac{(8\,A+7\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{4\,\sqrt{a}\,d}-\frac{1}{\sqrt{a}\,d}\sqrt{2}\,(A+C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+\frac{C\,\text{Sin}[c+d\,x]}{2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}}-\frac{C\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 572 leaves):

$$\frac{1}{16\, d\, \sqrt{a\, (1+\text{Cos}[c+d\, x])}}\, e^{-3\, i\, (c+d\, x)}\, \left(1+e^{i\, (c+d\, x)}\right) \left(i\, C - 2\, i\, C\, e^{i\, (c+d\, x)} + 3\, i\, C\, e^{2\, i\, (c+d\, x)} - 3\, i\, C\, e^{3\, i\, (c+d\, x)} + 2\, i\, C\, e^{4\, i\, (c+d\, x)} - i\, C\, e^{5\, i\, (c+d\, x)} + 8\, A\, d\, e^{2\, i\, (c+d\, x)}\, \sqrt{1+e^{2\, i\, (c+d\, x)}}\, x + 7\, C\, d\, e^{2\, i\, (c+d\, x)}\, \sqrt{1+e^{2\, i\, (c+d\, x)}}\, x - i\, (8\, A+7\, C)\, e^{2\, i\, (c+d\, x)}\, \sqrt{1+e^{2\, i\, (c+d\, x)}}\, \text{ArcSinh}\left[e^{i\, (c+d\, x)}\right] + 8\, i\, \sqrt{2}\, (A+C)\, e^{2\, i\, (c+d\, x)}\, \sqrt{1+e^{2\, i\, (c+d\, x)}}\, \text{Log}\left[1+e^{i\, (c+d\, x)}\right] + 8\, i\, A\, e^{2\, i\, (c+d\, x)}\, \sqrt{1+e^{2\, i\, (c+d\, x)}}\, \text{Log}\left[1+\sqrt{1+e^{2\, i\, (c+d\, x)}}\right] + 7\, i\, C\, e^{2\, i\, (c+d\, x)}\, \sqrt{1+e^{2\, i\, (c+d\, x)}}\, \text{Log}\left[1+\sqrt{1+e^{2\, i\, (c+d\, x)}}\right] - 8\, i\, \sqrt{2}\, A\, e^{2\, i\, (c+d\, x)}\, \sqrt{1+e^{2\, i\, (c+d\, x)}}\, \text{Log}\left[1-e^{i\, (c+d\, x)}+\sqrt{2}\, \sqrt{1+e^{2\, i\, (c+d\, x)}}\right] - 8\, i\, \sqrt{2}\, C\, e^{2\, i\, (c+d\, x)}\, \sqrt{1+e^{2\, i\, (c+d\, x)}}\, \text{Log}\left[1-e^{i\, (c+d\, x)}+\sqrt{2}\, \sqrt{1+e^{2\, i\, (c+d\, x)}}\right]\right) \sqrt{\text{Sec}[c+d\, x]}$$

Problem 1238: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+C\, \text{Cos}[c+d\, x]^2}{\sqrt{a+a\, \text{Cos}[c+d\, x]}\, \text{Sec}[c+d\, x]^{3/2}}\, dx$$

Optimal (type 3, 266 leaves, 9 steps):

$$-\frac{(8\, A+9\, C)\, \text{ArcSin}\left[\frac{\sqrt{a}\, \text{Sin}[c+d\, x]}{\sqrt{a+a\, \text{Cos}[c+d\, x]}}\right] \sqrt{\text{Cos}[c+d\, x]}\, \sqrt{\text{Sec}[c+d\, x]}}{8\, \sqrt{a}\, d} + \frac{1}{\sqrt{a}\, d} \sqrt{2}\, (A+C)\, \text{ArcTan}\left[\frac{\sqrt{a}\, \text{Sin}[c+d\, x]}{\sqrt{2}\, \sqrt{\text{Cos}[c+d\, x]}\, \sqrt{a+a\, \text{Cos}[c+d\, x]}}\right] \sqrt{\text{Cos}[c+d\, x]}\, \sqrt{\text{Sec}[c+d\, x]} + \frac{C\, \text{Sin}[c+d\, x]}{3\, d\, \sqrt{a+a\, \text{Cos}[c+d\, x]}\, \text{Sec}[c+d\, x]^{5/2}} - \frac{C\, \text{Sin}[c+d\, x]}{12\, d\, \sqrt{a+a\, \text{Cos}[c+d\, x]}\, \text{Sec}[c+d\, x]^{3/2}} + \frac{(8\, A+7\, C)\, \text{Sin}[c+d\, x]}{8\, d\, \sqrt{a+a\, \text{Cos}[c+d\, x]}\, \sqrt{\text{Sec}[c+d\, x]}}$$

Result (type 3, 638 leaves):

$$-\frac{1}{96\,d\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}}\,\mathrm{i}\,e^{-4\,\mathrm{i}\,(c+d\,x)}\,\left(1+e^{\mathrm{i}\,(c+d\,x)}\right)\,\left(-2\,C+3\,C\,e^{\mathrm{i}\,(c+d\,x)}-24\,A\,e^{2\,\mathrm{i}\,(c+d\,x)}-28\,C\,e^{2\,\mathrm{i}\,(c+d\,x)}+24\,A\,e^{3\,\mathrm{i}\,(c+d\,x)}+29\,C\,e^{3\,\mathrm{i}\,(c+d\,x)}-24\,A\,e^{4\,\mathrm{i}\,(c+d\,x)}-29\,C\,e^{4\,\mathrm{i}\,(c+d\,x)}+24\,A\,e^{5\,\mathrm{i}\,(c+d\,x)}+28\,C\,e^{5\,\mathrm{i}\,(c+d\,x)}-3\,C\,e^{6\,\mathrm{i}\,(c+d\,x)}+2\,C\,e^{7\,\mathrm{i}\,(c+d\,x)}-24\,\mathrm{i}\,A\,d\,e^{3\,\mathrm{i}\,(c+d\,x)}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\,x-27\,\mathrm{i}\,C\,d\,e^{3\,\mathrm{i}\,(c+d\,x)}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\,x-3\,(8\,A+9\,C)\,e^{3\,\mathrm{i}\,(c+d\,x)}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\,\text{ArcSinh}\left[e^{\mathrm{i}\,(c+d\,x)}\right]+48\,\sqrt{2}\,(A+C)\,e^{3\,\mathrm{i}\,(c+d\,x)}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\,\text{Log}\left[1+e^{\mathrm{i}\,(c+d\,x)}\right]+24\,A\,e^{3\,\mathrm{i}\,(c+d\,x)}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\,\text{Log}\left[1+\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\right]+27\,C\,e^{3\,\mathrm{i}\,(c+d\,x)}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\,\text{Log}\left[1+\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\right]-48\,\sqrt{2}\,A\,e^{3\,\mathrm{i}\,(c+d\,x)}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\,\text{Log}\left[1-e^{\mathrm{i}\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\right]-48\,\sqrt{2}\,C\,e^{3\,\mathrm{i}\,(c+d\,x)}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\,\text{Log}\left[1-e^{\mathrm{i}\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\right]\right)\,\sqrt{\text{Sec}[c+d\,x]}$$

Problem 1239: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{9/2}}{\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 3, 315 leaves, 9 steps):

$$\frac{1}{2\,\sqrt{2}\,a^{3/2}\,d}(19\,A+11\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{(1201\,A+665\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{210\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{(397\,A+245\,C)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{210\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{(67\,A+35\,C)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{70\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{(A+C)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{2\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}}+\frac{(11\,A+7\,C)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{14\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 279 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\left(-\frac{1}{d}\mathrm{i}\,(19\,A+11\,C)\,e^{-\frac{1}{2}\,\mathrm{i}\,(c+d\,x)}\,\sqrt{\frac{e^{\mathrm{i}\,(c+d\,x)}}{1+e^{2\,\mathrm{i}\,(c+d\,x)}}}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\,\left(\text{Log}\left[1+e^{\mathrm{i}\,(c+d\,x)}\right]-\text{Log}\left[1-e^{\mathrm{i}\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\right]\right)-\frac{1}{840\,d}\left(2339\,A+1435\,C+72\,(71\,A+35\,C)\,\text{Cos}[c+d\,x]+60\,(67\,A+35\,C)\,\text{Cos}\left[2\,(c+d\,x)\right]+1608\,A\,\text{Cos}\left[3\,(c+d\,x)\right]+840\,C\,\text{Cos}\left[3\,(c+d\,x)\right]+1201\,A\,\text{Cos}\left[4\,(c+d\,x)\right]+665\,C\,\text{Cos}\left[4\,(c+d\,x)\right]\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}[c+d\,x]^{7/2}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}$$

Problem 1240: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{7/2}}{\left(a + a \operatorname{Cos}[c + d x]\right)^{3/2}} \, dx$$

Optimal (type 3, 268 leaves, 8 steps):

$$-\frac{1}{2 \sqrt{2}\, a^{3/2} d}\left(15 A + 7 C\right) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c + d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + a \operatorname{Cos}[c + d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]} + \frac{\left(49 A + 25 C\right) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{10 a d \sqrt{a + a \operatorname{Cos}[c + d x]}} - \frac{\left(13 A + 5 C\right) \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{10 a d \sqrt{a + a \operatorname{Cos}[c + d x]}} - \frac{\left(A + C\right) \operatorname{Sec}[c + d x]^{5/2} \operatorname{Sin}[c + d x]}{2 d \left(a + a \operatorname{Cos}[c + d x]\right)^{3/2}} + \frac{\left(9 A + 5 C\right) \operatorname{Sec}[c + d x]^{5/2} \operatorname{Sin}[c + d x]}{10 a d \sqrt{a + a \operatorname{Cos}[c + d x]}}$$

Result (type 3, 256 leaves):

$$\frac{1}{5 d \left(a \left(1 + \operatorname{Cos}[c + d x]\right)\right)^{3/2}} \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]^3 \left(5 i \left(15 A + 7 C\right) e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1 + e^{2 i (c+d x)}}} \sqrt{1 + e^{2 i (c+d x)}} \left(\operatorname{Log}\left[1 + e^{i (c+d x)}\right] - \operatorname{Log}\left[1 - e^{i (c+d x)} + \sqrt{2} \sqrt{1 + e^{2 i (c+d x)}}\right]\right) + \frac{1}{4} \left(88 A + 40 C + \left(131 A + 75 C\right) \operatorname{Cos}[c + d x] + 8 \left(9 A + 5 C\right) \operatorname{Cos}[2 (c + d x)] + 49 A \operatorname{Cos}[3 (c + d x)] + 25 C \operatorname{Cos}[3 (c + d x)]\right) \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right] \operatorname{Sec}[c + d x]^{5/2} \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]\right)$$

Problem 1241: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{5/2}}{\left(a + a \operatorname{Cos}[c + d x]\right)^{3/2}} \, dx$$

Optimal (type 3, 221 leaves, 7 steps):

$$\frac{1}{2\sqrt{2}\,a^{3/2}\,d}(11A+3C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\right]$$

$$\sqrt{\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}-\frac{(19A+3C)\,\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{6\,a\,d\,\sqrt{a+a\,\text{Cos}[c+dx]}}-$$

$$\frac{(A+C)\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{2\,d\,(a+a\,\text{Cos}[c+dx])^{3/2}}+\frac{(7A+3C)\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{6\,a\,d\,\sqrt{a+a\,\text{Cos}[c+dx]}}$$

Result (type 3, 228 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left(-\frac{1}{d}\,i\,(11A+3C)\,e^{-\frac{1}{2}i(c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\right.\right.$$

$$\sqrt{1+e^{2i(c+dx)}}\left(\text{Log}\left[1+e^{i(c+dx)}\right]-\text{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\,\sqrt{1+e^{2i(c+dx)}}\right]\right)-$$

$$\frac{1}{6d}\left(11A+3C+24A\,\text{Cos}[c+dx]+(19A+3C)\,\text{Cos}[2(c+dx)]\right)\text{Sec}\left[\frac{1}{2}(c+dx)\right]$$

$$\left.\left.\text{Sec}[c+dx]^{3/2}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right)\right)\Big/\left(a\,(1+\text{Cos}[c+dx])\right)^{3/2}$$

Problem 1242: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(A+C\,\text{Cos}[c+dx]^2\right)\text{Sec}[c+dx]^{3/2}}{(a+a\,\text{Cos}[c+dx])^{3/2}}\,dx$$

Optimal (type 3, 172 leaves, 6 steps):

$$-\frac{1}{2\sqrt{2}\,a^{3/2}\,d}$$

$$(7A-C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\right]\sqrt{\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}-$$

$$\frac{(A+C)\,\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{2\,d\,(a+a\,\text{Cos}[c+dx])^{3/2}}+\frac{(5A+C)\,\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{2\,a\,d\,\sqrt{a+a\,\text{Cos}[c+dx]}}$$

Result (type 3, 206 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left(i\,(7A-C)\,e^{-\frac{1}{2}i(c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\sqrt{1+e^{2i(c+dx)}}\right.\right.$$

$$\left(\text{Log}\left[1+e^{i(c+dx)}\right]-\text{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\,\sqrt{1+e^{2i(c+dx)}}\right]\right)+\left(4A+(5A+C)\,\text{Cos}[c+dx]\right)$$

$$\left.\left.\text{Sec}\left[\frac{1}{2}(c+dx)\right]\sqrt{\text{Sec}[c+dx]}\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right)\right)\Big/\left(d\,\left(a\,(1+\text{Cos}[c+dx])\right)^{3/2}\right)$$

Problem 1243: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\sqrt{\mathrm{Sec}[c+d\,x]}}{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 3, 185 leaves, 7 steps):

$$\frac{2\,C\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}{a^{3/2}\,d}+\frac{1}{2\sqrt{2}\,a^{3/2}\,d}\left(3A-5C\right)\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}-\frac{\left(A+C\right)\mathrm{Sin}[c+d\,x]}{2\,d\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\sqrt{\mathrm{Sec}[c+d\,x]}}$$

Result (type 3, 326 leaves):

$$\frac{1}{2\,d\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}}\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3\left(\sqrt{2}\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\left(4\,C\,d\,x-4\,i\,C\,\mathrm{ArcSinh}\left[e^{i\,(c+d\,x)}\right]-i\sqrt{2}\left(3A-5C\right)\mathrm{Log}\left[1+e^{i\,(c+d\,x)}\right]+4\,i\,C\,\mathrm{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+3\,i\sqrt{2}\,A\,\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-5\,i\sqrt{2}\,C\,\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\left(A+C\right)\mathrm{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\sqrt{\mathrm{Sec}[c+d\,x]}\left(\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{3}{2}\left(c+d\,x\right)\right]\right)\right)$$

Problem 1244: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+C\,\mathrm{Cos}[c+d\,x]^2}{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\sqrt{\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 228 leaves, 8 steps):

$$-\frac{3\,C\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}{a^{3/2}\,d}+\frac{1}{2\sqrt{2}\,a^{3/2}\,d}\left(A+9C\right)\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}-\frac{\left(A+C\right)\mathrm{Sin}[c+d\,x]}{2\,d\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\mathrm{Sec}[c+d\,x]^{3/2}}+\frac{\left(A+3C\right)\mathrm{Sin}[c+d\,x]}{2\,a\,d\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}$$

Result (type 3, 329 leaves):

$$\frac{1}{2\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\left(-i\,\sqrt{2}\,e^{-\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\left(-6\,i\,C\,d\,x-6\,C\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]+\sqrt{2}\,(A+9\,C)\,\text{Log}\left[1+e^{i\,(c+d\,x)}\right]+6\,C\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-\sqrt{2}\,A\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-9\,\sqrt{2}\,C\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+(A+3\,C+2\,C\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{\text{Sec}[c+d\,x]}\,\left(-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\right)\right)$$

Problem 1245: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 285 leaves, 9 steps):

$$\frac{(8\,A+19\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{4\,a^{3/2}\,d}-\frac{1}{2\,\sqrt{2}\,a^{3/2}\,d}(5\,A+13\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{5/2}}+\frac{(A+2\,C)\,\text{Sin}[c+d\,x]}{2\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}}-\frac{(2\,A+7\,C)\,\text{Sin}[c+d\,x]}{4\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 1004 leaves):

$$\left(i\,A\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/\left(d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\right)+$$

$$\left(7\,i\,C\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/\left(2\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\right)+$$

$$\left(2\sqrt{2}\,A\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(d\,x-i\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]+i\sqrt{2}\,\text{Log}\left[1+e^{i\,(c+d\,x)}\right]+i\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-i\sqrt{2}\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/\left(d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\right)+$$

$$\left(19\,C\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(d\,x-i\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]+i\sqrt{2}\,\text{Log}\left[1+e^{i\,(c+d\,x)}\right]+i\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-i\sqrt{2}\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/\left(2\sqrt{2}\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\sqrt{\text{Sec}[c+d\,x]}\left(\frac{(-4\,A+3\,C)\,\text{Cos}\left[\frac{d\,x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{2\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{c}{2}\right]+C\,\text{Sin}\left[\frac{c}{2}\right]\right)}{d}-\frac{3\,C\,\text{Cos}\left[\frac{3\,d\,x}{2}\right]\text{Sin}\left[\frac{3\,c}{2}\right]}{d}+\frac{C\,\text{Cos}\left[\frac{5\,d\,x}{2}\right]\text{Sin}\left[\frac{5\,c}{2}\right]}{2\,d}+\frac{(-4\,A+3\,C)\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]}{2\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}-\frac{3\,C\,\text{Cos}\left[\frac{3\,c}{2}\right]\text{Sin}\left[\frac{3\,d\,x}{2}\right]}{d}+\frac{C\,\text{Cos}\left[\frac{5\,c}{2}\right]\text{Sin}\left[\frac{5\,d\,x}{2}\right]}{2\,d}\right)\right)\Big/\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}$$

Problem 1246: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^{7/2}}{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 3, 315 leaves, 9 steps):

$$-\frac{1}{16\sqrt{2}\,a^{5/2}\,d}\left(283\,A+75\,C\right)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}+\frac{\left(2671\,A+735\,C\right)\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{240\,a^2\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}-\frac{\left(787\,A+195\,C\right)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{240\,a^2\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}-\frac{\left(A+C\right)\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{4\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{5/2}}-\frac{\left(21\,A+5\,C\right)\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{16\,a\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}+\frac{\left(157\,A+45\,C\right)\,\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{80\,a^2\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 3, 476 leaves):

$$\left(i\,\left(283\,A+75\,C\right)\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(\mathrm{Log}\left[1+e^{i\,(c+d\,x)}\right]-\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/\left(4\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\right)+\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\sqrt{\mathrm{Sec}[c+d\,x]}\left(\frac{\left(2671\,A+735\,C\right)\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\,\mathrm{Sin}\left[\frac{c}{2}\right]}{30\,d}+\frac{\left(2671\,A+735\,C\right)\,\mathrm{Cos}\left[\frac{c}{2}\right]\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{30\,d}+\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(-29\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-13\,C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{4\,d}+\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\left(-A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-C\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{2\,d}-\frac{176\,A\,\mathrm{Sec}[c+d\,x]\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]}{15\,d}+\frac{16\,A\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]}{5\,d}-\frac{\left(29\,A+13\,C\right)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\mathrm{Tan}\left[\frac{c}{2}\right]}{4\,d}-\frac{\left(A+C\right)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\mathrm{Tan}\left[\frac{c}{2}\right]}{2\,d}\right)\right)\Big/\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}$$

Problem 1247: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A + C \,\text{Cos}[c + d\,x]^2\right) \text{Sec}[c + d\,x]^{5/2}}{\left(a + a\,\text{Cos}[c + d\,x]\right)^{5/2}} \,dx$$

Optimal (type 3, 266 leaves, 8 steps):

$$\frac{1}{16\sqrt{2}\, a^{5/2}\, d}\left(163\,A + 19\,C\right) \text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c + d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{a + a\,\text{Cos}[c + d\,x]}}\right] \sqrt{\text{Cos}[c + d\,x]}\,\sqrt{\text{Sec}[c + d\,x]} - \frac{\left(299\,A + 27\,C\right)\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{48\,a^2\,d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}} - \frac{\left(A + C\right)\text{Sec}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x]}{4\,d\,\left(a + a\,\text{Cos}[c + d\,x]\right)^{5/2}} - \frac{\left(17\,A + C\right)\text{Sec}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x]}{16\,a\,d\,\left(a + a\,\text{Cos}[c + d\,x]\right)^{3/2}} + \frac{5\,\left(19\,A + 3\,C\right)\text{Sec}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x]}{48\,a^2\,d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}}$$

Result (type 3, 261 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\left(c + d\,x\right)\right]^5 \left(-\frac{1}{d}\,i\,\left(163\,A + 19\,C\right) e^{-\frac{1}{2}\,i\,(c+d\,x)} \sqrt{\frac{e^{i\,(c+d\,x)}}{1 + e^{2\,i\,(c+d\,x)}}}\,\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\left(\text{Log}\left[1 + e^{i\,(c+d\,x)}\right] - \text{Log}\left[1 - e^{i\,(c+d\,x)} + \sqrt{2}\,\sqrt{1 + e^{2\,i\,(c+d\,x)}}\right]\right) - \frac{1}{24\,d}\left(878\,A + 78\,C + \left(1537\,A + 81\,C\right)\text{Cos}[c + d\,x] + 2\,\left(503\,A + 39\,C\right)\text{Cos}\left[2\,\left(c + d\,x\right)\right] + 299\,A\,\text{Cos}\left[3\,\left(c + d\,x\right)\right] + 27\,C\,\text{Cos}\left[3\,\left(c + d\,x\right)\right]\right)\text{Sec}\left[\frac{1}{2}\left(c + d\,x\right)\right]^3 \text{Sec}[c + d\,x]^{3/2}\,\text{Tan}\left[\frac{1}{2}\left(c + d\,x\right)\right]\right)\right) \Big/ \left(4\,\left(a\,\left(1 + \text{Cos}[c + d\,x]\right)\right)^{5/2}\right)$$

Problem 1248: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(A + C \,\text{Cos}[c + d\,x]^2\right) \text{Sec}[c + d\,x]^{3/2}}{\left(a + a\,\text{Cos}[c + d\,x]\right)^{5/2}} \,dx$$

Optimal (type 3, 219 leaves, 7 steps):

$$-\frac{1}{16\sqrt{2}\,a^{5/2}\,d}5\,(15\,A-C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{(A+C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,(a+a\,\text{Cos}[c+d\,x])^{5/2}}-\frac{(13\,A-3\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(49\,A+C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{16\,a^2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 230 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\left(5\,i\,(15\,A-C)\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\sqrt{1+e^{2\,i\,(c+d\,x)}}\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\frac{1}{4}\left(113\,A+C+10\,(17\,A+C)\,\text{Cos}[c+d\,x]+(49\,A+C)\,\text{Cos}[2\,(c+d\,x)]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\sqrt{\text{Sec}[c+d\,x]}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/\left(4\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\right)$$

Problem 1249: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\sqrt{\text{Sec}[c+d\,x]}}{(a+a\,\text{Cos}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 174 leaves, 6 steps):

$$\frac{1}{16\sqrt{2}\,a^{5/2}\,d}(19\,A+3\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{4\,d\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\sqrt{\text{Sec}[c+d\,x]}}-\frac{(9\,A-7\,C)\,\text{Sin}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 233 leaves):

$$-\left(\left(\left(i\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\left((19\,A+3\,C)\,e^{-\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\frac{1}{4}\,i\,(13\,A-3\,C+(9\,A-7\,C)\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\sqrt{\text{Sec}[c+d\,x]}\,\left(\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\right)\right)\right)\right)\Big/\left(4\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\right)\right)$$

Problem 1250: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 232 leaves, 8 steps):

$$\frac{2\,C\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{a^{5/2}\,d}+\frac{1}{16\,\sqrt{2}\,a^{5/2}\,d}(5\,A-43\,C)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{(A+C)\,\text{Sin}[c+d\,x]}{4\,d\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{3/2}}+\frac{(5\,A-11\,C)\,\text{Sin}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 345 leaves):

$$\frac{1}{8\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\left(\sqrt{2}\,e^{-\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\left(32\,C\,d\,x-32\,i\,C\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]-i\,\sqrt{2}\,(5\,A-43\,C)\,\text{Log}\left[1+e^{i\,(c+d\,x)}\right]+32\,i\,C\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+5\,i\,\sqrt{2}\,A\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-43\,i\,\sqrt{2}\,C\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\frac{1}{2}\,(5\,A-11\,C+(A-15\,C)\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\sqrt{\text{Sec}[c+d\,x]}\,\left(-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\right)\right)$$

Problem 1251: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A + C \operatorname{Cos}[c + d x]^2}{(a + a \operatorname{Cos}[c + d x])^{5/2} \operatorname{Sec}[c + d x]^{3/2}} \, dx$$

Optimal (type 3, 277 leaves, 9 steps):

$$-\frac{5 C \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}}{a^{5/2} d} + \frac{1}{16 \sqrt{2} a^{5/2} d}$$
$$(3 A + 115 C) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c + d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + a \operatorname{Cos}[c + d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]} -$$
$$\frac{(A + C) \operatorname{Sin}[c + d x]}{4 d (a + a \operatorname{Cos}[c + d x])^{5/2} \operatorname{Sec}[c + d x]^{5/2}} +$$
$$\frac{(A - 15 C) \operatorname{Sin}[c + d x]}{16 a d (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sec}[c + d x]^{3/2}} + \frac{(3 A + 35 C) \operatorname{Sin}[c + d x]}{16 a^2 d \sqrt{a + a \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}}$$

Result (type 3, 352 leaves):

$$\frac{1}{8 d (a (1 + \operatorname{Cos}[c + d x]))^{5/2}} \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]^5$$
$$\left(-i \sqrt{2} e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1 + e^{2 i (c+d x)}}} \sqrt{1 + e^{2 i (c+d x)}} \left(-80 i C d x - 80 C \operatorname{ArcSinh}\left[e^{i (c+d x)}\right] + \right.\right.$$
$$\sqrt{2} (3 A + 115 C) \operatorname{Log}\left[1 + e^{i (c+d x)}\right] + 80 C \operatorname{Log}\left[1 + \sqrt{1 + e^{2 i (c+d x)}}\right] - 3 \sqrt{2} A \operatorname{Log}\left[\right.$$
$$\left.\left. 1 - e^{i (c+d x)} + \sqrt{2} \sqrt{1 + e^{2 i (c+d x)}}\right] - 115 \sqrt{2} C \operatorname{Log}\left[1 - e^{i (c+d x)} + \sqrt{2} \sqrt{1 + e^{2 i (c+d x)}}\right]\right) +$$
$$\frac{1}{2} (3 A + 43 C + (7 A + 55 C) \operatorname{Cos}[c + d x] + 8 C \operatorname{Cos}[2 (c + d x)]) \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^4$$
$$\left.\sqrt{\operatorname{Sec}[c + d x]} \left(-\operatorname{Sin}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{3}{2} (c + d x)\right]\right)\right)$$

Problem 1252: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + C \operatorname{Cos}[c + d x]^2}{(a + a \operatorname{Cos}[c + d x])^{5/2} \operatorname{Sec}[c + d x]^{5/2}} \, dx$$

Optimal (type 3, 334 leaves, 10 steps):

$$\frac{(8 A+39 C) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}}{4 a^{5/2} d}-\frac{1}{16 \sqrt{2} a^{5/2} d}$$

$$(43 A+219 C) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}-$$

$$\frac{(A+C) \operatorname{Sin}[c+d x]}{4 d (a+a \operatorname{Cos}[c+d x])^{5/2} \operatorname{Sec}[c+d x]^{7/2}}-\frac{(3 A+19 C) \operatorname{Sin}[c+d x]}{16 a d (a+a \operatorname{Cos}[c+d x])^{3/2} \operatorname{Sec}[c+d x]^{5/2}}+$$

$$\frac{(7 A+31 C) \operatorname{Sin}[c+d x]}{16 a^2 d \sqrt{a+a \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x]^{3/2}}-\frac{(11 A+63 C) \operatorname{Sin}[c+d x]}{16 a^2 d \sqrt{a+a \operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 3, 1076 leaves) :

$$\left(11 i A e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\right.$$

$$\left.\left(\operatorname{Log}\left[1+e^{i (c+d x)}\right]-\operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/ \left(4 d (a (1+\operatorname{Cos}[c+d x]))^{5/2}\right)+$$

$$\left(63 i C e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\right.$$

$$\left.\left(\operatorname{Log}\left[1+e^{i (c+d x)}\right]-\operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/ \left(4 d (a (1+\operatorname{Cos}[c+d x]))^{5/2}\right)+$$

$$\left(4 \sqrt{2} A e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\right.$$

$$\left(d x-i \operatorname{ArcSinh}\left[e^{i (c+d x)}\right]+i \sqrt{2} \operatorname{Log}\left[1+e^{i (c+d x)}\right]+i \operatorname{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-\right.$$

$$\left.\left.i \sqrt{2} \operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/ \left(d (a (1+\operatorname{Cos}[c+d x]))^{5/2}\right)+$$

$$\left(39 C e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\right.$$

$$\left(d x-i \operatorname{ArcSinh}\left[e^{i (c+d x)}\right]+i \sqrt{2} \operatorname{Log}\left[1+e^{i (c+d x)}\right]+\right.$$

$$\left.\left.i \operatorname{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-i \sqrt{2} \operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/$$

$$\left(\sqrt{2}\, d\, \left(a\, \left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5 \sqrt{\text{Sec}[c+d\,x]}\right.$$
$$\left(-\frac{3\,(5\,A+3\,C)\,\text{Cos}\left[\frac{d\,x}{2}\right]\,\text{Sin}\left[\frac{c}{2}\right]}{2\,d}-\frac{10\,C\,\text{Cos}\left[\frac{3\,d\,x}{2}\right]\,\text{Sin}\left[\frac{3\,c}{2}\right]}{d}+\frac{C\,\text{Cos}\left[\frac{5\,d\,x}{2}\right]\,\text{Sin}\left[\frac{5\,c}{2}\right]}{d}-\right.$$
$$\frac{3\,(5\,A+3\,C)\,\text{Cos}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]}{2\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\left(-A\,\text{Sin}\left[\frac{d\,x}{2}\right]-C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{2\,d}+$$
$$\frac{\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\left(19\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+35\,C\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{4\,d}-\frac{10\,C\,\text{Cos}\left[\frac{3\,c}{2}\right]\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]}{d}+$$
$$\frac{C\,\text{Cos}\left[\frac{5\,c}{2}\right]\,\text{Sin}\left[\frac{5\,d\,x}{2}\right]}{d}+\frac{(19\,A+35\,C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Tan}\left[\frac{c}{2}\right]}{4\,d}-$$
$$\left.\left.\frac{(A+C)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Tan}\left[\frac{c}{2}\right]}{2\,d}\right)\right)\Big/\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}$$

Problem 1313: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{5/2}\,dx$$

Optimal (type 3, 140 leaves, 5 steps):

$$\frac{2\,\sqrt{a}\,C\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}+$$
$$\frac{2\,a\,(A+3\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{2\,A\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 424 leaves):

$$\frac{1}{d}\sqrt{a\,(1+\text{Cos}[c+d\,x])}\;\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\sqrt{\text{Sec}[c+d\,x]}\left(\frac{2}{3}\,(2\,A+3\,B)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{2}{3}\,A\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)-$$

$$\frac{1}{d}8\left(-3-2\sqrt{2}\right)C\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

$$\sqrt{a\,(1+\text{Cos}[c+d\,x])}\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+\right.$$

$$\left.2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

$$\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

Problem 1314: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^{3/2}\,dx$$

Optimal (type 3, 141 leaves, 5 steps):

$$\frac{\sqrt{a}\,(2\,B+C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}-$$

$$\frac{a\,(2\,A-C)\,\text{Sin}[c+d\,x]}{d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,A\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d}$$

Result (type 4, 422 leaves):

$$\frac{1}{d}\sqrt{a\left(1+\text{Cos}[c+d\,x]\right)}\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]$$
$$\sqrt{\text{Sec}[c+d\,x]}\ \left(\frac{1}{2}\left(4\,A-C\right)\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\frac{1}{2}\,C\,\text{Sin}\left[\frac{3}{2}\left(c+d\,x\right)\right]\right)-$$
$$\frac{1}{d}\,4\left(-3-2\sqrt{2}\right)\left(2\,B+C\right)\,\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{1+\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{1+\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]}}\ \left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)$$
$$\sqrt{a\left(1+\text{Cos}[c+d\,x]\right)}\ \left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]+\right.$$
$$\left.2\,\text{EllipticPi}\left[-3+2\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\,\text{Sec}\left[\frac{1}{4}\left(c+d\,x\right)\right]^2}$$
$$\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\left(c+d\,x\right)\right]^2}$$

Problem 1315: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Cos}[c+d\,x]}\ \left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\sqrt{\text{Sec}[c+d\,x]}\ dx$$

Optimal (type 3, 151 leaves, 5 steps):

$$\frac{1}{4\,d}\sqrt{a}\ \left(8\,A+4\,B+3\,C\right)\,\text{ArcSin}\left[\frac{\sqrt{a}\ \text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{\text{Sec}[c+d\,x]}\ +$$
$$\frac{a\left(4\,B+C\right)\,\text{Sin}[c+d\,x]}{4\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}\ \sqrt{\text{Sec}[c+d\,x]}}+\frac{C\sqrt{a+a\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{2\,d\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 441 leaves):

$$\frac{1}{d}\sqrt{a\left(1+\text{Cos}[c+d\,x]\right)}\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\sqrt{\text{Sec}[c+d\,x]}\left(-\frac{1}{8}\left(4\,B+C\right)\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\frac{1}{4}\left(2\,B+C\right)\text{Sin}\left[\frac{3}{2}\left(c+d\,x\right)\right]+\frac{1}{8}\,C\,\text{Sin}\left[\frac{5}{2}\left(c+d\,x\right)\right]\right)+$$

$$\frac{1}{d}\left(2+\frac{3}{\sqrt{2}}\right)\left(8\,A+4\,B+3\,C\right)\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{1+\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]}}$$
$$\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\sqrt{a\left(1+\text{Cos}[c+d\,x]\right)}$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+\right.$$
$$\left.2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\text{Sec}\left[\frac{1}{4}\left(c+d\,x\right)\right]^2}$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\text{Sec}\left[\frac{1}{4}\left(c+d\,x\right)\right]^2}$$
$$\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\left(c+d\,x\right)\right]^2}$$

Problem 1316: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+a\,\text{Cos}[c+d\,x]}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 199 leaves, 6 steps):

$$\frac{1}{8\,d}\sqrt{a}\left(8\,A+6\,B+5\,C\right)\text{ArcSin}\left[\frac{\sqrt{a}\ \text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{a\left(6\,B+C\right)\text{Sin}[c+d\,x]}{12\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}\ \text{Sec}[c+d\,x]^{3/2}}+$$
$$\frac{C\sqrt{a+a\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{3\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a\left(8\,A+6\,B+5\,C\right)\text{Sin}[c+d\,x]}{8\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 472 leaves):

$$\frac{1}{d}\sqrt{a\,(1+\text{Cos}[c+d\,x])}\;\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\sqrt{\text{Sec}[c+d\,x]}$$
$$\left(-\frac{1}{48}\,(24\,A+6\,B+11\,C)\;\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{12}\,(6\,A+3\,B+4\,C)\;\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+\right.$$
$$\left.\frac{1}{16}\,(2\,B+C)\;\text{Sin}\left[\frac{5}{2}\,(c+d\,x)\right]+\frac{1}{24}\,C\,\text{Sin}\left[\frac{7}{2}\,(c+d\,x)\right]\right)+$$

$$\frac{1}{d}\left(1+\frac{3}{2\sqrt{2}}\right)(8\,A+6\,B+5\,C)\;\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}$$
$$\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\sqrt{a\,(1+\text{Cos}[c+d\,x])}$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]+\right.$$
$$\left.2\,\text{EllipticPi}\left[-3+2\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],\,17-12\sqrt{2}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$
$$\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

Problem 1317: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+a\,\text{Cos}[c+d\,x]}\;\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 247 leaves, 7 steps):

$$\frac{1}{64\,d}\sqrt{a}\;(48\,A+40\,B+35\,C)\;\text{ArcSin}\left[\frac{\sqrt{a}\;\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{a\,(8\,B+C)\;\text{Sin}[c+d\,x]}{24\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{5/2}}+\frac{C\sqrt{a+a\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{4\,d\,\text{Sec}[c+d\,x]^{5/2}}+$$
$$\frac{a\,(48\,A+40\,B+35\,C)\;\text{Sin}[c+d\,x]}{96\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{3/2}}+\frac{a\,(48\,A+40\,B+35\,C)\;\text{Sin}[c+d\,x]}{64\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 496 leaves):

$$\frac{1}{d}\sqrt{a\,(1+\text{Cos}[c+d\,x])}\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\sqrt{\text{Sec}[c+d\,x]}\left(-\frac{1}{384}\,(48\,A+88\,B+41\,C)\ \text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{48}\,(12\,A+16\,B+11\,C)\ \text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+\frac{1}{128}\,(16\,A+8\,B+15\,C)\ \text{Sin}\left[\frac{5}{2}\,(c+d\,x)\right]+\frac{1}{48}\,(2\,B+C)\ \text{Sin}\left[\frac{7}{2}\,(c+d\,x)\right]+\frac{1}{64}\,C\,\text{Sin}\left[\frac{9}{2}\,(c+d\,x)\right]\right)+$$

$$\frac{1}{\left(-64+48\,\sqrt{2}\right)d}\,(48\,A+40\,B+35\,C)\ \text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4\sqrt{\frac{7-5\,\sqrt{2}+\left(10-7\,\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}$$

$$\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\sqrt{a\,(1+\text{Cos}[c+d\,x])}$$

$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\,\sqrt{2},\,-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\,\sqrt{2}}}\right],\,17-12\,\sqrt{2}\right]\right)$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

$$\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\,\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

Problem 1321: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^{7/2}\,dx$$

Optimal (type 3, 192 leaves, 6 steps):

$$\frac{2\,a^{3/2}\,C\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{2\,a^2\,(12\,A+20\,B+15\,C)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{2\,a\,(3\,A+5\,B)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{15\,d}+\frac{2\,A\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 4, 470 leaves):

$$\frac{1}{d}\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\sqrt{\text{Sec}[c+d x]}\left(\frac{1}{15}\left(18 A+25 B+15 C\right)\text{Sin}\left[\frac{1}{2}\left(c+d x\right)\right]+\frac{1}{5}A\,\text{Sec}[c+d x]^2\,\text{Sin}\left[\frac{1}{2}\left(c+d x\right)\right]+\frac{1}{15}\text{Sec}[c+d x]\left(9 A\,\text{Sin}\left[\frac{1}{2}\left(c+d x\right)\right]+5 B\,\text{Sin}\left[\frac{1}{2}\left(c+d x\right)\right]\right)\right)-$$

$$\frac{1}{d}4\left(-3-2\sqrt{2}\right)C\,\text{Cos}\left[\frac{1}{4}\left(c+d x\right)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]}{1+\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]}{1+\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]\right)$$

$$\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\left(c+d x\right)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+\right.$$

$$\left.2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\left(c+d x\right)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]\right)\text{Sec}\left[\frac{1}{4}\left(c+d x\right)\right]^2}$$

$$\text{Sec}[c+d x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\left(c+d x\right)\right]^2}$$

Problem 1322: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\text{Cos}[c+d x]\right)^{3/2}\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]^{5/2}\,dx$$

Optimal (type 3, 191 leaves, 6 steps):

$$\frac{a^{3/2}\left(2 B+3 C\right)\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}}{d}-$$

$$\frac{a^2\left(8 A+6 B-3 C\right)\text{Sin}[c+d x]}{3 d\sqrt{a+a\,\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}}+\frac{2 a\left(A+B\right)\sqrt{a+a\,\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{d}+$$

$$\frac{2 A\left(a+a\,\text{Cos}[c+d x]\right)^{3/2}\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{3 d}$$

Result (type 4, 452 leaves):

$$\frac{1}{d}\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\sqrt{\text{Sec}[c+d x]}\left(\frac{1}{12}\left(20 A+12 B-3 C\right)\text{Sin}\left[\frac{1}{2}\left(c+d x\right)\right]+\frac{1}{3}A\,\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}\left(c+d x\right)\right]+\frac{1}{4}C\,\text{Sin}\left[\frac{3}{2}\left(c+d x\right)\right]\right)-$$

$$\frac{1}{d}2\left(-3-2\sqrt{2}\right)\left(2 B+3 C\right)\text{Cos}\left[\frac{1}{4}\left(c+d x\right)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]}{1+\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]}}$$

$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]}{1+\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]\right)$$

$$\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\left(c+d x\right)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+\right.$$

$$\left.2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\left(c+d x\right)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d x\right)\right]\right)\text{Sec}\left[\frac{1}{4}\left(c+d x\right)\right]^2}$$

$$\text{Sec}[c+d x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\left(c+d x\right)\right]^2}$$

Problem 1323: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\text{Cos}[c+d x]\right)^{3/2}\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]^{3/2}\,dx$$

Optimal (type 3, 201 leaves, 6 steps):

$$\frac{1}{4 d}a^{3/2}\left(8 A+12 B+7 C\right)\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}-$$

$$\frac{a^2\left(8 A-4 B-5 C\right)\text{Sin}[c+d x]}{4 d\sqrt{a+a\,\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}-\frac{a\left(4 A-C\right)\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{2 d\sqrt{\text{Sec}[c+d x]}}+$$

$$\frac{2 A\left(a+a\,\text{Cos}[c+d x]\right)^{3/2}\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{d}$$

Result (type 4, 454 leaves):

$$\frac{1}{d}\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\sqrt{\text{Sec}[c+d\,x]}$$
$$\left(\frac{1}{16}\,(16\,A-4\,B-5\,C)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+\frac{1}{8}\,(2\,B+3\,C)\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+\frac{1}{16}\,C\,\text{Sin}\left[\frac{5}{2}\,(c+d\,x)\right]\right)+$$
$$\frac{1}{d}\left(1+\frac{3}{2\sqrt{2}}\right)(8\,A+12\,B+7\,C)\,\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}}$$
$$\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+\right.$$
$$\left.2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$
$$\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\,(c+d\,x)\right]^2}$$

Problem 1324: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int(a+a\,\text{Cos}[c+d\,x])^{3/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\sqrt{\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 201 leaves, 6 steps):

$$\frac{1}{8\,d}a^{3/2}\,(24\,A+14\,B+11\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{a^2\,(24\,A+30\,B+19\,C)\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+$$
$$\frac{a\,(2\,B+C)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{C\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 479 leaves):

$$\frac{1}{d}\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\sqrt{\text{Sec}[c+d\,x]}$$
$$\left(-\frac{1}{96}\left(24\,A+30\,B+17\,C\right)\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\frac{1}{24}\left(6\,A+9\,B+7\,C\right)\text{Sin}\left[\frac{3}{2}\left(c+d\,x\right)\right]+\right.$$
$$\left.\frac{1}{32}\left(2\,B+3\,C\right)\text{Sin}\left[\frac{5}{2}\left(c+d\,x\right)\right]+\frac{1}{48}\,C\,\text{Sin}\left[\frac{7}{2}\left(c+d\,x\right)\right]\right)+$$
$$\frac{1}{8\,d}\left(4+3\sqrt{2}\right)\left(24\,A+14\,B+11\,C\right)\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{1+\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]}}$$
$$\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{3/2}$$
$$\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+\right.$$
$$\left.2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\text{Sec}\left[\frac{1}{4}\left(c+d\,x\right)\right]^2}$$
$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\text{Sec}\left[\frac{1}{4}\left(c+d\,x\right)\right]^2}$$
$$\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\left(c+d\,x\right)\right]^2}$$

Problem 1325: Result unnecessarily involves higher level functions.

$$\int\frac{\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 253 leaves, 7 steps):

$$\frac{1}{64\,d}a^{3/2}\left(112\,A+88\,B+75\,C\right)\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{a^2\left(48\,A+56\,B+39\,C\right)\text{Sin}[c+d\,x]}{96\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a\left(8\,B+3\,C\right)\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d\,\text{Sec}[c+d\,x]^{3/2}}+$$
$$\frac{C\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\text{Sin}[c+d\,x]}{4\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a^2\left(112\,A+88\,B+75\,C\right)\text{Sin}[c+d\,x]}{64\,d\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 503 leaves):

$$\frac{1}{d}\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\sqrt{\text{Sec}[c+d x]}\left(-\frac{1}{768}(240 A+136 B+129 C)\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\frac{1}{96}(36 A+28 B+27 C)\text{Sin}\left[\frac{3}{2}(c+d x)\right]+\frac{1}{256}(16 A+24 B+23 C)\text{Sin}\left[\frac{5}{2}(c+d x)\right]+\frac{1}{96}(2 B+3 C)\text{Sin}\left[\frac{7}{2}(c+d x)\right]+\frac{1}{128}C\,\text{Sin}\left[\frac{9}{2}(c+d x)\right]\right)+$$

$$\frac{1}{64 d}\left(4+3\sqrt{2}\right)(112 A+88 B+75 C)\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}\,\text{Sec}[c+d x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

Problem 1326: Result unnecessarily involves higher level functions.

$$\int\frac{\left(a+a\,\text{Cos}[c+d x]\right)^{3/2}\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)}{\text{Sec}[c+d x]^{3/2}}\,dx$$

Optimal (type 3, 303 leaves, 8 steps):

$$\frac{1}{128\,d}a^{3/2}\,(176\,A+150\,B+133\,C)\,\text{ArcSin}\Big[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\Big]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+\frac{a^2\,(80\,A+90\,B+67\,C)\,\text{Sin}[c+d\,x]}{240\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{5/2}}+\frac{a\,(10\,B+3\,C)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{40\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{C\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{a^2\,(176\,A+150\,B+133\,C)\,\text{Sin}[c+d\,x]}{192\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a^2\,(176\,A+150\,B+133\,C)\,\text{Sin}[c+d\,x]}{128\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 527 leaves):

$$\frac{1}{d}(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^3\,\sqrt{\text{Sec}[c+d\,x]}\,\Big(-\frac{(1360\,A+1290\,B+1019\,C)\,\text{Sin}[\frac{1}{2}\,(c+d\,x)]}{7680}+\frac{1}{960}\,(280\,A+270\,B+239\,C)\,\text{Sin}\Big[\frac{3}{2}\,(c+d\,x)\Big]+\frac{1}{512}\,(48\,A+46\,B+49\,C)\,\text{Sin}\Big[\frac{5}{2}\,(c+d\,x)\Big]+\frac{1}{480}\,(10\,A+15\,B+17\,C)\,\text{Sin}\Big[\frac{7}{2}\,(c+d\,x)\Big]+\frac{1}{256}\,(2\,B+3\,C)\,\text{Sin}\Big[\frac{9}{2}\,(c+d\,x)\Big]+\frac{1}{320}\,C\,\text{Sin}\Big[\frac{11}{2}\,(c+d\,x)\Big]\Big)+$$

$$\frac{1}{64\,d}\Big(2+\frac{3}{\sqrt{2}}\Big)\,(176\,A+150\,B+133\,C)\,\text{Cos}\Big[\frac{1}{4}\,(c+d\,x)\Big]^4\,\sqrt{\frac{7-5\,\sqrt{2}+(10-7\,\sqrt{2})\,\text{Cos}[\frac{1}{2}\,(c+d\,x)]}{1+\text{Cos}[\frac{1}{2}\,(c+d\,x)]}}\,\Big(1-\sqrt{2}+(-2+\sqrt{2})\,\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big)\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\text{Tan}[\frac{1}{4}\,(c+d\,x)]}{\sqrt{3-2\,\sqrt{2}}}\Big],\,17-12\,\sqrt{2}\Big]+2\,\text{EllipticPi}\Big[-3+2\,\sqrt{2},\,-\text{ArcSin}\Big[\frac{\text{Tan}[\frac{1}{4}\,(c+d\,x)]}{\sqrt{3-2\,\sqrt{2}}}\Big],\,17-12\,\sqrt{2}\Big]\Big)\,\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^3\,\sqrt{\Big(-1+\sqrt{2}-(-2+\sqrt{2})\,\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big)\,\text{Sec}\Big[\frac{1}{4}\,(c+d\,x)\Big]^2}\,\sqrt{\Big(-1-\sqrt{2}+(2+\sqrt{2})\,\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big)\,\text{Sec}\Big[\frac{1}{4}\,(c+d\,x)\Big]^2}\,\text{Sec}[c+d\,x]^{3/2}\,\sqrt{3-2\,\sqrt{2}-\text{Tan}\Big[\frac{1}{4}\,(c+d\,x)\Big]^2}$$

Problem 1330: Result unnecessarily involves higher level functions and more

than twice size of optimal antiderivative.

$$\int (a + a \operatorname{Cos}[c + d x])^{5/2} \left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{9/2} \, dx$$

Optimal (type 3, 242 leaves, 7 steps):

$$\frac{2 a^{5/2} C \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}}{d} + \frac{2 a^3 (160 A + 224 B + 245 C) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{105 d \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{1}{105 d} 2 a^2 (40 A + 56 B + 35 C) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x] + \frac{2 a (5 A + 7 B) (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sec}[c + d x]^{5/2} \operatorname{Sin}[c + d x]}{35 d} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^{5/2} \operatorname{Sec}[c + d x]^{7/2} \operatorname{Sin}[c + d x]}{7 d}$$

Result (type 4, 522 leaves):

$$\frac{1}{d}\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\sqrt{\text{Sec}[c+d\,x]}$$
$$\left(\frac{1}{210}\left(230\,A+301\,B+280\,C\right)\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\frac{1}{14}A\,\text{Sec}[c+d\,x]^3\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\right.$$
$$\frac{1}{70}\text{Sec}[c+d\,x]^2\left(20\,A\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+7\,B\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)+$$
$$\left.\frac{1}{210}\text{Sec}[c+d\,x]\left(115\,A\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+98\,B\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+35\,C\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\right)-$$
$$\frac{1}{d}2\left(-3-2\sqrt{2}\right)C\,\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{1+\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]}}$$
$$\sqrt{\frac{-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{1+\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)$$
$$\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+\right.$$
$$\left.2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\text{Sec}\left[\frac{1}{4}\left(c+d\,x\right)\right]^2}$$
$$\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}\left(c+d\,x\right)\right]^2}$$

Problem 1331: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^{7/2}\,dx$$

Optimal (type 3, 243 leaves, 7 steps):

$$\frac{a^{5/2} (2 B + 5 C) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}}{d} - \frac{a^3 (64 A + 70 B + 15 C) \operatorname{Sin}[c+d x]}{15 d \sqrt{a + a \operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}} + \frac{2 a^2 (8 A + 10 B + 5 C) \sqrt{a + a \operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c+d x]}{5 d} + \frac{2 a (A+B) (a + a \operatorname{Cos}[c+d x])^{3/2} \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]}{3 d} + \frac{2 A (a + a \operatorname{Cos}[c+d x])^{5/2} \operatorname{Sec}[c+d x]^{5/2} \operatorname{Sin}[c+d x]}{5 d}$$

Result (type 4, 488 leaves):

$$\frac{1}{d}\left(a (1 + \operatorname{Cos}[c+d x])\right)^{5/2} \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^5 \sqrt{\operatorname{Sec}[c+d x]} \left(\frac{1}{120} (172 A + 160 B + 45 C) \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right] + \frac{1}{10} A \operatorname{Sec}[c+d x]^2 \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right] + \frac{1}{30} \operatorname{Sec}[c+d x] \left(14 A \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right] + 5 B \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right) + \frac{1}{8} C \operatorname{Sin}\left[\frac{3}{2} (c+d x)\right]\right) +$$

$$\frac{1}{d}\left(2 + \frac{3}{\sqrt{2}}\right) (2 B + 5 C) \operatorname{Cos}\left[\frac{1}{4} (c+d x)\right]^4 \sqrt{\frac{7 - 5 \sqrt{2} + \left(10 - 7 \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]}{1 + \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]}} \left(1 - \sqrt{2} + \left(-2 + \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]\right) \left(a (1 + \operatorname{Cos}[c+d x])\right)^{5/2} \left(\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\operatorname{Tan}\left[\frac{1}{4} (c+d x)\right]}{\sqrt{3 - 2 \sqrt{2}}}\right], 17 - 12 \sqrt{2}\right] + 2 \operatorname{EllipticPi}\left[-3 + 2 \sqrt{2}, -\operatorname{ArcSin}\left[\frac{\operatorname{Tan}\left[\frac{1}{4} (c+d x)\right]}{\sqrt{3 - 2 \sqrt{2}}}\right], 17 - 12 \sqrt{2}\right]\right) \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^5 \sqrt{\left(-1 + \sqrt{2} - \left(-2 + \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]\right) \operatorname{Sec}\left[\frac{1}{4} (c+d x)\right]^2} \sqrt{\left(-1 - \sqrt{2} + \left(2 + \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]\right) \operatorname{Sec}\left[\frac{1}{4} (c+d x)\right]^2} \operatorname{Sec}[c+d x]^{3/2} \sqrt{3 - 2 \sqrt{2} - \operatorname{Tan}\left[\frac{1}{4} (c+d x)\right]^2}$$

Problem 1332: Result unnecessarily involves higher level functions.

$$\int (a+a\,\text{Cos}[c+d\,x])^{5/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^{5/2}\,dx$$

Optimal (type 3, 253 leaves, 7 steps):

$$\frac{1}{4d}a^{5/2}(8A+20B+19C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{a^3(56A+12B-27C)\,\text{Sin}[c+d\,x]}{12d\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}-\frac{a^2(8A+4B-C)\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2d\sqrt{\text{Sec}[c+d\,x]}}+\frac{2a(5A+3B)(a+a\,\text{Cos}[c+d\,x])^{3/2}\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3d}+\frac{2A(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3d}$$

Result (type 4, 476 leaves):

$$\frac{1}{d}\left(a(1+\text{Cos}[c+d\,x])\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\sqrt{\text{Sec}[c+d\,x]}\left(\frac{1}{96}(128A+36B-27C)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{6}A\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+\frac{1}{16}(2B+5C)\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\frac{1}{32}C\,\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]\right)+$$

$$\frac{1}{8d}\left(4+3\sqrt{2}\right)(8A+20B+19C)\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(a(1+\text{Cos}[c+d\,x])\right)^{5/2}\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\,\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

Problem 1333: Result unnecessarily involves higher level functions.

$$\int (a + a \operatorname{Cos}[c + d x])^{5/2} \left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{3/2} \, dx$$

Optimal (type 3, 251 leaves, 7 steps):

$$\frac{1}{8 d} a^{5/2} (40 A + 38 B + 25 C) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c + d x]}{\sqrt{a + a \operatorname{Cos}[c + d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]} - \frac{a^3 (24 A - 54 B - 49 C) \operatorname{Sin}[c + d x]}{24 d \sqrt{a + a \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}} - \frac{a^2 (8 A - 2 B - 3 C) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{4 d \sqrt{\operatorname{Sec}[c + d x]}} - \frac{a (6 A - C) (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{3 d \sqrt{\operatorname{Sec}[c + d x]}} + \frac{2 A (a + a \operatorname{Cos}[c + d x])^{5/2} \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{d}$$

Result (type 4, 479 leaves):

$$\frac{1}{d}\left(a (1 + \operatorname{Cos}[c + d x])\right)^{5/2} \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^5 \sqrt{\operatorname{Sec}[c + d x]} \left(\frac{1}{192} (72 A - 54 B - 47 C) \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right] + \frac{1}{48} (6 A + 15 B + 16 C) \operatorname{Sin}\left[\frac{3}{2} (c + d x)\right] + \frac{1}{64} (2 B + 5 C) \operatorname{Sin}\left[\frac{5}{2} (c + d x)\right] + \frac{1}{96} C \operatorname{Sin}\left[\frac{7}{2} (c + d x)\right]\right) +$$

$$\frac{1}{8 d}\left(2 + \frac{3}{\sqrt{2}}\right) (40 A + 38 B + 25 C) \operatorname{Cos}\left[\frac{1}{4} (c + d x)\right]^4 \sqrt{\frac{7 - 5\sqrt{2} + \left(10 - 7\sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]}{1 + \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]}} \left(1 - \sqrt{2} + \left(-2 + \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]\right) \left(a (1 + \operatorname{Cos}[c + d x])\right)^{5/2} \left(\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\operatorname{Tan}\left[\frac{1}{4} (c + d x)\right]}{\sqrt{3 - 2\sqrt{2}}}\right], 17 - 12\sqrt{2}\right] + 2 \operatorname{EllipticPi}\left[-3 + 2\sqrt{2}, -\operatorname{ArcSin}\left[\frac{\operatorname{Tan}\left[\frac{1}{4} (c + d x)\right]}{\sqrt{3 - 2\sqrt{2}}}\right], 17 - 12\sqrt{2}\right]\right) \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^5 \sqrt{\left(-1 + \sqrt{2} - \left(-2 + \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]\right) \operatorname{Sec}\left[\frac{1}{4} (c + d x)\right]^2} \sqrt{\left(-1 - \sqrt{2} + \left(2 + \sqrt{2}\right) \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]\right) \operatorname{Sec}\left[\frac{1}{4} (c + d x)\right]^2} \operatorname{Sec}[c + d x]^{3/2} \sqrt{3 - 2\sqrt{2} - \operatorname{Tan}\left[\frac{1}{4} (c + d x)\right]^2}$$

Problem 1334: Result unnecessarily involves higher level functions.

$$\int (a+a\,\text{Cos}[c+d\,x])^{5/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\sqrt{\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 253 leaves, 7 steps):

$$\frac{1}{64\,d}a^{5/2}(304\,A+200\,B+163\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+\frac{a^3\,(432\,A+392\,B+299\,C)\,\text{Sin}[c+d\,x]}{192\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{a^2\,(16\,A+24\,B+17\,C)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{32\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{a\,(8\,B+5\,C)\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{C\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 503 leaves):

$$\frac{1}{d}(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\sqrt{\text{Sec}[c+d\,x]}\left(-\frac{(432\,A+376\,B+265\,C)\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{1536}+\frac{1}{192}(60\,A+64\,B+55\,C)\,\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]+\frac{1}{512}(16\,A+40\,B+47\,C)\,\text{Sin}\left[\frac{5}{2}(c+d\,x)\right]+\frac{1}{192}(2\,B+5\,C)\,\text{Sin}\left[\frac{7}{2}(c+d\,x)\right]+\frac{1}{256}C\,\text{Sin}\left[\frac{9}{2}(c+d\,x)\right]\right)+$$

$$\frac{1}{64\,d}\left(2+\frac{3}{\sqrt{2}}\right)(304\,A+200\,B+163\,C)\,\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]^4\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d\,x)\right]^2}\,\text{Sec}[c+d\,x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d\,x)\right]^2}$$

Problem 1335: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a \operatorname{Cos}[c + d x])^{5/2} \left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right)}{\sqrt{\operatorname{Sec}[c + d x]}} \, dx$$

Optimal (type 3, 301 leaves, 8 steps):

$$\frac{1}{128 d} a^{5/2} (400 A + 326 B + 283 C) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c + d x]}{\sqrt{a + a \operatorname{Cos}[c + d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]} + \frac{a^3 (1040 A + 950 B + 787 C) \operatorname{Sin}[c + d x]}{960 d \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sec}[c + d x]^{3/2}} + \frac{a^2 (80 A + 110 B + 79 C) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{240 d \operatorname{Sec}[c + d x]^{3/2}} + \frac{a (2 B + C) (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{8 d \operatorname{Sec}[c + d x]^{3/2}} + \frac{C (a + a \operatorname{Cos}[c + d x])^{5/2} \operatorname{Sin}[c + d x]}{5 d \operatorname{Sec}[c + d x]^{3/2}} + \frac{a^3 (400 A + 326 B + 283 C) \operatorname{Sin}[c + d x]}{128 d \sqrt{a + a \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}}$$

Result (type 4, 527 leaves):

$$\frac{1}{d}\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\sqrt{\text{Sec}[c+d x]}$$

$$\left(-\frac{(3760 A+2650 B+2309 C)\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{15360}+\frac{(640 A+550 B+509 C)\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]}{1920}+\right.$$

$$\frac{(80 A+94 B+95 C)\,\text{Sin}\left[\frac{5}{2}(c+d x)\right]}{1024}+\frac{1}{960}(10 A+25 B+32 C)\,\text{Sin}\left[\frac{7}{2}(c+d x)\right]+$$

$$\left.\frac{1}{512}(2 B+5 C)\,\text{Sin}\left[\frac{9}{2}(c+d x)\right]+\frac{1}{640}C\,\text{Sin}\left[\frac{11}{2}(c+d x)\right]\right)+$$

$$\frac{1}{256 d}\left(4+3\sqrt{2}\right)(400 A+326 B+283 C)\,\text{Cos}\left[\frac{1}{4}(c+d x)\right]^4$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]+\right.$$

$$\left.2\,\text{EllipticPi}\left[-3+2\sqrt{2},-\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right],17-12\sqrt{2}\right]\right)$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right)\text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)\text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\text{Sec}[c+d x]^{3/2}\sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

Problem 1336: Result unnecessarily involves higher level functions.

$$\int\frac{\left(a+a\,\text{Cos}[c+d x]\right)^{5/2}\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)}{\text{Sec}[c+d x]^{3/2}}\,dx$$

Optimal (type 3, 353 leaves, 9 steps):

$$\frac{1}{512\,d}a^{5/2}\,(1304\,A+1132\,B+1015\,C)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,+$$
$$\frac{a^3\,(680\,A+628\,B+545\,C)\,\text{Sin}[c+d\,x]}{960\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{5/2}}+$$
$$\frac{a^2\,(120\,A+156\,B+115\,C)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{480\,d\,\text{Sec}[c+d\,x]^{5/2}}+$$
$$\frac{a\,(12\,B+5\,C)\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{60\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{C\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{6\,d\,\text{Sec}[c+d\,x]^{5/2}}+$$
$$\frac{a^3\,(1304\,A+1132\,B+1015\,C)\,\text{Sin}[c+d\,x]}{768\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a^3\,(1304\,A+1132\,B+1015\,C)\,\text{Sin}[c+d\,x]}{512\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 551 leaves) :

$$\frac{1}{d}\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \sqrt{\text{Sec}[c+d x]}$$

$$\left(-\frac{(10600 A+9236 B+7945 C) \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{61440}+\frac{(1100 A+1018 B+935 C) \text{Sin}\left[\frac{3}{2}(c+d x)\right]}{3840}+\right.$$

$$\frac{(1128 A+1140 B+1145 C) \text{Sin}\left[\frac{5}{2}(c+d x)\right]}{12288}+\frac{(100 A+128 B+145 C) \text{Sin}\left[\frac{7}{2}(c+d x)\right]}{3840}+$$

$$\left.\frac{(24 A+60 B+83 C) \text{Sin}\left[\frac{9}{2}(c+d x)\right]}{6144}+\frac{(2 B+5 C) \text{Sin}\left[\frac{11}{2}(c+d x)\right]}{1280}+\frac{C \text{Sin}\left[\frac{13}{2}(c+d x)\right]}{1536}\right)+$$

$$\frac{1}{512 d}\left(2+\frac{3}{\sqrt{2}}\right)(1304 A+1132 B+1015 C) \text{Cos}\left[\frac{1}{4}(c+d x)\right]^4$$

$$\sqrt{\frac{7-5\sqrt{2}+\left(10-7\sqrt{2}\right) \text{Cos}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Cos}\left[\frac{1}{2}(c+d x)\right]}}\left(1-\sqrt{2}+\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\left(\text{EllipticF}\left[\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right]+\right.$$

$$\left.2 \text{EllipticPi}\left[-3+2\sqrt{2}, -\text{ArcSin}\left[\frac{\text{Tan}\left[\frac{1}{4}(c+d x)\right]}{\sqrt{3-2\sqrt{2}}}\right], 17-12\sqrt{2}\right]\right)$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \sqrt{\left(-1+\sqrt{2}-\left(-2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2}(c+d x)\right]\right) \text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\sqrt{\left(-1-\sqrt{2}+\left(2+\sqrt{2}\right) \text{Cos}\left[\frac{1}{2}(c+d x)\right]\right) \text{Sec}\left[\frac{1}{4}(c+d x)\right]^2}$$

$$\text{Sec}[c+d x]^{3/2} \sqrt{3-2\sqrt{2}-\text{Tan}\left[\frac{1}{4}(c+d x)\right]^2}$$

Problem 1345: 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):

$$\frac{1}{\sqrt{a}\, d}(2\,A\,b+2\,a\,B-b\,B)\,\text{ArcSin}\Big[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\Big]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+\frac{1}{\sqrt{a}\,d}\sqrt{2}\,(a-b)\,(A-B)\,\text{ArcTan}\Big[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\Big]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+\frac{b\,B\,\text{Sin}[c+d\,x]}{d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 807 leaves):

$$\frac{1}{4\,d\,\sqrt{a\,(1+\text{Cos}[c+d\,x])}}\,e^{-2\,i\,(c+d\,x)}\,\left(1+e^{i\,(c+d\,x)}\right)\Big(i\,b\,B-i\,b\,B\,e^{i\,(c+d\,x)}+i\,b\,B\,e^{2\,i\,(c+d\,x)}-i\,b\,B\,e^{3\,i\,(c+d\,x)}+2\,A\,b\,d\,e^{i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\,x+2\,a\,B\,d\,e^{i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\,x-b\,B\,d\,e^{i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\,x-i\,(2\,A\,b+2\,a\,B-b\,B)\,e^{i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{ArcSinh}\big[e^{i\,(c+d\,x)}\big]-2\,i\,\sqrt{2}\,(a-b)\,(A-B)\,e^{i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Log}\big[1+e^{i\,(c+d\,x)}\big]+2\,i\,A\,b\,e^{i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Log}\Big[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\Big]+2\,i\,a\,B\,e^{i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Log}\Big[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\Big]-i\,b\,B\,e^{i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Log}\Big[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\Big]+2\,i\,\sqrt{2}\,a\,A\,e^{i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Log}\Big[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\Big]-2\,i\,\sqrt{2}\,A\,b\,e^{i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Log}\Big[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\Big]-2\,i\,\sqrt{2}\,a\,B\,e^{i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Log}\Big[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\Big]+2\,i\,\sqrt{2}\,b\,B\,e^{i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Log}\Big[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\Big]\Big)\sqrt{\text{Sec}[c+d\,x]}$$

Problem 1391: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{7/2}}{a+b\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 4, 266 leaves, 9 steps):

$$-\frac{1}{5\,a^3\,d}2\,\left(5\,A\,b^2+a^2\,(3\,A+5\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\Big[\frac{1}{2}\,(c+d\,x),2\Big]\sqrt{\text{Sec}[c+d\,x]}-\frac{2\,A\,b\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\big[\frac{1}{2}\,(c+d\,x),2\big]\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d}-\frac{1}{a^3\,(a+b)\,d}2\,b\,\left(A\,b^2+a^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\Big[\frac{2\,b}{a+b},\frac{1}{2}\,(c+d\,x),2\Big]\sqrt{\text{Sec}[c+d\,x]}+\frac{2\,\left(5\,A\,b^2+a^2\,(3\,A+5\,C)\right)\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,a^3\,d}-\frac{2\,A\,b\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,a^2\,d}+\frac{2\,A\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,a\,d}$$

Result (type 4, 648 leaves):

$$-\frac{1}{30\,a^3\,d}\Bigg(-\Bigg(\Bigg(2\,\left(18\,a^3\,A+40\,a\,A\,b^2+30\,a^3\,C\right)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\left[-\frac{a}{b},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]$$

$$\left(b+a\,\text{Sec}[c+d\,x]\right)\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\,\text{Sin}[c+d\,x]\Bigg)\Big/$$

$$\left(b\,\left(a+b\,\text{Cos}[c+d\,x]\right)\,\left(1-\text{Cos}[c+d\,x]^2\right)\right)\Bigg)+$$

$$\Bigg(2\,\left(19\,a^2\,A\,b+45\,A\,b^3+45\,a^2\,b\,C\right)\,\text{Cos}[c+d\,x]^2\,\Bigg(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]+$$

$$\text{EllipticPi}\left[-\frac{a}{b},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\Bigg)\,\left(b+a\,\text{Sec}[c+d\,x]\right)$$

$$\sqrt{1-\text{Sec}[c+d\,x]^2}\,\,\text{Sin}[c+d\,x]\Bigg)\Big/\,\left(a\,\left(a+b\,\text{Cos}[c+d\,x]\right)\,\left(1-\text{Cos}[c+d\,x]^2\right)\right)+$$

$$\Bigg(\left(9\,a^2\,A\,b+15\,A\,b^3+15\,a^2\,b\,C\right)\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\left(b+a\,\text{Sec}[c+d\,x]\right)\,\Bigg(-4\,a\,b+4\,a\,b\,\text{Sec}[c+d\,x]^2-$$

$$4\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,+$$

$$2\,\left(2\,a-b\right)\,b\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,+$$

$$4\,a^2\,\text{EllipticPi}\left[-\frac{a}{b},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,-$$

$$2\,b^2\,\text{EllipticPi}\left[-\frac{a}{b},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\Bigg)$$

$$\text{Sin}[c+d\,x]\Bigg)\Big/\,\Bigg(a\,b^2\,\left(a+b\,\text{Cos}[c+d\,x]\right)\,\left(1-\text{Cos}[c+d\,x]^2\right)$$

$$\sqrt{\text{Sec}[c+d\,x]}\,\,\left(2-\text{Sec}[c+d\,x]^2\right)\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{\text{Sec}[c+d\,x]}\,\left(\frac{2\,\left(3\,a^2\,A+5\,A\,b^2+5\,a^2\,C\right)\,\text{Sin}[c+d\,x]}{5\,a^3}-\right.$$

$$\frac{2\,A\,b\,\text{Tan}[c+d\,x]}{3\,a^2}+$$

$$\left.\frac{2\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{5\,a}\right)$$

Problem 1395: Result more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 190 leaves, 7 steps):

$$-\frac{2\,a\,C\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}}{b^2\,d}+\frac{1}{3\,b^3\,d}$$

$$2\,\left(3\,a^2\,C+b^2\,(3\,A+C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}-\frac{1}{b^3\,(a+b)\,d}$$

$$2\,a\,\left(A\,b^2+a^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticPi}\left[\frac{2\,b}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}+$$

$$\frac{2\,C\,\text{Sin}[c+d\,x]}{3\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 539 leaves) :

$$\frac{1}{6\,b\,d}\left(-\left(\left(2\,(6\,A\,b+2\,b\,C)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\left[-\frac{a}{b},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\right.\right.\right.$$

$$\left.(b+a\,\text{Sec}[c+d\,x])\sqrt{1-\text{Sec}[c+d\,x]^2}\;\text{Sin}[c+d\,x]\right)\Big/$$

$$\left.\left(b\,(a+b\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\right)\right)-$$

$$\left(2\,C\,\text{Cos}[c+d\,x]^2\,\left(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]+\right.\right.$$

$$\left.\text{EllipticPi}\left[-\frac{a}{b},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\right)(b+a\,\text{Sec}[c+d\,x])$$

$$\left.\sqrt{1-\text{Sec}[c+d\,x]^2}\;\text{Sin}[c+d\,x]\right)\Big/\left(\left(a+b\,\text{Cos}[c+d\,x]\right)\left(1-\text{Cos}[c+d\,x]^2\right)\right)-$$

$$\left(3\,C\,\text{Cos}[2\,(c+d\,x)]\,(b+a\,\text{Sec}[c+d\,x])\,\left(-4\,a\,b+4\,a\,b\,\text{Sec}[c+d\,x]^2-\right.\right.$$

$$4\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$

$$2\,(2\,a-b)\,b\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$

$$4\,a^2\,\text{EllipticPi}\left[-\frac{a}{b},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-$$

$$\left.2\,b^2\,\text{EllipticPi}\left[-\frac{a}{b},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\right)$$

$$\left.\text{Sin}[c+d\,x]\right)\Big/\left(b^2\,(a+b\,\text{Cos}[c+d\,x])\,\left(1-\text{Cos}[c+d\,x]^2\right)\sqrt{\text{Sec}[c+d\,x]}\right.$$

$$\left.\left.\left(2-\text{Sec}[c+d\,x]^2\right)\right)\right)+\frac{C\,\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[2\,(c+d\,x)]}{3\,b\,d}$$

Problem 1396: Result more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 241 leaves, 8 steps) :

$$\frac{1}{5 b^3 d} 2 \left(5 a^2 C + b^2 (5 A + 3 C)\right) \sqrt{\text{Cos}[c + d x]} \,\text{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\text{Sec}[c + d x]} - \frac{1}{3 b^4 d} 2 a \left(3 A b^2 + (3 a^2 + b^2) C\right) \sqrt{\text{Cos}[c + d x]} \,\text{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\text{Sec}[c + d x]} + \frac{1}{b^4 (a + b) d} 2 a^2 (A b^2 + a^2 C) \sqrt{\text{Cos}[c + d x]} \,\text{EllipticPi}\left[\frac{2 b}{a + b}, \frac{1}{2} (c + d x), 2\right] \sqrt{\text{Sec}[c + d x]} + \frac{2 C \,\text{Sin}[c + d x]}{5 b d \,\text{Sec}[c + d x]^{3/2}} - \frac{2 a C \,\text{Sin}[c + d x]}{3 b^2 d \sqrt{\text{Sec}[c + d x]}}$$

Result (type 4, 603 leaves) :

$$\frac{1}{30 b^2 d} \Bigg(-\Bigg(\Big(16 a C \,\text{Cos}[c + d x]^2 \,\text{EllipticPi}\left[-\frac{a}{b}, -\text{ArcSin}\left[\sqrt{\text{Sec}[c + d x]}\right], -1\right] (b + a \,\text{Sec}[c + d x]) \sqrt{1 - \text{Sec}[c + d x]^2} \,\text{Sin}[c + d x]\Big) \Big/ \Big((a + b \,\text{Cos}[c + d x]) (1 - \text{Cos}[c + d x]^2)\Big)\Bigg) + \Bigg(2 (15 A b^2 + 5 a^2 C + 9 b^2 C) \,\text{Cos}[c + d x]^2 \Big(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c + d x]}\right], -1\right] + \text{EllipticPi}\left[-\frac{a}{b}, -\text{ArcSin}\left[\sqrt{\text{Sec}[c + d x]}\right], -1\right]\Big) (b + a \,\text{Sec}[c + d x]) \sqrt{1 - \text{Sec}[c + d x]^2} \,\text{Sin}[c + d x]\Bigg) \Big/ \Big(a (a + b \,\text{Cos}[c + d x]) (1 - \text{Cos}[c + d x]^2)\Big) + \Bigg((15 A b^2 + 15 a^2 C + 9 b^2 C) \,\text{Cos}[2 (c + d x)] (b + a \,\text{Sec}[c + d x]) \Big(-4 a b + 4 a b \,\text{Sec}[c + d x]^2 - 4 a b \,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c + d x]}\right], -1\right] \sqrt{\text{Sec}[c + d x]} \sqrt{1 - \text{Sec}[c + d x]^2} + 2 (2 a - b) b \,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c + d x]}\right], -1\right] \sqrt{\text{Sec}[c + d x]} \sqrt{1 - \text{Sec}[c + d x]^2} + 4 a^2 \,\text{EllipticPi}\left[-\frac{a}{b}, -\text{ArcSin}\left[\sqrt{\text{Sec}[c + d x]}\right], -1\right] \sqrt{\text{Sec}[c + d x]} \sqrt{1 - \text{Sec}[c + d x]^2} - 2 b^2 \,\text{EllipticPi}\left[-\frac{a}{b}, -\text{ArcSin}\left[\sqrt{\text{Sec}[c + d x]}\right], -1\right] \sqrt{\text{Sec}[c + d x]} \sqrt{1 - \text{Sec}[c + d x]^2}\Big) \,\text{Sin}[c + d x]\Bigg) \Big/ \Big(a b^2 (a + b \,\text{Cos}[c + d x]) (1 - \text{Cos}[c + d x]^2) \sqrt{\text{Sec}[c + d x]} (2 - \text{Sec}[c + d x]^2)\Big)\Bigg) + \frac{\sqrt{\text{Sec}[c + d x]} \left(\frac{C \,\text{Sin}[c+d x]}{10 b} - \frac{a C \,\text{Sin}[2 (c+d x)]}{3 b^2} + \frac{C \,\text{Sin}[3 (c+d x)]}{10 b}\right)}{d}$$

Problem 1397: Result more than twice size of optimal antiderivative.

$$\int \frac{A + C \,\text{Cos}[c + d x]^2}{(a + b \,\text{Cos}[c + d x]) \,\text{Sec}[c + d x]^{5/2}} \, dx$$

Optimal (type 4, 299 leaves, 9 steps) :

$$-\frac{1}{5 b^4 d} 2 a \left(5 A b^2+5 a^2 C+3 b^2 C\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}+\frac{1}{21 b^5 d} 2 \left(21 a^4 C+7 a^2 b^2 (3 A+C)+b^4 (7 A+5 C)\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}-\frac{1}{b^5 (a+b) d} 2 a^3 \left(A b^2+a^2 C\right) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticPi}\left[\frac{2 b}{a+b}, \frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}+\frac{2 C \text{Sin}[c+d x]}{7 b d \text{Sec}[c+d x]^{5/2}}-\frac{2 a C \text{Sin}[c+d x]}{5 b^2 d \text{Sec}[c+d x]^{3/2}}+\frac{2 \left(7 a^2 C+b^2 (7 A+5 C)\right) \text{Sin}[c+d x]}{21 b^3 d \sqrt{\text{Sec}[c+d x]}}$$

Result (type 4, 663 leaves) :

$$-\frac{1}{210\,b^3\,d}\Bigg(-\Bigg(\Big(2\,\big(-70\,A\,b^3+56\,a^2\,b\,C-50\,b^3\,C\big)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{a}{b},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\big(b+a\,\text{Sec}[c+d\,x]\big)\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/\Big(b\,\big(a+b\,\text{Cos}[c+d\,x]\big)\,\big(1-\text{Cos}[c+d\,x]^2\big)\Big)\Bigg)+$$
$$\Big(2\,\big(35\,a\,A\,b^2+35\,a^3\,C+13\,a\,b^2\,C\big)\,\text{Cos}[c+d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]+\text{EllipticPi}\Big[-\frac{a}{b},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)\,\big(b+a\,\text{Sec}[c+d\,x]\big)\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/\Big(a\,\big(a+b\,\text{Cos}[c+d\,x]\big)\,\big(1-\text{Cos}[c+d\,x]^2\big)\Big)+$$
$$\Big(\big(105\,a\,A\,b^2+105\,a^3\,C+63\,a\,b^2\,C\big)\,\text{Cos}\big[2\,(c+d\,x)\big]\,\big(b+a\,\text{Sec}[c+d\,x]\big)\,\Big(-4\,a\,b+4\,a\,b\,\text{Sec}[c+d\,x]^2-$$
$$4\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$
$$2\,(2\,a-b)\,b\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$
$$4\,a^2\,\text{EllipticPi}\Big[-\frac{a}{b},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-$$
$$2\,b^2\,\text{EllipticPi}\Big[-\frac{a}{b},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Big)$$
$$\text{Sin}[c+d\,x]\Big)\Big/\Big(a\,b^2\,\big(a+b\,\text{Cos}[c+d\,x]\big)\,\big(1-\text{Cos}[c+d\,x]^2\big)\,\sqrt{\text{Sec}[c+d\,x]}\,\big(2-\text{Sec}[c+d\,x]^2\big)\Big)\Bigg)+\frac{1}{d}$$
$$\sqrt{\text{Sec}[c+d\,x]}\,\left(-\frac{a\,C\,\text{Sin}[c+d\,x]}{10\,b^2}+\frac{\big(14\,A\,b^2+14\,a^2\,C+13\,b^2\,C\big)\,\text{Sin}\big[2\,(c+d\,x)\big]}{42\,b^3}-\frac{a\,C\,\text{Sin}\big[3\,(c+d\,x)\big]}{10\,b^2}+\frac{C\,\text{Sin}\big[4\,(c+d\,x)\big]}{28\,b}\right)$$

Problem 1399: Result more than twice size of optimal antiderivative.

$$\int\frac{\big(A+C\,\text{Cos}[c+d\,x]^2\big)\,\text{Sec}[c+d\,x]^{3/2}}{\big(a+b\,\text{Cos}[c+d\,x]\big)^2}\,dx$$

Optimal (type 4, 330 leaves, 8 steps):

$$\frac{1}{a^2\left(a^2-b^2\right)d}\left(3\,A\,b^2-a^2\left(2\,A-C\right)\right)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}+\frac{\left(A\,b^2+a^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a\,b\left(a^2-b^2\right)d}+\left(\left(3\,A\,b^4-a^4\,C-a^2\,b^2\left(5\,A+C\right)\right)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticPi}\left[\frac{2\,b}{a+b},\frac{1}{2}\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}\right)\Big/\left(a^2\left(a-b\right)b\left(a+b\right)^2d\right)-\frac{\left(3\,A\,b^2-a^2\left(2\,A-C\right)\right)\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{a^2\left(a^2-b^2\right)d}+\frac{\left(A\,b^2+a^2\,C\right)\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{a\left(a^2-b^2\right)d\left(a+b\,\text{Cos}[c+d\,x]\right)}$$

Result (type 4, 682 leaves):

$$-\frac{1}{4\,a^2\left(a-b\right)\left(a+b\right)d}\Bigg(-\Bigg(\Bigg(2\left(4\,a^3\,A-8\,a\,A\,b^2-4\,a^3\,C\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]\left(b+a\,\text{Sec}[c+d\,x]\right)\sqrt{1-\text{Sec}[c+d\,x]^2}\ \text{Sin}[c+d\,x]\Bigg)\Big/\left(b\left(a+b\,\text{Cos}[c+d\,x]\right)\left(1-\text{Cos}[c+d\,x]^2\right)\right)\Bigg)+\Bigg(2\left(10\,a^2\,A\,b-9\,A\,b^3+a^2\,b\,C\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)\left(b+a\,\text{Sec}[c+d\,x]\right)\sqrt{1-\text{Sec}[c+d\,x]^2}\ \text{Sin}[c+d\,x]\Bigg)\Big/\left(a\left(a+b\,\text{Cos}[c+d\,x]\right)\left(1-\text{Cos}[c+d\,x]^2\right)\right)+\Bigg(\left(2\,a^2\,A\,b-3\,A\,b^3-a^2\,b\,C\right)\text{Cos}\left[2\left(c+d\,x\right)\right]\left(b+a\,\text{Sec}[c+d\,x]\right)\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\left(2\,a-b\right)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\left(a+b\,\text{Cos}[c+d\,x]\right)\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{\left(2\,a^2\,A-3\,A\,b^2-a^2\,C\right)\text{Sin}[c+d\,x]}{a^2\left(a^2-b^2\right)}+\frac{A\,b^2\,\text{Sin}[c+d\,x]+a^2\,C\,\text{Sin}[c+d\,x]}{a\left(a^2-b^2\right)\left(a+b\,\text{Cos}[c+d\,x]\right)}\right)}{d}$$

Problem 1400: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(A + C \operatorname{Cos}[c + d x]^2\right) \sqrt{\operatorname{Sec}[c + d x]}}{\left(a + b \operatorname{Cos}[c + d x]\right)^2} \, dx$$

Optimal (type 4, 274 leaves, 7 steps):

$$-\frac{1}{a b \left(a^2 - b^2\right) d}\left(A b^2 + a^2 C\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} - \frac{1}{b^2 \left(a^2 - b^2\right) d}\left(A b^2 - a^2 C + 2 b^2 C\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} - \left(\left(A b^4 + a^4 C - 3 a^2 b^2 (A + C)\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticPi}\left[\frac{2 b}{a + b}, \frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}\right) \Big/ \left(a (a - b) b^2 (a + b)^2 d\right) + \frac{\left(A b^2 + a^2 C\right) \operatorname{Sin}[c + d x]}{a \left(a^2 - b^2\right) d \left(a + b \operatorname{Cos}[c + d x]\right) \sqrt{\operatorname{Sec}[c + d x]}}$$

Result (type 4, 657 leaves):

$$\frac{1}{4 a (-a + b) (a + b) d}\Bigg(-\Bigg(\Big(2 (4 a A b + 4 a b C) \operatorname{Cos}[c + d x]^2 \operatorname{EllipticPi}\left[-\frac{a}{b}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \left(b + a \operatorname{Sec}[c + d x]\right) \sqrt{1 - \operatorname{Sec}[c + d x]^2} \operatorname{Sin}[c + d x]\Big) \Big/ \left(b \left(a + b \operatorname{Cos}[c + d x]\right) \left(1 - \operatorname{Cos}[c + d x]^2\right)\right)\Bigg) + \Big(2 \left(-4 a^2 A + 3 A b^2 - a^2 C\right) \operatorname{Cos}[c + d x]^2 \Big(\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] + \operatorname{EllipticPi}\left[-\frac{a}{b}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right]\Big) \left(b + a \operatorname{Sec}[c + d x]\right) \sqrt{1 - \operatorname{Sec}[c + d x]^2} \operatorname{Sin}[c + d x]\Big) \Big/ \left(a \left(a + b \operatorname{Cos}[c + d x]\right) \left(1 - \operatorname{Cos}[c + d x]^2\right)\right) + \Big(\left(A b^2 + a^2 C\right) \operatorname{Cos}[2 (c + d x)] \left(b + a \operatorname{Sec}[c + d x]\right) \Big(-4 a b + 4 a b \operatorname{Sec}[c + d x]^2 - 4 a b \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c + d x]} \sqrt{1 - \operatorname{Sec}[c + d x]^2} + 2 (2 a - b) b \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c + d x]} \sqrt{1 - \operatorname{Sec}[c + d x]^2} + 4 a^2 \operatorname{EllipticPi}\left[-\frac{a}{b}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c + d x]} \sqrt{1 - \operatorname{Sec}[c + d x]^2} - 2 b^2 \operatorname{EllipticPi}\left[-\frac{a}{b}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c + d x]} \sqrt{1 - \operatorname{Sec}[c + d x]^2}\Big) \operatorname{Sin}[c + d x]\Big) \Big/ \left(a b^2 \left(a + b \operatorname{Cos}[c + d x]\right) \left(1 - \operatorname{Cos}[c + d x]^2\right) \sqrt{\operatorname{Sec}[c + d x]} \left(2 - \operatorname{Sec}[c + d x]^2\right)\right)\Bigg) + \frac{\sqrt{\operatorname{Sec}[c + d x]} \left(\frac{\left(A b^2 + a^2 C\right) \operatorname{Sin}[c + d x]}{a b \left(a^2 - b^2\right)} + \frac{A b^2 \operatorname{Sin}[c + d x] + a^2 C \operatorname{Sin}[c + d x]}{b \left(-a^2 + b^2\right) \left(a + b \operatorname{Cos}[c + d x]\right)}\right)}{d}$$

Problem 1401: Result more than twice size of optimal antiderivative.

$$\int \frac{A + C \operatorname{Cos}[c + d x]^2}{(a + b \operatorname{Cos}[c + d x])^2 \sqrt{\operatorname{Sec}[c + d x]}} \, dx$$

Optimal (type 4, 277 leaves, 7 steps):

$$\frac{1}{b^2 (a^2 - b^2) d} (A b^2 + 3 a^2 C - 2 b^2 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} + \frac{1}{b^3 (a^2 - b^2) d} a (A b^2 - 3 a^2 C + 4 b^2 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} - \left((A b^4 - 3 a^4 C + a^2 b^2 (A + 5 C)) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticPi}\left[\frac{2 b}{a + b}, \frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}\right) \Big/ \left((a - b) b^3 (a + b)^2 d\right) - \frac{(A b^2 + a^2 C) \operatorname{Sin}[c + d x]}{b (a^2 - b^2) d (a + b \operatorname{Cos}[c + d x]) \sqrt{\operatorname{Sec}[c + d x]}}$$

Result (type 4, 663 leaves):

$$\frac{1}{4 (a - b) b (a + b) d} \Bigg(-\Bigg(\Bigg(2 (4 a A b + 4 a b C) \operatorname{Cos}[c + d x]^2 \operatorname{EllipticPi}\left[-\frac{a}{b}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] (b + a \operatorname{Sec}[c + d x]) \sqrt{1 - \operatorname{Sec}[c + d x]^2} \operatorname{Sin}[c + d x]\Bigg) \Big/ \left(b (a + b \operatorname{Cos}[c + d x]) (1 - \operatorname{Cos}[c + d x]^2)\right)\Bigg) + \Bigg(2 (-A b^2 + a^2 C - 2 b^2 C) \operatorname{Cos}[c + d x]^2 \left(\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] + \operatorname{EllipticPi}\left[-\frac{a}{b}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right]\right) (b + a \operatorname{Sec}[c + d x]) \sqrt{1 - \operatorname{Sec}[c + d x]^2} \operatorname{Sin}[c + d x]\Bigg) \Big/ \left(a (a + b \operatorname{Cos}[c + d x]) (1 - \operatorname{Cos}[c + d x]^2)\right) + \Bigg((A b^2 + 3 a^2 C - 2 b^2 C) \operatorname{Cos}[2 (c + d x)] (b + a \operatorname{Sec}[c + d x]) \Big(-4 a b + 4 a b \operatorname{Sec}[c + d x]^2 - 4 a b \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c + d x]} \sqrt{1 - \operatorname{Sec}[c + d x]^2} + 2 (2 a - b) b \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c + d x]} \sqrt{1 - \operatorname{Sec}[c + d x]^2} + 4 a^2 \operatorname{EllipticPi}\left[-\frac{a}{b}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c + d x]} \sqrt{1 - \operatorname{Sec}[c + d x]^2} - 2 b^2 \operatorname{EllipticPi}\left[-\frac{a}{b}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c + d x]} \sqrt{1 - \operatorname{Sec}[c + d x]^2}\Big) \operatorname{Sin}[c + d x]\Bigg) \Big/ \left(a b^2 (a + b \operatorname{Cos}[c + d x]) (1 - \operatorname{Cos}[c + d x]^2) \sqrt{\operatorname{Sec}[c + d x]} (2 - \operatorname{Sec}[c + d x]^2)\right)\Bigg) + \frac{\sqrt{\operatorname{Sec}[c + d x]} \left(\frac{(A b^2 + a^2 C) \operatorname{Sin}[c+d x]}{b^2 (-a^2 + b^2)} + \frac{-a A b^2 \operatorname{Sin}[c+d x] - a^3 C \operatorname{Sin}[c+d x]}{b^2 (-a^2 + b^2) (a + b \operatorname{Cos}[c+d x])}\right)}{d}$$

Problem 1406: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\sqrt{\text{Sec}[c+d\,x]}}{\left(a+b\,\text{Cos}[c+d\,x]\right)^3}\,dx$$

Optimal (type 4, 405 leaves, 8 steps):

$$\frac{1}{4\,a^2\,b\,\left(a^2-b^2\right)^2\,d}\left(3\,A\,b^4-a^4\,C-a^2\,b^2\,\left(9\,A+5\,C\right)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}+\frac{1}{4\,a\,b^2\,\left(a^2-b^2\right)^2\,d}\left(A\,b^4+a^4\,C-7\,a^2\,b^2\,\left(A+C\right)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}+\left(\left(3\,A\,b^6-3\,a^2\,b^4\,\left(2\,A-C\right)-a^6\,C+5\,a^4\,b^2\,\left(3\,A+2\,C\right)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticPi}\left[\frac{2\,b}{a+b},\frac{1}{2}\,\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}\right)\Big/\left(4\,a^2\,\left(a-b\right)^2\,b^2\,\left(a+b\right)^3\,d\right)+\frac{\left(A\,b^2+a^2\,C\right)\,\text{Sin}[c+d\,x]}{2\,a\,\left(a^2-b^2\right)\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)^2\sqrt{\text{Sec}[c+d\,x]}}-\frac{\left(3\,A\,b^4-a^4\,C-a^2\,b^2\,\left(9\,A+5\,C\right)\right)\,\text{Sin}[c+d\,x]}{4\,a^2\,\left(a^2-b^2\right)^2\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 816 leaves):

$$\frac{1}{16\,a^2\,(a-b)^2\,(a+b)^2\,d}\Bigg(-\Bigg(\bigg(2\,\left(-32\,a^3\,A\,b+8\,a\,A\,b^3-24\,a^3\,b\,C\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]\,\left(b+a\,\text{Sec}[c+d\,x]\right)\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\bigg)\bigg/\left(b\,\left(a+b\,\text{Cos}[c+d\,x]\right)\,\left(1-\text{Cos}[c+d\,x]^2\right)\right)\Bigg)+\Bigg(2\,\left(16\,a^4\,A-19\,a^2\,A\,b^2+9\,A\,b^4+5\,a^4\,C+a^2\,b^2\,C\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)\,\left(b+a\,\text{Sec}[c+d\,x]\right)\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Bigg)\Bigg/\left(a\,\left(a+b\,\text{Cos}[c+d\,x]\right)\,\left(1-\text{Cos}[c+d\,x]^2\right)\right)+\Bigg(\left(-9\,a^2\,A\,b^2+3\,A\,b^4-a^4\,C-5\,a^2\,b^2\,C\right)\,\text{Cos}\left[2\,(c+d\,x)\right]\,\left(b+a\,\text{Sec}[c+d\,x]\right)\,\bigg(-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}\bigg)\,\text{Sin}[c+d\,x]\Bigg)\Bigg/\left(a\,b^2\,\left(a+b\,\text{Cos}[c+d\,x]\right)\,\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{1}{d}\sqrt{\text{Sec}[c+d\,x]}\,\Bigg(\frac{\left(9\,a^2\,A\,b^2-3\,A\,b^4+a^4\,C+5\,a^2\,b^2\,C\right)\,\text{Sin}[c+d\,x]}{4\,a^2\,b\,\left(a^2-b^2\right)^2}+\frac{A\,b^2\,\text{Sin}[c+d\,x]+a^2\,C\,\text{Sin}[c+d\,x]}{2\,b\,\left(-a^2+b^2\right)\,\left(a+b\,\text{Cos}[c+d\,x]\right)^2}+\left(-7\,a^2\,A\,b^2\,\text{Sin}[c+d\,x]+A\,b^4\,\text{Sin}[c+d\,x]+a^4\,C\,\text{Sin}[c+d\,x]-7\,a^2\,b^2\,C\,\text{Sin}[c+d\,x]\right)\Big/\left(4\,a\,b\,\left(a^2-b^2\right)^2\,\left(a+b\,\text{Cos}[c+d\,x]\right)\right)\Bigg)$$

Problem 1407: Result more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{\left(a+b\,\text{Cos}[c+d\,x]\right)^3\,\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 408 leaves, 8 steps):

$$\frac{1}{4\,a\,b^2\,\left(a^2-b^2\right)^2\,d}\left(A\,b^4-3\,a^4\,C+a^2\,b^2\,\left(5\,A+9\,C\right)\right)$$

$$\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,\left(c+d\,x\right),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}+\frac{1}{4\,b^3\,\left(a^2-b^2\right)^2\,d}$$

$$\left(a^2\,b^2\,\left(3\,A-5\,C\right)+3\,a^4\,C+b^4\,\left(3\,A+8\,C\right)\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}+$$

$$\left(\left(A\,b^6-3\,a^4\,b^2\,\left(A-2\,C\right)-3\,a^6\,C-5\,a^2\,b^4\,\left(2\,A+3\,C\right)\right)\,\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\left.\text{EllipticPi}\left[\frac{2\,b}{a+b},\,\frac{1}{2}\,\left(c+d\,x\right),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}\right)\Big/\left(4\,a\,\left(a-b\right)^2\,b^3\,\left(a+b\right)^3\,d\right)-$$

$$\frac{\left(A\,b^2+a^2\,C\right)\,\text{Sin}[c+d\,x]}{2\,b\,\left(a^2-b^2\right)\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)^2\,\sqrt{\text{Sec}[c+d\,x]}}-$$

$$\frac{\left(A\,b^4-3\,a^4\,C+a^2\,b^2\,\left(5\,A+9\,C\right)\right)\,\text{Sin}[c+d\,x]}{4\,a\,b\,\left(a^2-b^2\right)^2\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 821 leaves) :

$$-\frac{1}{16\,a\,(a-b)^2\,b\,(a+b)^2\,d}\Bigg(-\Bigg(\bigg(2\left(-16\,a^3\,A\,b-8\,a\,A\,b^3-8\,a^3\,b\,C-16\,a\,b^3\,C\right)\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{a}{b},$$
$$-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]\left(b+a\,\text{Sec}[c+d\,x]\right)\sqrt{1-\text{Sec}[c+d\,x]^2}$$
$$\text{Sin}[c+d\,x]\bigg)\Big/\left(b\left(a+b\,\text{Cos}[c+d\,x]\right)\left(1-\text{Cos}[c+d\,x]^2\right)\right)\Bigg)+$$
$$\bigg(2\left(9\,a^2\,A\,b^2-3\,A\,b^4+a^4\,C+5\,a^2\,b^2\,C\right)\text{Cos}[c+d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]+$$
$$\text{EllipticPi}\Big[-\frac{a}{b},-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]\Big)\left(b+a\,\text{Sec}[c+d\,x]\right)$$
$$\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\bigg)\Big/\left(a\left(a+b\,\text{Cos}[c+d\,x]\right)\left(1-\text{Cos}[c+d\,x]^2\right)\right)+$$
$$\bigg(\left(-5\,a^2\,A\,b^2-A\,b^4+3\,a^4\,C-9\,a^2\,b^2\,C\right)\text{Cos}\left[2\left(c+d\,x\right)\right]\left(b+a\,\text{Sec}[c+d\,x]\right)$$
$$\Big(-4\,a\,b+4\,a\,b\,\text{Sec}[c+d\,x]^2-$$
$$4\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$
$$2\left(2\,a-b\right)b\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$
$$4\,a^2\,\text{EllipticPi}\Big[-\frac{a}{b},-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-$$
$$2\,b^2\,\text{EllipticPi}\Big[-\frac{a}{b},-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Big)$$
$$\text{Sin}[c+d\,x]\bigg)\Big/\Big(a\,b^2\left(a+b\,\text{Cos}[c+d\,x]\right)\left(1-\text{Cos}[c+d\,x]^2\right)$$
$$\sqrt{\text{Sec}[c+d\,x]}\left(2-\text{Sec}[c+d\,x]^2\right)\Big)\Bigg)+$$
$$\frac{1}{d}\sqrt{\text{Sec}[c+d\,x]}\,\Bigg(\frac{\left(-5\,a^2\,A\,b^2-A\,b^4+3\,a^4\,C-9\,a^2\,b^2\,C\right)\text{Sin}[c+d\,x]}{4\,a\,b^2\left(a^2-b^2\right)^2}-$$
$$\frac{a\,A\,b^2\,\text{Sin}[c+d\,x]+a^3\,C\,\text{Sin}[c+d\,x]}{2\,b^2\left(-a^2+b^2\right)\left(a+b\,\text{Cos}[c+d\,x]\right)^2}+$$
$$\left(3\,a^2\,A\,b^2\,\text{Sin}[c+d\,x]+3\,A\,b^4\,\text{Sin}[c+d\,x]-5\,a^4\,C\,\text{Sin}[c+d\,x]+11\,a^2\,b^2\,C\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(4\,b^2\left(-a^2+b^2\right)^2\left(a+b\,\text{Cos}[c+d\,x]\right)\right)\Bigg)$$

Problem 1408: Result more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{\left(a+b\,\text{Cos}[c+d\,x]\right)^3\,\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 405 leaves, 8 steps):

$$-\frac{1}{4\, b^3 \left(a^2-b^2\right)^2 d}\left(b^4 (5\, A-8\, C)-15\, a^4\, C+a^2\, b^2 (A+29\, C)\right) \sqrt{\text{Cos}[c+d\, x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d\, x),2\right] \sqrt{\text{Sec}[c+d\, x]}-\frac{1}{4\, b^4 \left(a^2-b^2\right)^2 d}a \left(15\, a^4\, C+b^4 (7\, A+24\, C)-a^2\, b^2 (A+33\, C)\right) \sqrt{\text{Cos}[c+d\, x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d\, x),2\right] \sqrt{\text{Sec}[c+d\, x]}+\left(\left(3\, A\, b^6+15\, a^6\, C+5\, a^2\, b^4 (2\, A+7\, C)-a^4\, b^2 (A+38\, C)\right) \sqrt{\text{Cos}[c+d\, x]}\ \text{EllipticPi}\left[\frac{2\, b}{a+b},\frac{1}{2} (c+d\, x),2\right] \sqrt{\text{Sec}[c+d\, x]}\right)\Big/\left(4\, (a-b)^2\, b^4\, (a+b)^3\, d\right)-\frac{\left(A\, b^2+a^2\, C\right) \text{Sin}[c+d\, x]}{2\, b \left(a^2-b^2\right) d\, (a+b\, \text{Cos}[c+d\, x])^2\, \text{Sec}[c+d\, x]^{3/2}}+\frac{\left(3\, A\, b^4-5\, a^4\, C+a^2\, b^2 (3\, A+11\, C)\right) \text{Sin}[c+d\, x]}{4\, b^2 \left(a^2-b^2\right)^2 d\, (a+b\, \text{Cos}[c+d\, x]) \sqrt{\text{Sec}[c+d\, x]}}$$

Result (type 4, 824 leaves) :

$$\frac{1}{16\,(a-b)^2\,b^2\,(a+b)^2\,d}\Bigg(-\Bigg(\Big(2\,\left(-24\,a\,A\,b^3+8\,a^3\,b\,C-32\,a\,b^3\,C\right)\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{EllipticPi}\Big[-\frac{a}{b},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,(b+a\,\mathrm{Sec}[c+d\,x])\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\mathrm{Sin}[c+d\,x]\Big)\Big/\left(b\,(a+b\,\mathrm{Cos}[c+d\,x])\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)\right)\Bigg)+$$

$$\Big(2\,\left(5\,a^2\,A\,b^2+A\,b^4+5\,a^4\,C-7\,a^2\,b^2\,C+8\,b^4\,C\right)\,\mathrm{Cos}[c+d\,x]^2\,\Big(\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]+\mathrm{EllipticPi}\Big[-\frac{a}{b},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)\,(b+a\,\mathrm{Sec}[c+d\,x])\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\mathrm{Sin}[c+d\,x]\Big)\Big/\left(a\,(a+b\,\mathrm{Cos}[c+d\,x])\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)\right)+$$

$$\Big(\left(-a^2\,A\,b^2-5\,A\,b^4+15\,a^4\,C-29\,a^2\,b^2\,C+8\,b^4\,C\right)\,\mathrm{Cos}[2\,(c+d\,x)]\,(b+a\,\mathrm{Sec}[c+d\,x])\,\Big(-4\,a\,b+4\,a\,b\,\mathrm{Sec}[c+d\,x]^2-4\,a\,b\,\mathrm{EllipticE}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}+2\,(2\,a-b)\,b\,\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}+4\,a^2\,\mathrm{EllipticPi}\Big[-\frac{a}{b},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}-2\,b^2\,\mathrm{EllipticPi}\Big[-\frac{a}{b},\,-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\Big)\,\mathrm{Sin}[c+d\,x]\Big)\Big/\left(a\,b^2\,(a+b\,\mathrm{Cos}[c+d\,x])\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(2-\mathrm{Sec}[c+d\,x]^2\right)\right)\Bigg)+$$

$$\frac{1}{d}\sqrt{\mathrm{Sec}[c+d\,x]}\,\Bigg(-\frac{\left(-a^2\,A\,b^2-5\,A\,b^4+7\,a^4\,C-13\,a^2\,b^2\,C\right)\,\mathrm{Sin}[c+d\,x]}{4\,b^3\,\left(a^2-b^2\right)^2}-\frac{-a^2\,A\,b^2\,\mathrm{Sin}[c+d\,x]-a^4\,C\,\mathrm{Sin}[c+d\,x]}{2\,b^3\,\left(-a^2+b^2\right)\,(a+b\,\mathrm{Cos}[c+d\,x])^2}+\left(a^3\,A\,b^2\,\mathrm{Sin}[c+d\,x]-7\,a\,A\,b^4\,\mathrm{Sin}[c+d\,x]+9\,a^5\,C\,\mathrm{Sin}[c+d\,x]-15\,a^3\,b^2\,C\,\mathrm{Sin}[c+d\,x]\right)\Big/\left(4\,b^3\,\left(-a^2+b^2\right)^2\,(a+b\,\mathrm{Cos}[c+d\,x])\right)\Bigg)$$

Problem 1411: Attempted integration timed out after 120 seconds.

$$\int\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^{11/2}\,dx$$

Optimal (type 4, 544 leaves, 8 steps):

$$-\left(\left(2\,(a-b)\,\sqrt{a+b}\,\left(16\,A\,b^4+6\,a^2\,b^2\,(4\,A+7\,C)-21\,a^4\,(7\,A+9\,C)\right)\right.\right.$$

$$\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(315\,a^5\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\Bigg)-$$

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(12\,a\,A\,b^2+16\,A\,b^3+6\,a^2\,b\,(6\,A+7\,C)+21\,a^3\,(7\,A+9\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(315\,a^4\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\frac{1}{315\,a^3\,d}2\,b\,\left(8\,A\,b^2+a^2\,(13\,A+21\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]-$$

$$\frac{1}{315\,a^2\,d}$$

$$2\,\left(6\,A\,b^2-7\,a^2\,(7\,A+9\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]+$$

$$\frac{2\,A\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{63\,a\,d}+$$

$$\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{9\,d}$$

Result (type 1, 1 leaves):

???

Problem 1412: Unable to integrate problem.

$$\int\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{9/2}\,dx$$

Optimal (type 4, 455 leaves, 7 steps):

$$\left(2\,(a-b)\,b\,\sqrt{a+b}\,\left(8\,A\,b^2+a^2\,(19\,A+35\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\right.$$
$$\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(105\,a^4\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$
$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(6\,a\,A\,b+8\,A\,b^2+5\,a^2\,(5\,A+7\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\right.$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}$$
$$\left.\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(105\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-\frac{1}{105\,a^2\,d}$$
$$2\,\left(4\,A\,b^2-5\,a^2\,(5\,A+7\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]+$$
$$\frac{2\,A\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{35\,a\,d}+$$
$$\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 8, 39 leaves) :

$$\int\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{9/2}\,dx$$

Problem 1413: Attempted integration timed out after 120 seconds.

$$\int\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{7/2}\,dx$$

Optimal (type 4, 385 leaves, 6 steps) :

$$-\left(\left(2\,(a-b)\,\sqrt{a+b}\,\left(2\,A\,b^2-3\,a^2\,(3\,A+5\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\right.\right.$$
$$\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\bigg/\left(15\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)-$$
$$\left(2\,(a-b)\,\sqrt{a+b}\,(9\,a\,A+2\,A\,b+15\,a\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\right.$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\bigg/\left(15\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$
$$\frac{2\,A\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{15\,a\,d}+$$
$$\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 1, 1 leaves):

???

Problem 1416: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\sqrt{\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 515 leaves, 8 steps):

$$-\left(\left((a-b)\sqrt{a+b}\,C\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\right.\right.$$

$$\left.\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(4\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)+$$

$$\left(\sqrt{a+b}\,(8\,A\,b+(a+2\,b)\,C)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(4\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\left(\sqrt{a+b}\,\left(a^2\,C-4\,b^2\,(2\,A+C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\right.\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/$$

$$\left(4\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{C\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{a\,C\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,b\,d}$$

Result (type 4, 1391 leaves):

$$\frac{C\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[2\,(c+d\,x)]}{4\,d}+$$

$$\left(-a^2\sqrt{\frac{a-b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-a\,b\,\sqrt{\frac{a-b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+2\,a\,b\,\sqrt{\frac{a-b}{a+b}}\,C\right.$$

$$\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+a^2\sqrt{\frac{a-b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-a\,b\,\sqrt{\frac{a-b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$16\,i\,A\,b^2\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,-$$

$$2\,\mathrm{i}\,a^2\,C\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$8\,\mathrm{i}\,b^2\,C\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$16\,\mathrm{i}\,A\,b^2\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$2\,\mathrm{i}\,a^2\,C\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$8\,\mathrm{i}\,b^2\,C\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$\mathrm{i}\,a\,(a-b)\,C\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$2\,\mathrm{i}\,(a-b)\,(4\,A\,b+(a+2\,b)\,C)\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)$$

$$\left.\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\right)\Big/$$

$$\left(4\,b\,\sqrt{\frac{a-b}{a+b}}\,d\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)\right.$$

$$\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)^{3/2}\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\right)$$

Problem 1417: Result more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)}{\sqrt{\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 613 leaves, 9 steps):

$$\left((a-b)\sqrt{a+b}\left(3a^2C-8b^2(3A+2C)\right)\sqrt{\text{Cos}[c+dx]}\right.$$

$$\text{Csc}[c+dx]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a(1-\text{Sec}[c+dx])}{a+b}}\sqrt{\frac{a(1+\text{Sec}[c+dx])}{a-b}}\right)\Big/\left(24ab^2d\sqrt{\text{Sec}[c+dx]}\right)-$$

$$\left(\sqrt{a+b}\left(3a^2C-2abC-8b^2(3A+2C)\right)\sqrt{\text{Cos}[c+dx]}\,\text{Csc}[c+dx]\,\text{EllipticF}\right[$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\text{Sec}[c+dx])}{a+b}}\sqrt{\frac{a(1+\text{Sec}[c+dx])}{a-b}}\right)\Big/$$

$$\left(24b^2d\sqrt{\text{Sec}[c+dx]}\right)-\left(a\sqrt{a+b}\left(8Ab^2+(a^2+4b^2)C\right)\sqrt{\text{Cos}[c+dx]}\right.$$

$$\text{Csc}[c+dx]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a(1-\text{Sec}[c+dx])}{a+b}}\sqrt{\frac{a(1+\text{Sec}[c+dx])}{a-b}}\right)\Big/\left(8b^3d\sqrt{\text{Sec}[c+dx]}\right)-$$

$$\frac{aC\sqrt{a+b\,\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{4bd\sqrt{\text{Sec}[c+dx]}}+\frac{C(a+b\,\text{Cos}[c+dx])^{3/2}\,\text{Sin}[c+dx]}{3bd\sqrt{\text{Sec}[c+dx]}}-$$

$$\frac{1}{24b^2d}$$

$$\left(3a^2C-8b^2(3A+2C)\right)\sqrt{a+b\,\text{Cos}[c+dx]}\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]$$

Result (type 4, 1317 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+dx]}\sqrt{\text{Sec}[c+dx]}$$

$$\left(\frac{1}{12}C\,\text{Sin}[c+dx]+\frac{aC\,\text{Sin}[2(c+dx)]}{24b}+\frac{1}{12}C\,\text{Sin}[3(c+dx)]\right)+$$

$$\left(\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\right.$$

$$\left(-24\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-24\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\right.$$

$$3\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-16\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-16\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$48\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-6\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+32\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+$$

$$24\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-24\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-3\,a^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$3\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+16\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-16\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$48\,a\,A\,b^2\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$6\,a^3\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$24\,a\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$48\,a\,A\,b^2\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$6\,a^3\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$24\,a\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$(a+b)\left(-24 A b^2+3 a^2 C-16 b^2 C\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$
$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-2 a b\left(-24 A b+(a-14 b) C\right)$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$
$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\Bigg/$$
$$\left(24 b^2 d\sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(b\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-a\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

Problem 1418: Result more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{a+b\,\text{Cos}[c+d x]}\left(A+C\,\text{Cos}[c+d x]^2\right)}{\text{Sec}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 698 leaves, 10 steps):

$$-\Bigg(\Bigg((a-b)\sqrt{a+b}\,\left(48\,A\,b^2+15\,a^2\,C+28\,b^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\Bigg)\Big/\left(192\,b^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\Bigg)+$$

$$\Bigg(\sqrt{a+b}\,\left(15\,a^3\,C-10\,a^2\,b\,C+24\,b^3\,(4\,A+3\,C)+4\,a\,b^2\,(12\,A+7\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\Bigg)\Big/\left(192\,b^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\Bigg(\sqrt{a+b}\,\left(5\,a^4\,C+8\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\Bigg)\Big/\left(64\,b^4\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{C\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{4\,b\,d\,\text{Sec}[c+d\,x]^{3/2}}+$$

$$\frac{\left(5\,a^2\,C+4\,b^2\,(4\,A+3\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{32\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}}-\frac{5\,a\,C\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{24\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{1}{192\,b^3\,d}a\left(48\,A\,b^2+15\,a^2\,C+28\,b^2\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]$$

Result (type 4, 3838 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\left(\frac{a\,C\,\text{Sin}[c+d\,x]}{96\,b}+\right.$$

$$\frac{\left(48\,A\,b^2-5\,a^2\,C+48\,b^2\,C\right)\,\text{Sin}\left[2\,\left(c+d\,x\right)\right]}{192\,b^2}+\frac{a\,C\,\text{Sin}\left[3\,\left(c+d\,x\right)\right]}{96\,b}+\frac{1}{32}\,C\,\text{Sin}\left[4\,\left(c+d\,x\right)\right]\Bigg)+$$

$$\Bigg(\Bigg(\frac{A\,b}{2\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{a^2\,C}{96\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{3\,b\,C}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{3\,a\,A\,\sqrt{\text{Sec}[c+d\,x]}}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{25\,a\,C\,\sqrt{\text{Sec}[c+d\,x]}}{96\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{5\,a^3\,C\,\sqrt{\text{Sec}[c+d\,x]}}{384\,b^2\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{a\,A\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{7\,a\,C\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{96\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{5\,a^3\,C\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{128\,b^2\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\Bigg)$$

$$\Bigg(-\Bigg(\Bigg(\Bigg(a\,\left(a+b\right)\,\left(48\,A\,b^2+15\,a^2\,C+28\,b^2\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]-$$

$$2\,b\,\left(5\,a^3\,C+2\,a^2\,b\,C-12\,a\,b^2\,\left(4\,A+3\,C\right)+24\,b^3\,\left(4\,A+3\,C\right)\right)$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]+6\,\left(5\,a^4\,C+8\,a^2\,b^2\,\left(2\,A+C\right)-\right.$$

$$\left.16\,b^4\,\left(4\,A+3\,C\right)\right)\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\Bigg)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^4}\Bigg)\Bigg/$$

$$\Bigg(192\,b^3\,\left(a+b\right)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}\Bigg)\Bigg)+$$

$$\Bigg(a\,\left(48\,A\,b^2+15\,a^2\,C+28\,b^2\,C\right)\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\,\sqrt{a+\frac{b-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\Bigg)\Bigg/$$

$$\Bigg(192\,b^3\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(d\Bigg(\Bigg(\Bigg(a\,(a+b)\,\left(48\,A\,b^2+15\,a^2\,C+28\,b^2\,C\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(5\,a^3\,C+2\,a^2\,b\,C-12\,a\,b^2\,(4\,A+3\,C)+24\,b^3\,(4\,A+3\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+6\,\left(5\,a^4\,C+8\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\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(192\,b^3\,(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)+\Bigg(\Bigg(a\,(a+b)\,\left(48\,A\,b^2+15\,a^2\,C+28\,b^2\,C\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(5\,a^3\,C+2\,a^2\,b\,C-12\,a\,b^2\,(4\,A+3\,C)+24\,b^3\,(4\,A+3\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+6\,\left(5\,a^4\,C+8\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\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)\,\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)\,\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(384\,b^3\,(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)\,\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}\Bigg)+$$

$$\left(\left(a\,(a+b)\,\left(48\,A\,b^2+15\,a^2\,C+28\,b^2\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]-\right.\right.$$

$$2\,b\,\left(5\,a^3\,C+2\,a^2\,b\,C-12\,a\,b^2\,(4\,A+3\,C)+24\,b^3\,(4\,A+3\,C)\right)\,\text{EllipticF}\Big[$$

$$\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\Big]+6\,\left(5\,a^4\,C+8\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\right)$$

$$\left.\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$

$$\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)\Bigg/\left(192\,b^3\,(a+b)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left.\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)+$$

$$\left(\left(a\,(a+b)\,\left(48\,A\,b^2+15\,a^2\,C+28\,b^2\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]-\right.\right.$$

$$2\,b\,\left(5\,a^3\,C+2\,a^2\,b\,C-12\,a\,b^2\,(4\,A+3\,C)+24\,b^3\,(4\,A+3\,C)\right)\,\text{EllipticF}\Big[$$

$$\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\Big]+6\,\left(5\,a^4\,C+8\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\right)$$

$$\left.\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\right)$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)\Bigg/\left(384\,b^3\right.$$

$$\left.(a+b)\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)+$$

$$\left(a\,\left(48\,A\,b^2+15\,a^2\,C+28\,b^2\,C\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(-\frac{b\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}-\right.\right.$$

$$\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\left(b-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\Big/$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\Bigg)\Bigg)\Big/$$

$$\left(384\, b^3 \sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\sqrt{a+\frac{b-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)+$$

$$\left(a\left(48 A b^2+15 a^2 C+28 b^2 C\right) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{a+\frac{b-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)\Big/$$

$$\left(384\, b^3 \sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)-$$

$$\Bigg(a\left(48 A b^2+15 a^2 C+28 b^2 C\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]$$

$$\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}+\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right.\right.$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\Big/\left(1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)$$

$$\sqrt{a+\frac{b-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\Bigg)\Big/\left(384\, b^3\left(\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^{3/2}\right)-$$

$$\Bigg(\Bigg(a(a+b)\left(48 A b^2+15 a^2 C+28 b^2 C\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]-$$

$$2 b\left(5 a^3 C+2 a^2 b C-12 a b^2(4 A+3 C)+24 b^3(4 A+3 C)\right) \text{EllipticF}\Big[$$

$$\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\Big]+6\left(5 a^4 C+8 a^2 b^2(2 A+C)-16 b^4(4 A+3 C)\right)$$

$$\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\Bigg)\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}$$

$$\Bigg(\Bigg(a\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]-b\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg)\Big/$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right.$$

$$\left(a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\Big)\Big/\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\Bigg)\Bigg/$$

$$\left(384\,b^3\,(a+b)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right.$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)-$$

$$\left(\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right.$$

$$\left(-\left(\left(b\,\left(5\,a^3\,C+2\,a^2\,b\,C-12\,a\,b^2\,(4\,A+3\,C)+24\,b^3\,(4\,A+3\,C)\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\Big/\right.\right.$$

$$\left.\left.\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\right)-$$

$$\left(3\,\left(5\,a^4\,C+8\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\Big/$$

$$\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)+$$

$$\left(a\,(a+b)\,\left(48\,A\,b^2+15\,a^2\,C+28\,b^2\,C\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right.$$

$$\left.\left.\left.\sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\Big/\left(2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right)\right)\right)\Big/$$

$$\left(192\,b^3\,(a+b)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right.$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg)\Bigg)$$

Problem 1419: Attempted integration timed out after 120 seconds.

$$\int(a+b\,\text{Cos}[c+d\,x])^{3/2}\left(A+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^{11/2}\,dx$$

Optimal (type 4, 542 leaves, 8 steps):

$$\Bigg(2\,(a-b)\,\sqrt{a+b}\,\left(8\,A\,b^4+21\,a^4\,(7\,A+9\,C)+3\,a^2\,b^2\,(11\,A+21\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\Bigg)\Bigg/\left(315\,a^4\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\Bigg(2\,(a-b)\,\sqrt{a+b}\,\left(6\,a\,A\,b^2+8\,A\,b^3-21\,a^3\,(7\,A+9\,C)+a^2\,(39\,A\,b+63\,b\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\Bigg)\Bigg/\left(315\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\frac{1}{315\,a^2\,d}4\,b\,\left(2\,A\,b^2-a^2\,(44\,A+63\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]+$$

$$\frac{1}{315\,a\,d}2\,\left(3\,A\,b^2+7\,a^2\,(7\,A+9\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]+$$

$$\frac{2\,A\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{21\,d}+$$

$$\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{9\,d}$$

Result (type 1, 1 leaves):

???

Problem 1420: Attempted integration timed out after 120 seconds.

$$\int(a+b\,\text{Cos}[c+d\,x])^{3/2}\left(A+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^{9/2}\,dx$$

Optimal (type 4, 458 leaves, 7 steps):

$$-\left(\left(4\,(a-b)\,b\,\sqrt{a+b}\,\left(3\,A\,b^2-a^2\,(41\,A+70\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(105\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)+$$

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(25\,a^2\,A-57\,a\,A\,b-6\,A\,b^2+35\,a^2\,C-105\,a\,b\,C\right)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(105\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\frac{1}{105\,a\,d}2\,\left(3\,A\,b^2+5\,a^2\,(5\,A+7\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]+$$

$$\frac{6\,A\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{35\,d}+$$

$$\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 1, 1 leaves):

???

Problem 1422: Result more than twice size of optimal antiderivative.

$$\int(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{5/2}\,dx$$

Optimal (type 4, 560 leaves, 9 steps):

$$\left((a-b)\,b\,\sqrt{a+b}\,(8A-3C)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,a\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)+$$

$$\left(\sqrt{a+b}\,\left(6\,A\,b^2+2\,a^2\,(A+3C)-a\,(8\,A\,b-3\,b\,C)\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\right.\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/$$

$$\left(3\,a\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)-\frac{1}{d\,\sqrt{\mathrm{Sec}[c+d\,x]}}3\,a\,\sqrt{a+b}\,C\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}[c+d\,x]$$

$$\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{2\,A\,b\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{d}-$$

$$\frac{b\,(8A-3C)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{3\,d}+$$

$$\frac{2\,A\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 3392 leaves):

$$\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(\frac{8}{3}\,A\,b\,\mathrm{Sin}[c+d\,x]+\frac{2}{3}\,a\,A\,\mathrm{Tan}[c+d\,x]\right)+$$

$$\left(\left(-\frac{4\,a\,A\,b}{3\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}+\frac{2\,a\,b\,C}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}+\right.\right.$$

$$\frac{a^2\,A\,\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}-\frac{A\,b^2\,\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\frac{a^2\,C\,\sqrt{\mathrm{Sec}[c+d\,x]}}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\frac{b^2\,C\,\sqrt{\mathrm{Sec}[c+d\,x]}}{2\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}-$$

$$\left.\frac{4\,A\,b^2\,\mathrm{Cos}[2\,(c+d\,x)]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\frac{b^2\,C\,\mathrm{Cos}[2\,(c+d\,x)]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{2\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}\right)$$

$$\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]}\,\left(-2\,b\,(a+b)\,(8A-3C)\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\right.$$

$$\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$4\,\left(3\,A\,b^2+a^2\,(A+3\,C)+a\,(4\,A\,b-6\,b\,C)\right)\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-36\,a\,b\,C\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}$$

$$\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-$$

$$\left.\left.b\,(8\,A-3\,C)\,\text{Cos}[c+d\,x]\,(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$

$$\left(3\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \sqrt{\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\ \left(\frac{1}{6\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\sqrt{\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.\right.$$

$$b\,\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]\,\left(-2\,b\,(a+b)\,(8\,A-3\,C)\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\right.$$

$$\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$4\,\left(3\,A\,b^2+a^2\,(A+3\,C)+a\,(4\,A\,b-6\,b\,C)\right)\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-36\,a\,b\,C\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}$$

$$\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\ \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-$$

$$\left.b\,(8\,A-3\,C)\,\text{Cos}[c+d\,x]\,(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)-$$

$$\frac{1}{6\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \sqrt{\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sec}[c+d\,x]}$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(-2\,b\,(a+b)\,(8\,A-3\,C)\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\right.$$

$$\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$4\left(3\,A\,b^2+a^2\,(A+3\,C)+a\,(4\,A\,b-6\,b\,C)\right)\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-36\,a\,b\,C\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}$$

$$\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-$$

$$\left.b\,(8\,A-3\,C)\,\mathrm{Cos}[c+d\,x]\,(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)+$$

$$\frac{1}{3\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\sqrt{\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}$$

$$\left(-\frac{1}{2}\,b\,(8\,A-3\,C)\,\mathrm{Cos}[c+d\,x]\,(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^4-\frac{1}{\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}}\right.$$

$$b\,(a+b)\,(8\,A-3\,C)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\right.$$

$$\left.\frac{-a+b}{a+b}\right]\left(\frac{\mathrm{Cos}[c+d\,x]\,\mathrm{Sin}[c+d\,x]}{(1+\mathrm{Cos}[c+d\,x])^2}-\frac{\mathrm{Sin}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}\right)+\frac{1}{\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}}$$

$$2\left(3\,A\,b^2+a^2\,(A+3\,C)+a\,(4\,A\,b-6\,b\,C)\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticF}\Big[$$

$$\left.\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\left(\frac{\mathrm{Cos}[c+d\,x]\,\mathrm{Sin}[c+d\,x]}{(1+\mathrm{Cos}[c+d\,x])^2}-\frac{\mathrm{Sin}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}\right)-$$

$$\frac{1}{\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}} 18 a b C \sqrt{\frac{a+b \text{Cos}[c+d x]}{(a+b) (1+\text{Cos}[c+d x])}} \text{EllipticPi}\Big[-1,$$

$$-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2} (c+d x)\Big]\Big], \frac{-a+b}{a+b}\Big] \left(\frac{\text{Cos}[c+d x] \text{Sin}[c+d x]}{(1+\text{Cos}[c+d x])^2}-\frac{\text{Sin}[c+d x]}{1+\text{Cos}[c+d x]}\right)-$$

$$\Bigg(b (a+b) (8 A-3 C) \sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}} \text{EllipticE}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2} (c+d x)\Big]\Big], \frac{-a+b}{a+b}\Big]$$

$$\left(-\frac{b \text{Sin}[c+d x]}{(a+b) (1+\text{Cos}[c+d x])}+\frac{(a+b \text{Cos}[c+d x]) \text{Sin}[c+d x]}{(a+b) (1+\text{Cos}[c+d x])^2}\right)\Bigg) \Big/$$

$$\left(\sqrt{\frac{a+b \text{Cos}[c+d x]}{(a+b) (1+\text{Cos}[c+d x])}}\right)+\Bigg(2 \left(3 A b^2+a^2 (A+3 C)+a (4 A b-6 b C)\right)$$

$$\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}} \text{EllipticF}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2} (c+d x)\Big]\Big], \frac{-a+b}{a+b}\Big]$$

$$\left(-\frac{b \text{Sin}[c+d x]}{(a+b) (1+\text{Cos}[c+d x])}+\frac{(a+b \text{Cos}[c+d x]) \text{Sin}[c+d x]}{(a+b) (1+\text{Cos}[c+d x])^2}\right)\Bigg) \Big/$$

$$\left(\sqrt{\frac{a+b \text{Cos}[c+d x]}{(a+b) (1+\text{Cos}[c+d x])}}\right)-\Bigg(18 a b C \sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}$$

$$\text{EllipticPi}\Big[-1, -\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2} (c+d x)\Big]\Big], \frac{-a+b}{a+b}\Big] \Bigg(-\frac{b \text{Sin}[c+d x]}{(a+b) (1+\text{Cos}[c+d x])}+$$

$$\frac{(a+b \text{Cos}[c+d x]) \text{Sin}[c+d x]}{(a+b) (1+\text{Cos}[c+d x])^2}\Bigg)\Bigg) \Big/ \left(\sqrt{\frac{a+b \text{Cos}[c+d x]}{(a+b) (1+\text{Cos}[c+d x])}}\right)+$$

$$b^2 (8 A-3 C) \text{Cos}[c+d x] \text{Sec}\Big[\frac{1}{2} (c+d x)\Big]^2 \text{Sin}[c+d x] \text{Tan}\Big[\frac{1}{2} (c+d x)\Big]+$$

$$b (8 A-3 C) (a+b \text{Cos}[c+d x]) \text{Sec}\Big[\frac{1}{2} (c+d x)\Big]^2 \text{Sin}[c+d x] \text{Tan}\Big[\frac{1}{2} (c+d x)\Big]-$$

$$b (8 A-3 C) \text{Cos}[c+d x] (a+b \text{Cos}[c+d x]) \text{Sec}\Big[\frac{1}{2} (c+d x)\Big]^2 \text{Tan}\Big[\frac{1}{2} (c+d x)\Big]^2+$$

$$\Bigg(2 \left(3 A b^2+a^2 (A+3 C)+a (4 A b-6 b C)\right) \sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}$$

$$\sqrt{\frac{a+b \text{Cos}[c+d x]}{(a+b) (1+\text{Cos}[c+d x])}} \text{Sec}\Big[\frac{1}{2} (c+d x)\Big]^2\Bigg) \Big/$$

$$\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)+$$

$$\left(18\,a\,b\,C\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/$$

$$\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)-$$

$$\left(b\,(a+b)\,(8A-3C)\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}\right.$$

$$\left.\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\Big/\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\right)+$$

$$\left(\left(-2\,b\,(a+b)\,(8A-3C)\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}\,\text{EllipticE}\right[\right.$$

$$\left.\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]+4\left(3Ab^2+a^2(A+3C)+a(4Ab-6bC)\right)$$

$$\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]-36\,a\,b\,C\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}$$

$$\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]-$$

$$\left.b\,(8A-3C)\,\text{Cos}[c+d x]\,(a+b\,\text{Cos}[c+d x])\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)$$

$$\left(-\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}[c+d x]\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$\left.\left.\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]\,\text{Tan}[c+d x]\right)\right)\Big/$$

$$\left.\left.\left(6\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\right)\right)\right)$$

Problem 1423: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\mathrm{Sec}[c+d\,x]^{3/2}\,dx$$

Optimal (type 4, 569 leaves, 9 steps):

$$\left((a-b)\sqrt{a+b}\,(8\,A-5\,C)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(4\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)-$$

$$\left(\sqrt{a+b}\,(8\,a\,A-16\,A\,b-5\,a\,C-2\,b\,C)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(4\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)-$$

$$\left(\sqrt{a+b}\,\left(8\,A\,b^2+3\,a^2\,C+4\,b^2\,C\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/$$

$$\left(4\,b\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)-\frac{b\,(4\,A-C)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{2\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}-$$

$$\frac{a\,(8\,A-5\,C)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{4\,d}+$$

$$\frac{2\,A\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{d}$$

Result (type 4, 1178 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}\;\left(2\,a\,A\,\text{Sin}[c+d\,x]+\frac{1}{4}\,b\,C\,\text{Sin}\left[2\,\left(c+d\,x\right)\right]\right)+$$

$$\Bigg(8\,a^2\,A\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+8\,a\,A\,b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-5\,a^2\,C\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-$$

$$5\,a\,b\,C\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-16\,a\,A\,b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3+10\,a\,b\,C\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3-$$

$$8\,a^2\,A\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5+8\,a\,A\,b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5+5\,a^2\,C\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5-$$

$$5\,a\,b\,C\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5+16\,A\,b^2\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$6\,a^2\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$8\,b^2\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$16\,A\,b^2\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$6\,a^2\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$8\,b^2\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$a\,\left(a+b\right)\,\left(8\,A-5\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a+b}}-$$

$$2\left(4 a^2\left(A-C\right)-2 b^2\left(2 A+C\right)+a b\left(8 A+C\right)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2\right)$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a+b}}\right)\Bigg/$$

$$\left(4 d\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}}\left(-1+\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2\right)\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2\right)^{3/2}\right.$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}}\right)$$

Problem 1424: Result more than twice size of optimal antiderivative.

$$\int\left(a+b\,\text{Cos}[c+d x]\right)^{3/2}\left(A+C\,\text{Cos}[c+d x]^2\right)\sqrt{\text{Sec}[c+d x]}\,dx$$

Optimal (type 4, 613 leaves, 9 steps):

$$-\left(\left((a-b)\sqrt{a+b}\left(3a^2C+8b^2(3A+2C)\right)\sqrt{\mathrm{Cos}[c+dx]}\right.\right.$$

$$\mathrm{Csc}[c+dx]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}}{\sqrt{a+b}\sqrt{\mathrm{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{\frac{a(1-\mathrm{Sec}[c+dx])}{a+b}}\sqrt{\frac{a(1+\mathrm{Sec}[c+dx])}{a-b}}\right)\Big/\left(24\,a\,b\,d\sqrt{\mathrm{Sec}[c+dx]}\right)\right)+$$

$$\left(\sqrt{a+b}\left(48\,a\,A\,b+24\,A\,b^2+3a^2C+14\,a\,b\,C+16\,b^2C\right)\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Csc}[c+dx]\right.$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}}{\sqrt{a+b}\sqrt{\mathrm{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a(1-\mathrm{Sec}[c+dx])}{a+b}}\sqrt{\frac{a(1+\mathrm{Sec}[c+dx])}{a-b}}\right)\Big/\left(24\,b\,d\sqrt{\mathrm{Sec}[c+dx]}\right)-$$

$$\left(a\sqrt{a+b}\left(24\,A\,b^2-a^2C+12\,b^2C\right)\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Csc}[c+dx]\right.$$

$$\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}}{\sqrt{a+b}\sqrt{\mathrm{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a(1-\mathrm{Sec}[c+dx])}{a+b}}\sqrt{\frac{a(1+\mathrm{Sec}[c+dx])}{a-b}}\right)\Big/\left(8\,b^2\,d\sqrt{\mathrm{Sec}[c+dx]}\right)+$$

$$\frac{a\,C\sqrt{a+b\,\mathrm{Cos}[c+dx]}\,\mathrm{Sin}[c+dx]}{4\,d\sqrt{\mathrm{Sec}[c+dx]}}+\frac{C\,(a+b\,\mathrm{Cos}[c+dx])^{3/2}\,\mathrm{Sin}[c+dx]}{3\,d\sqrt{\mathrm{Sec}[c+dx]}}+$$

$$\frac{1}{24\,b\,d}$$

$$\left(3a^2C+8b^2(3A+2C)\right)\sqrt{a+b\,\mathrm{Cos}[c+dx]}\sqrt{\mathrm{Sec}[c+dx]}\,\mathrm{Sin}[c+dx]$$

Result (type 4, 1285 leaves):

$$\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\sqrt{\mathrm{Sec}[c+dx]}$$

$$\left(\frac{1}{12}b\,C\,\mathrm{Sin}[c+dx]+\frac{7}{24}a\,C\,\mathrm{Sin}[2(c+dx)]+\frac{1}{12}b\,C\,\mathrm{Sin}[3(c+dx)]\right)+$$

$$\frac{1}{24\,b\,d\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^{3/2}\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}}$$

$$\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\Bigg(24\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+24\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$3\,a^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+16\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$16\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-48\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-6\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-$$

$$32\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-24\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+24\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$3\,a^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+3\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-16\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$16\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-144\,a\,A\,b^2\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$6\,a^3\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$72\,a\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$144\,a\,A\,b^2\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$6\,a^3\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$72\,a\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$\left(a+b\right)\,\left(24\,A\,b^2+3\,a^2\,C+16\,b^2\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}\;+2\,a\,b\,\left(24\,a\,A-48\,A\,b+7\,a\,C-26\,b\,C\right)$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}$$

$$\left.\left(1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2\right)\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}\right)$$

Problem 1425: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(a+b\,\text{Cos}\left[c+d\,x\right]\right)^{3/2}\,\left(A+C\,\text{Cos}\left[c+d\,x\right]^2\right)}{\sqrt{\text{Sec}\left[c+d\,x\right]}}\,dx$$

Optimal (type 4, 698 leaves, 10 steps):

$$-\left(\left(\left((a-b)\sqrt{a+b}\left(80\,A\,b^2-3\,a^2\,C+52\,b^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\right.\right.\right.$$

$$\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(64\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\Bigg)-$$

$$\left(\sqrt{a+b}\left(3\,a^3\,C-2\,a^2\,b\,C-8\,b^3\,(4\,A+3\,C)-4\,a\,b^2\,(20\,A+13\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(64\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\left(\sqrt{a+b}\left(3\,a^4\,C+24\,a^2\,b^2\,(2\,A+C)+16\,b^4\,(4\,A+3\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\right.$$

$$\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(64\,b^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\frac{\left(3\,a^2\,C-4\,b^2\,(4\,A+3\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{32\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}}-$$

$$\frac{a\,C\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{8\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{C\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{4\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{1}{64\,b^2\,d}$$

$$a\left(80\,A\,b^2-3\,a^2\,C+52\,b^2\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]$$

Result (type 4, 4000 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\left(\frac{3}{32}\,a\,C\,\text{Sin}[c+d\,x]+\right.$$

$$\frac{\left(16\,A\,b^2+a^2\,C+16\,b^2\,C\right)\,\text{Sin}\left[2\,\left(c+d\,x\right)\right]}{64\,b}+\frac{3}{32}\,a\,C\,\text{Sin}\left[3\,\left(c+d\,x\right)\right]+\frac{1}{32}\,b\,C\,\text{Sin}\left[4\,\left(c+d\,x\right)\right]\Bigg)+$$

$$\Bigg(\Bigg(\frac{a^2\,A}{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{A\,b^2}{2\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{19\,a^2\,C}{32\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{3\,b^2\,C}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{7\,a\,A\,b\,\sqrt{\text{Sec}[c+d\,x]}}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-\frac{a^3\,C\,\sqrt{\text{Sec}[c+d\,x]}}{128\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{19\,a\,b\,C\,\sqrt{\text{Sec}[c+d\,x]}}{32\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{5\,a\,A\,b\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-\frac{3\,a^3\,C\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{128\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{13\,a\,b\,C\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{32\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\Bigg)\,\Bigg(-\Bigg(\Bigg(a\,\left(-80\,A\,b^2+3\,a^2\,C-52\,b^2\,C\right)$$

$$\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\Bigg)\Bigg/$$

$$\left(64\,b^2\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\right)\Bigg)+$$

$$\Bigg(\Bigg(a\,\left(a+b\right)\,\left(-80\,A\,b^2+3\,a^2\,C-52\,b^2\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$2\,b\,\left(-a^3\,C-4\,a\,b^2\,\left(4\,A+3\,C\right)+8\,b^3\,\left(4\,A+3\,C\right)+a^2\,\left(64\,A\,b+38\,b\,C\right)\right)\,\text{EllipticF}\Big[$$

$$\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\Big]+2\,\left(3\,a^4\,C+24\,a^2\,b^2\,\left(2\,A+C\right)+16\,b^4\,\left(4\,A+3\,C\right)\right)$$

$$\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\Bigg)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^4}\Bigg)\Bigg/$$

$$\Bigg(64\,b^2\,\left(a+b\right)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2\right)$$

$$\left.\left.\left.\left.\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\right)\right)\Big/$$

$$\left(d\left(-\left(\left(\left(a\,\left(-80\,A\,b^2+3\,a^2\,C-52\,b^2\,C\right)\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right.\right.\right.\right.\right.$$

$$\left.\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)\Big/$$

$$\left.\left.\left(128\,b^2\,\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)\right)-$$

$$\left(\left(a\,(a+b)\,\left(-80\,A\,b^2+3\,a^2\,C-52\,b^2\,C\right)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+\right.\right.$$

$$2\,b\,\left(-a^3\,C-4\,a\,b^2\,(4\,A+3\,C)+8\,b^3\,(4\,A+3\,C)+a^2\,(64\,A\,b+38\,b\,C)\right)\,\mathrm{EllipticF}\Big[$$

$$\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\Big]+2\,\left(3\,a^4\,C+24\,a^2\,b^2\,(2\,A+C)+16\,b^4\,(4\,A+3\,C)\right)$$

$$\left.\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\right)\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\left.\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)\Big/$$

$$\left(64\,b^2\,(a+b)\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right.$$

$$\left.\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)-$$

$$\left(\left(a\,(a+b)\,\left(-80\,A\,b^2+3\,a^2\,C-52\,b^2\,C\right)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+\right.\right.$$

$$2\,b\,\left(-a^3\,C-4\,a\,b^2\,(4\,A+3\,C)+8\,b^3\,(4\,A+3\,C)+a^2\,(64\,A\,b+38\,b\,C)\right)\,\mathrm{EllipticF}\Big[$$

$$\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\Big]+2\,\left(3\,a^4\,C+24\,a^2\,b^2\,(2\,A+C)+16\,b^4\,(4\,A+3\,C)\right)$$

$$\left.\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\right)$$

$$\left(a\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-b\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\;\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)\bigg/$$

$$\left(128\,b^2\,(a+b)^2\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right.$$

$$\left.\left(\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}\right)^{3/2}\right)-$$

$$\left(\left(a\,(a+b)\,\left(-80\,A\,b^2+3\,a^2\,C-52\,b^2\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+\right.\right.$$

$$2\,b\,\left(-a^3\,C-4\,a\,b^2\,(4\,A+3\,C)+8\,b^3\,(4\,A+3\,C)+a^2\,(64\,A\,b+38\,b\,C)\right)\,\text{EllipticF}\Big[$$

$$\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\Big]+2\,\left(3\,a^4\,C+24\,a^2\,b^2\,(2\,A+C)+16\,b^4\,(4\,A+3\,C)\right)$$

$$\left.\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$

$$\left.\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)\bigg/\left(64\,b^2\,(a+b)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left.\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)-$$

$$\left(\left(a\,(a+b)\,\left(-80\,A\,b^2+3\,a^2\,C-52\,b^2\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+\right.\right.$$

$$2\,b\,\left(-a^3\,C-4\,a\,b^2\,(4\,A+3\,C)+8\,b^3\,(4\,A+3\,C)+a^2\,(64\,A\,b+38\,b\,C)\right)\,\text{EllipticF}\Big[$$

$$\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\Big]+2\,\left(3\,a^4\,C+24\,a^2\,b^2\,(2\,A+C)+16\,b^4\,(4\,A+3\,C)\right)$$

$$\left.\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\right)$$

$$\mathrm{Sec}\left[\frac{1}{2}\left(c+d x\right)\right]^2 \mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}}$$

$$\left.\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}}\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^4}\right)\Big/\left(128\,b^2\right.$$

$$\left.\left(a+b\right)\left(-1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2\right)\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a+b}}\right)+$$

$$\left(a\left(-80\,A\,b^2+3\,a^2\,C-52\,b^2\,C\right)\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right.$$

$$\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}}$$

$$\left(\frac{\mathrm{Sec}\left[\frac{1}{2}\left(c+d x\right)\right]^2\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]}{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}+\left(\mathrm{Sec}\left[\frac{1}{2}\left(c+d x\right)\right]^2\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right.\right.$$

$$\left.\left.\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2\right)\right)\Big/\left(1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2\right)^2\right)\right)\Big/$$

$$\left(128\,b^2\left(\frac{1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}\right)^{3/2}\right)-\left(a\left(-80\,A\,b^2+3\,a^2\,C-52\,b^2\,C\right)\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right.$$

$$\left(\left(a\,\mathrm{Sec}\left[\frac{1}{2}\left(c+d x\right)\right]^2\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]-b\,\mathrm{Sec}\left[\frac{1}{2}\left(c+d x\right)\right]^2\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right)\Big/\right.$$

$$\left(1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2\right)-\left(\mathrm{Sec}\left[\frac{1}{2}\left(c+d x\right)\right]^2\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right.$$

$$\left.\left.\left.\left(a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2\right)\right)\Big/\left(1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2\right)^2\right)\right)\Big/$$

$$\left(128\,b^2\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}}\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]^2}}\right)+$$

$$\left(\left(a\left(a+b\right)\left(-80\,A\,b^2+3\,a^2\,C-52\,b^2\,C\right)\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right],\frac{-a+b}{a+b}\right]+\right.\right.$$

$$2\,b\left(-a^3\,C-4\,a\,b^2\left(4\,A+3\,C\right)+8\,b^3\left(4\,A+3\,C\right)+a^2\left(64\,A\,b+38\,b\,C\right)\right)\mathrm{EllipticF}\Big[$$

$$\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]+2\left(3 a^4 C+24 a^2 b^2 (2 A+C)+16 b^4 (4 A+3 C)\right)$$

$$\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\Bigg)\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}$$

$$\left(\left(a \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]-b \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Big/\right.$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right.$$

$$\left.\left.\left(a+b+a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\Big/\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\Bigg/$$

$$\left(128 b^2 (a+b)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.$$

$$\sqrt{\frac{a+b+a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}$$

$$\left.\sqrt{\frac{a+b+a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)+$$

$$\left(\sqrt{\frac{a+b+a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\right.$$

$$\left(\left(b\left(-a^3 C-4 a b^2 (4 A+3 C)+8 b^3 (4 A+3 C)+a^2 (64 A b+38 b C)\right) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/\right.$$

$$\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{1-\frac{(-a+b) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)-$$

$$\left(\left(3 a^4 C+24 a^2 b^2 (2 A+C)+16 b^4 (4 A+3 C)\right) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/$$

$$\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{1-\frac{(-a+b) \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)+$$

$$\left(a (a+b)\left(-80 A b^2+3 a^2 C-52 b^2 C\right) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right.$$

$$\sqrt{1-\frac{(-a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg/\left(2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(64\,b^2\,(a+b)\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg)$$

Problem 1426: Attempted integration timed out after 120 seconds.

$$\int (a+b\,\mathrm{Cos}[c+d\,x])^{5/2}\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\mathrm{Sec}[c+d\,x]^{13/2}\,dx$$

Optimal (type 4, 627 leaves, 9 steps):

$$\left(2\,(a-b)\,b\,\sqrt{a+b}\,\left(8\,A\,b^4+3\,a^2\,b^2\,(17\,A+33\,C)+a^4\,(741\,A+957\,C)\right)\right.$$
$$\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(693\,a^4\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)+$$
$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(6\,a\,A\,b^3+8\,A\,b^4+15\,a^4\,(9\,A+11\,C)+3\,a^2\,b^2\,(19\,A+33\,C)-6\,a^3\,b\,(101\,A+132\,C)\right)\right.$$
$$\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(693\,a^3\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)-\frac{1}{693\,a^2\,d}$$
$$2\,\left(4\,A\,b^4-15\,a^4\,(9\,A+11\,C)-a^2\,b^2\,(205\,A+297\,C)\right)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]+$$
$$\frac{1}{693\,a\,d}2\,b\,\left(3\,A\,b^2+a^2\,(229\,A+297\,C)\right)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]+$$
$$\frac{1}{231\,d}2\,\left(5\,A\,b^2+3\,a^2\,(9\,A+11\,C)\right)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]^{7/2}\,\mathrm{Sin}[c+d\,x]+$$
$$\frac{10\,A\,b\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sec}[c+d\,x]^{9/2}\,\mathrm{Sin}[c+d\,x]}{99\,d}+$$
$$\frac{2\,A\,(a+b\,\mathrm{Cos}[c+d\,x])^{5/2}\,\mathrm{Sec}[c+d\,x]^{11/2}\,\mathrm{Sin}[c+d\,x]}{11\,d}$$

Result (type 1, 1 leaves):

???

Problem 1427: Attempted integration timed out after 120 seconds.

$$\int(a+b\,\mathrm{Cos}[c+d\,x])^{5/2}\,\left(A+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^{11/2}\,dx$$

Optimal (type 4, 544 leaves, 8 steps):

$$-\left(\left(2\,(a-b)\,\sqrt{a+b}\,\left(10\,A\,b^4-21\,a^4\,(7\,A+9\,C)-3\,a^2\,b^2\,(93\,A+161\,C)\right)\right.\right.$$

$$\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(315\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)-$$

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(10\,A\,b^3+21\,a^3\,(7\,A+9\,C)+15\,a\,b^2\,(11\,A+21\,C)-6\,a^2\,b\,(19\,A+28\,C)\right)\right.$$

$$\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(315\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\frac{1}{315\,a\,d}2\,b\,\left(5\,A\,b^2+a^2\,(163\,A+231\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]+$$

$$\frac{1}{315\,d}$$

$$2\,\left(15\,A\,b^2+7\,a^2\,(7\,A+9\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]+$$

$$\frac{10\,A\,b\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{63\,d}+$$

$$\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{9\,d}$$

Result (type 1, 1 leaves):

???

Problem 1431: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{3/2}\,dx$$

Optimal (type 4, 669 leaves, 10 steps):

$$\Bigg((a-b)\sqrt{a+b}\left(a^2(48A-33C)-8b^2(3A+2C)\right)$$

$$\sqrt{\text{Cos}[c+dx]}\ \text{Csc}[c+dx]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a(1-\text{Sec}[c+dx])}{a+b}}\ \sqrt{\frac{a(1+\text{Sec}[c+dx])}{a-b}}\Bigg)\Big/\left(24\,a\,d\sqrt{\text{Sec}[c+dx]}\right)-$$

$$\Bigg(\sqrt{a+b}\left(a^2(48A-33C)-8b^2(3A+2C)-2ab(72A+13C)\right)\sqrt{\text{Cos}[c+dx]}$$

$$\text{Csc}[c+dx]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a(1-\text{Sec}[c+dx])}{a+b}}\ \sqrt{\frac{a(1+\text{Sec}[c+dx])}{a-b}}\Bigg)\Big/\left(24\,d\sqrt{\text{Sec}[c+dx]}\right)-$$

$$\Bigg(5a\sqrt{a+b}\left(8Ab^2+(a^2+4b^2)C\right)\sqrt{\text{Cos}[c+dx]}\ \text{Csc}[c+dx]\ \text{EllipticPi}\left[\frac{a+b}{b},\right.$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\text{Sec}[c+dx])}{a+b}}\ \sqrt{\frac{a(1+\text{Sec}[c+dx])}{a-b}}\Bigg)\Big/$$

$$\left(8\,b\,d\sqrt{\text{Sec}[c+dx]}\right)-\frac{ab(8A-3C)\sqrt{a+b\,\text{Cos}[c+dx]}\ \text{Sin}[c+dx]}{4\,d\sqrt{\text{Sec}[c+dx]}}-$$

$$\frac{b(6A-C)\left(a+b\,\text{Cos}[c+dx]\right)^{3/2}\text{Sin}[c+dx]}{3\,d\sqrt{\text{Sec}[c+dx]}}-\frac{1}{24\,d}$$

$$\left(a^2(48A-33C)-8b^2(3A+2C)\right)\sqrt{a+b\,\text{Cos}[c+dx]}\ \sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]+$$

$$\frac{2A\left(a+b\,\text{Cos}[c+dx]\right)^{5/2}\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{d}$$

Result (type 4, 1405 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+dx]}\ \sqrt{\text{Sec}[c+dx]}$$

$$\left(\frac{1}{12}\left(24a^2A+b^2C\right)\text{Sin}[c+dx]+\frac{13}{24}abC\,\text{Sin}[2(c+dx)]+\frac{1}{12}b^2C\,\text{Sin}[3(c+dx)]\right)+$$

$$\frac{1}{24\,d\left(1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^{3/2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}}$$

$$\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\;\left(-48\,a^3\,A\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-48\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\right.$$

$$24\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+24\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+33\,a^3\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+$$

$$33\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+16\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+16\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+$$

$$96\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3-48\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3-66\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3-$$

$$32\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3+48\,a^3\,A\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-48\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-$$

$$24\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+24\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-33\,a^3\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+$$

$$33\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-16\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+16\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-$$

$$240\,a\,A\,b^2\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;-$$

$$30\,a^3\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;-$$

$$120\,a\,b^2\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;-$$

$$240\,a\,A\,b^2\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;-$$

$$30\,a^3\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;-$$

$$120\,a\,b^2\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$(a+b)\left(a^2(48 A-33 C)-8 b^2(3 A+2 C)\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$2 a\left(24 a^2(A-C)+a b(72 A+13 C)-2 b^2(36 A+19 C)\right)$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)$$

Problem 1433: Result more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d x])^{5/2}\left(A+C\,\text{Cos}[c+d x]^2\right)}{\sqrt{\text{Sec}[c+d x]}}\,dx$$

Optimal (type 4, 806 leaves, 11 steps):

$$\left((a-b)\sqrt{a+b}\left(45a^4C-256b^4(5A+4C)-12a^2b^2(220A+141C)\right)\right.$$
$$\sqrt{\mathrm{Cos}[c+dx]}\ \mathrm{Csc}[c+dx]\ \mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}}{\sqrt{a+b}\ \sqrt{\mathrm{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\mathrm{Sec}[c+dx])}{a+b}}\ \sqrt{\frac{a\,(1+\mathrm{Sec}[c+dx])}{a-b}}\right)\Big/\left(1920\,a\,b^2\,d\sqrt{\mathrm{Sec}[c+dx]}\right)-$$
$$\left(\sqrt{a+b}\left(45a^4C-30a^3bC-256b^4(5A+4C)-12a^2b^2(220A+141C)-8ab^3(260A+193C)\right)\right.$$
$$\sqrt{\mathrm{Cos}[c+dx]}\ \mathrm{Csc}[c+dx]\ \mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}}{\sqrt{a+b}\ \sqrt{\mathrm{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\mathrm{Sec}[c+dx])}{a+b}}\ \sqrt{\frac{a\,(1+\mathrm{Sec}[c+dx])}{a-b}}\right)\Big/\left(1920\,b^2\,d\sqrt{\mathrm{Sec}[c+dx]}\right)-$$
$$\left(a\sqrt{a+b}\left(3a^4C+40a^2b^2(2A+C)+80b^4(4A+3C)\right)\sqrt{\mathrm{Cos}[c+dx]}\ \mathrm{Csc}[c+dx]\right.$$
$$\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}}{\sqrt{a+b}\ \sqrt{\mathrm{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\mathrm{Sec}[c+dx])}{a+b}}\ \sqrt{\frac{a\,(1+\mathrm{Sec}[c+dx])}{a-b}}\right)\Big/\left(128\,b^3\,d\sqrt{\mathrm{Sec}[c+dx]}\right)+$$
$$\frac{a\left(240Ab^2-15a^2C+172b^2C\right)\sqrt{a+b\,\mathrm{Cos}[c+dx]}\ \mathrm{Sin}[c+dx]}{320\,b\,d\sqrt{\mathrm{Sec}[c+dx]}}-$$
$$\frac{\left(15a^2C-16b^2(5A+4C)\right)(a+b\,\mathrm{Cos}[c+dx])^{3/2}\,\mathrm{Sin}[c+dx]}{240\,b\,d\sqrt{\mathrm{Sec}[c+dx]}}-$$
$$\frac{3aC\,(a+b\,\mathrm{Cos}[c+dx])^{5/2}\,\mathrm{Sin}[c+dx]}{40\,b\,d\sqrt{\mathrm{Sec}[c+dx]}}+$$
$$\frac{C\,(a+b\,\mathrm{Cos}[c+dx])^{7/2}\,\mathrm{Sin}[c+dx]}{5\,b\,d\sqrt{\mathrm{Sec}[c+dx]}}-\frac{1}{1920\,b^2\,d}$$
$$\left(45a^4C-256b^4(5A+4C)-12a^2b^2(220A+141C)\right)\sqrt{a+b\,\mathrm{Cos}[c+dx]}\ \sqrt{\mathrm{Sec}[c+dx]}\ \mathrm{Sin}[c+dx]$$

Result (type 4, 2064 leaves):

$$\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\ \sqrt{\mathrm{Sec}[c+dx]}$$

$$\left(\frac{1}{960}\left(80\,A\,b^2+93\,a^2\,C+88\,b^2\,C\right)\,\mathrm{Sin}[c+d\,x]+\frac{a\,\left(1040\,A\,b^2+15\,a^2\,C+1024\,b^2\,C\right)\,\mathrm{Sin}\left[2\,\left(c+d\,x\right)\right]}{1920\,b}+\right.$$
$$\frac{1}{960}\left(80\,A\,b^2+93\,a^2\,C+100\,b^2\,C\right)\,\mathrm{Sin}\left[3\,\left(c+d\,x\right)\right]+$$
$$\left.\frac{21}{320}\,a\,b\,C\,\mathrm{Sin}\left[4\,\left(c+d\,x\right)\right]+\frac{1}{80}\,b^2\,C\,\mathrm{Sin}\left[5\,\left(c+d\,x\right)\right]\right)+$$
$$\left(\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\right.$$
$$\left(-2640\,a^3\,A\,b^2\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-2640\,a^2\,A\,b^3\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-1280\,a\,A\,b^4\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\right.$$
$$1280\,A\,b^5\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+45\,a^5\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+45\,a^4\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-$$
$$1692\,a^3\,b^2\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-1692\,a^2\,b^3\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-1024\,a\,b^4\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-$$
$$1024\,b^5\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+5280\,a^2\,A\,b^3\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3+2560\,A\,b^5\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3-$$
$$90\,a^4\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3+3384\,a^2\,b^3\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3+2048\,b^5\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3+$$
$$2640\,a^3\,A\,b^2\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5-2640\,a^2\,A\,b^3\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5+1280\,a\,A\,b^4\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5-$$
$$1280\,A\,b^5\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5-45\,a^5\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5+45\,a^4\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5+$$
$$1692\,a^3\,b^2\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5-1692\,a^2\,b^3\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5+1024\,a\,b^4\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5-$$
$$1024\,b^5\,C\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5+2400\,a^3\,A\,b^2\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\right.$$
$$\left.\frac{-a+b}{a+b}\right]\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}+$$
$$9600\,a\,A\,b^4\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}+$$
$$90\,a^5\,C\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$1200\,a^3\,b^2\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$7200\,a\,b^4\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$2400\,a^3\,A\,b^2\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$9600\,a\,A\,b^4\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$90\,a^5\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$1200\,a^3\,b^2\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$7200\,a\,b^4\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$(a+b)\,\left(45\,a^4\,C-256\,b^4\,(5\,A+4\,C)-12\,a^2\,b^2\,(220\,A+141\,C)\right)$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$2\,a\,b\,\left(15\,a^3\,C-6\,a^2\,b\,\left(320\,A+191\,C\right)+4\,a\,b^2\,\left(260\,A+193\,C\right)-8\,b^3\,\left(380\,A+289\,C\right)\right)$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$
$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$
$$\left(1920\,b^2\,d\,\sqrt{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(b\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-a\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)$$

Problem 1434: Unable to integrate problem.

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{9/2}}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 469 leaves, 7 steps):

$$-\left(\left(4\,(a-b)\,b\,\sqrt{a+b}\,\left(24\,A\,b^2+a^2\,(22\,A+35\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\right.\right.$$
$$\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(105\,a^5\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)-$$
$$\left(2\,\sqrt{a+b}\,\left(12\,a\,A\,b^2-48\,A\,b^3-5\,a^3\,(5\,A+7\,C)-a^2\,(44\,A\,b+70\,b\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\right.$$
$$\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(105\,a^4\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$
$$\frac{1}{105\,a^3\,d}2\,\left(24\,A\,b^2+5\,a^2\,(5\,A+7\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]-$$
$$\frac{12\,A\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{35\,a^2\,d}+$$
$$\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{7\,a\,d}$$

Result (type 8, 39 leaves):

$$\int \frac{\left(A + C\,\text{Cos}[c + d\,x]^2\right)\,\text{Sec}[c + d\,x]^{9/2}}{\sqrt{a + b\,\text{Cos}[c + d\,x]}}\,dx$$

Problem 1435: Unable to integrate problem.

$$\int \frac{\left(A + C\,\text{Cos}[c + d\,x]^2\right)\,\text{Sec}[c + d\,x]^{7/2}}{\sqrt{a + b\,\text{Cos}[c + d\,x]}}\,dx$$

Optimal (type 4, 394 leaves, 6 steps):

$$\Bigg(2\,(a - b)\,\sqrt{a + b}\,\left(8\,A\,b^2 + 3\,a^2\,(3\,A + 5\,C)\right)\,\sqrt{\text{Cos}[c + d\,x]}\;\text{Csc}[c + d\,x]\;\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a + b\,\text{Cos}[c + d\,x]}}{\sqrt{a + b}\,\sqrt{\text{Cos}[c + d\,x]}}\Big],\,-\frac{a + b}{a - b}\Big]\,\sqrt{\frac{a\,(1 - \text{Sec}[c + d\,x])}{a + b}}\,\sqrt{\frac{a\,(1 + \text{Sec}[c + d\,x])}{a - b}}\Bigg)\Bigg/\left(15\,a^4\,d\,\sqrt{\text{Sec}[c + d\,x]}\right) +$$

$$\Bigg(2\,\sqrt{a + b}\,\left(2\,a\,A\,b - 8\,A\,b^2 - 3\,a^2\,(3\,A + 5\,C)\right)\,\sqrt{\text{Cos}[c + d\,x]}\;\text{Csc}[c + d\,x]\;\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a + b\,\text{Cos}[c + d\,x]}}{\sqrt{a + b}\,\sqrt{\text{Cos}[c + d\,x]}}\Big],\,-\frac{a + b}{a - b}\Big]\,\sqrt{\frac{a\,(1 - \text{Sec}[c + d\,x])}{a + b}}\,\sqrt{\frac{a\,(1 + \text{Sec}[c + d\,x])}{a - b}}\Bigg)\Bigg/\left(15\,a^3\,d\,\sqrt{\text{Sec}[c + d\,x]}\right) - \frac{8\,A\,b\,\sqrt{a + b\,\text{Cos}[c + d\,x]}\;\text{Sec}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x]}{15\,a^2\,d} +$$

$$\frac{2\,A\,\sqrt{a + b\,\text{Cos}[c + d\,x]}\;\text{Sec}[c + d\,x]^{5/2}\,\text{Sin}[c + d\,x]}{5\,a\,d}$$

Result (type 8, 39 leaves):

$$\int \frac{\left(A + C\,\text{Cos}[c + d\,x]^2\right)\,\text{Sec}[c + d\,x]^{7/2}}{\sqrt{a + b\,\text{Cos}[c + d\,x]}}\,dx$$

Problem 1436: Unable to integrate problem.

$$\int \frac{\left(A + C\,\text{Cos}[c + d\,x]^2\right)\,\text{Sec}[c + d\,x]^{5/2}}{\sqrt{a + b\,\text{Cos}[c + d\,x]}}\,dx$$

Optimal (type 4, 323 leaves, 5 steps):

$$-\left(\left(4\,A\,(a-b)\,b\,\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\right.\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\Bigg)+$$

$$\left(2\,\sqrt{a+b}\,(2\,A\,b+a\,(A+3\,C))\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\right.\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/$$

$$\left(3\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,a\,d}$$

Result (type 8, 39 leaves):

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{5/2}}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Problem 1439: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 515 leaves, 8 steps):

$$\left(3\,(a-b)\,\sqrt{a+b}\,C\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\right.$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(4\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\left((3\,a-2\,b)\,\sqrt{a+b}\,C\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(4\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\left(\sqrt{a+b}\,\left(3\,a^2\,C+4\,b^2\,(2\,A+C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\right.\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/$$

$$\left(4\,b^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{C\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}}-$$

$$\frac{3\,a\,C\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,b^2\,d}$$

Result (type 4, 1399 leaves):

$$\frac{C\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[2\,(c+d\,x)]}{4\,b\,d}+$$

$$\left(3\,a^2\,\sqrt{\frac{a-b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a\,b\,\sqrt{\frac{a-b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-6\,a\,b\,\sqrt{\frac{a-b}{a+b}}\,C\right.$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-3\,a^2\,\sqrt{\frac{a-b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+3\,a\,b\,\sqrt{\frac{a-b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$16\,i\,A\,b^2\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$6\,i\,a^2\,C\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$8\,i\,b^2\,C\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$16\,i\,A\,b^2\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$6\,i\,a^2\,C\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$8\,i\,b^2\,C\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$3\,i\,a\,(a-b)\,C\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-2\,i\,\left(4\,A\,b^2+3\,a^2\,C-a\,b\,C+2\,b^2\,C\right)$$

$$\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]\right],\ -\frac{a+b}{a-b}\right]\ \sqrt{1-\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2}$$

$$\left.\left(1+\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2\right)\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2}{a+b}}\ \right)\Bigg/$$

$$\left(4\,b^2\ \sqrt{\frac{a-b}{a+b}}\ d\ \sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2}}\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^2}}\right.$$

$$\left.\left(-1+\text{Tan}\left[\frac{1}{2}\ (c+d\,x)\right]^4\right)\right)$$

Problem 1440: Attempted integration timed out after 120 seconds.

$$\int \frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\ \text{Sec}[c+d\,x]^{7/2}}{(a+b\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 534 leaves, 7 steps):

$$-\left(\left(2\left(16 A b^4-2 a^2 b^2(4 A-5 C)-a^4(3 A+5 C)\right)\sqrt{\mathrm{Cos}[c+d x]}\right.\right.$$
$$\mathrm{Csc}[c+d x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a(1-\mathrm{Sec}[c+d x])}{a+b}}\,\sqrt{\frac{a(1+\mathrm{Sec}[c+d x])}{a-b}}\right)\Big/\left(5 a^5\sqrt{a+b}\,d\sqrt{\mathrm{Sec}[c+d x]}\right)\right)-$$
$$\left(2\left(12 a A b^2+16 A b^3+2 a^2 b(2 A+5 C)+a^3(3 A+5 C)\right)\sqrt{\mathrm{Cos}[c+d x]}\,\mathrm{Csc}[c+d x]\right.$$
$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\mathrm{Sec}[c+d x])}{a+b}}$$
$$\left.\sqrt{\frac{a(1+\mathrm{Sec}[c+d x])}{a-b}}\right)\Big/\left(5 a^4\sqrt{a+b}\,d\sqrt{\mathrm{Sec}[c+d x]}\right)+\frac{1}{5 a^3\left(a^2-b^2\right) d}$$
$$2 b\left(8 A b^2-a^2(3 A-5 C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d x]}\,\mathrm{Sec}[c+d x]^{3/2}\,\mathrm{Sin}[c+d x]+$$
$$\frac{2\left(A b^2+a^2 C\right)\mathrm{Sec}[c+d x]^{5/2}\,\mathrm{Sin}[c+d x]}{a\left(a^2-b^2\right) d\sqrt{a+b\,\mathrm{Cos}[c+d x]}}-$$
$$\frac{1}{5 a^2\left(a^2-b^2\right) d}$$
$$2\left(6 A b^2-a^2(A-5 C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d x]}\,\mathrm{Sec}[c+d x]^{5/2}\,\mathrm{Sin}[c+d x]$$

Result (type 1, 1 leaves):

???

Problem 1441: Unable to integrate problem.

$$\int\frac{\left(A+C\,\mathrm{Cos}[c+d x]^2\right)\mathrm{Sec}[c+d x]^{5/2}}{\left(a+b\,\mathrm{Cos}[c+d x]\right)^{3/2}}\,dx$$

Optimal (type 4, 432 leaves, 6 steps):

$$\left(2\,b\,\left(8\,A\,b^2-a^2\,\left(5\,A-3\,C\right)\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Csc}[c+d\,x]\,\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\,\sqrt{\text{Cos}[c+d\,x]}}\right],\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\,\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\right)\Big/\left(3\,a^4\,\sqrt{a+b}\,\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\left(2\,\left(6\,a\,A\,b+8\,A\,b^2+a^2\,\left(A+3\,C\right)\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Csc}[c+d\,x]\,\,\text{EllipticF}\left[\right.\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]\,\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\right)\Big/$$

$$\left(3\,a^3\,\sqrt{a+b}\,\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{2\,\left(A\,b^2+a^2\,C\right)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{a\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-$$

$$\frac{1}{3\,a^2\,\left(a^2-b^2\right)\,d}2\,\left(4\,A\,b^2-a^2\,\left(A-3\,C\right)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]$$

Result (type 8, 39 leaves) :

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{5/2}}{\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Problem 1442: Unable to integrate problem.

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{3/2}}{\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 348 leaves, 5 steps) :

$$-\left(\left(2\left(2 A b^2-a^2(A-C)\right)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(a^3\sqrt{a+b}\,d\,\sqrt{\text{Sec}[c+d x]}\right)\right)-$$

$$\left(2(2 A b+a(A-C))\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/$$

$$\left(a^2\sqrt{a+b}\,d\,\sqrt{\text{Sec}[c+d x]}\right)+\frac{2\left(A b^2+a^2 C\right)\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{a\left(a^2-b^2\right)d\,\sqrt{a+b\,\text{Cos}[c+d x]}}$$

Result (type 8, 39 leaves):

$$\int\frac{\left(A+C\,\text{Cos}[c+d x]^2\right)\text{Sec}[c+d x]^{3/2}}{(a+b\,\text{Cos}[c+d x])^{3/2}}\,dx$$

Problem 1443: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+C\,\text{Cos}[c+d x]^2\right)\sqrt{\text{Sec}[c+d x]}}{(a+b\,\text{Cos}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 481 leaves, 7 steps):

$$\left(2\left(A b^2+a^2 C\right)\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(a^2 b\sqrt{a+b}\ d\sqrt{\text{Sec}[c+d x]}\right)+$$

$$\left(2\left(A b-a C\right)\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(a b\sqrt{a+b}\ d\sqrt{\text{Sec}[c+d x]}\right)-$$

$$\left(2\sqrt{a+b}\ C\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/$$

$$\left(b^2 d\sqrt{\text{Sec}[c+d x]}\right)-\frac{2\left(A b^2+a^2 C\right)\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{b\left(a^2-b^2\right) d\sqrt{a+b\,\text{Cos}[c+d x]}}$$

Result (type 4, 1027 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}\left(\frac{2\left(A b^2+a^2 C\right)\text{Sin}[c+d x]}{a b\left(a^2-b^2\right)}+\frac{2\left(A b^2\,\text{Sin}[c+d x]+a^2 C\,\text{Sin}[c+d x]\right)}{b\left(-a^2+b^2\right)\left(a+b\,\text{Cos}[c+d x]\right)}\right)-$$

$$\left(2\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(a A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+A b^3\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+a^3 C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.\right.$$

$$a^2 b C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-2 A b^3\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-2 a^2 b C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-$$

$$a A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+A b^3\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-a^3 C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$

$$a^2 b C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+2 a^3 C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$2 a b^2 C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\,+$$

$$2\,a^3\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\,-$$

$$2\,a\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\,+$$

$$(a+b)\left(A\,b^2+a^2\,C\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\,-$$

$$a\,b\,(a+b)\,(A+C)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\Bigg/$$

$$\left(b\left(a^3-a\,b^2\right)d\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)$$

Problem 1444: Result more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d x]^2}{(a+b\,\text{Cos}[c+d x])^{3/2}\sqrt{\text{Sec}[c+d x]}}\,dx$$

Optimal (type 4, 563 leaves, 8 steps):

$$-\left(\left(\left(2\,A\,b^2+3\,a^2\,C-b^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\;\sqrt{\text{Cos}[c+d\,x]}}\right],\right.\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\;\sqrt{\frac{a\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\right)\Big/\left(a\,b^2\,\sqrt{a+b}\;d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)+$$

$$\left(\left(2\,A\,b^2+a\,\left(3\,a+b\right)\,C\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\;\sqrt{\text{Cos}[c+d\,x]}}\right],\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\;\sqrt{\frac{a\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\right)\Big/\left(a\,b^2\,\sqrt{a+b}\;d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\left(3\,a\,\sqrt{a+b}\;C\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[\frac{a+b}{b},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\;\sqrt{\text{Cos}[c+d\,x]}}\right],\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\;\sqrt{\frac{a\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\right)\Big/$$

$$\left(b^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-\frac{2\left(A\,b^2+a^2\,C\right)\text{Sin}[c+d\,x]}{b\left(a^2-b^2\right)d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{\left(2\,A\,b^2+3\,a^2\,C-b^2\,C\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b^2\left(a^2-b^2\right)d}$$

Result (type 4, 1163 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}$$

$$\left(\frac{2\left(A\,b^2+a^2\,C\right)\text{Sin}[c+d\,x]}{b^2\left(-a^2+b^2\right)}-\frac{2\left(a\,A\,b^2\,\text{Sin}[c+d\,x]+a^3\,C\,\text{Sin}[c+d\,x]\right)}{b^2\left(-a^2+b^2\right)\left(a+b\,\text{Cos}[c+d\,x]\right)}\right)+$$

$$\left(\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\right.$$

$$\left(2\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+2\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+3\,a^3\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\right.$$

$$3\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-b^3\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-$$

$$4\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3-6\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3+2\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3-$$

$$2\,a\,A\,b^2\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+2\,A\,b^3\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-3\,a^3\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$
$$3\,a^2\,b\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+a\,b^2\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-b^3\,C\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$
$$6\,a^3\,C\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$
$$6\,a\,b^2\,C\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$
$$6\,a^3\,C\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$
$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$
$$6\,a\,b^2\,C\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$
$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$
$$(a+b)\,\left(2\,A\,b^2+3\,a^2\,C-b^2\,C\right)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$
$$\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$
$$2\,b\,(a+b)\,(A\,b+a\,C)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$
$$\left.\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Bigg/$$
$$\left(b^2\,\left(-a^2+b^2\right)\,d\,\sqrt{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(b\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)-a\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)$$

Problem 1445: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + C \operatorname{Cos}[c + d x]^2}{(a + b \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sec}[c + d x]^{3/2}} \, dx$$

Optimal (type 4, 664 leaves, 9 steps):

$$\left((8 A b^2 + 15 a^2 C - 7 b^2 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Csc}[c + d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \operatorname{Sec}[c + d x])}{a - b}}\right) \Big/ \left(4 b^3 \sqrt{a + b} \, d \sqrt{\operatorname{Sec}[c + d x]}\right) -$$

$$\left((8 A b^2 + (15 a^2 + 5 a b - 2 b^2) C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Csc}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \operatorname{Sec}[c + d x])}{a - b}}\right) \Big/ \left(4 b^3 \sqrt{a + b} \, d \sqrt{\operatorname{Sec}[c + d x]}\right) -$$

$$\left(\sqrt{a + b} (8 A b^2 + 15 a^2 C + 4 b^2 C) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Csc}[c + d x] \operatorname{EllipticPi}\left[\frac{a + b}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \operatorname{Sec}[c + d x])}{a - b}}\right) \Big/$$

$$\left(4 b^4 d \sqrt{\operatorname{Sec}[c + d x]}\right) - \frac{2 (A b^2 + a^2 C) \operatorname{Sin}[c + d x]}{b (a^2 - b^2) d \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Sec}[c + d x]^{3/2}} +$$

$$\frac{(4 A b^2 + 5 a^2 C - b^2 C) \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{2 b^2 (a^2 - b^2) d \sqrt{\operatorname{Sec}[c + d x]}} -$$

$$\frac{1}{4 b^3 (a^2 - b^2) d} a (8 A b^2 + 15 a^2 C - 7 b^2 C) \sqrt{a + b \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]$$

Result (type 4, 40 202 leaves): Display of huge result suppressed!

Problem 1446: Attempted integration timed out after 120 seconds.

$$\int \frac{\left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{5/2}}{\left(a + b \operatorname{Cos}[c + d x]\right)^{5/2}} \, dx$$

Optimal (type 4, 589 leaves, 7 steps):

$$-\left(\left(4 b \left(8 A b^4 + a^4 (4 A - 3 C) - a^2 b^2 (14 A - C)\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Csc}[c + d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \operatorname{Sec}[c + d x])}{a - b}}\right) \Big/ \left(3 a^5 \sqrt{a + b} \left(a^2 - b^2\right) d \sqrt{\operatorname{Sec}[c + d x]}\right)\right) - \left(2 \left(12 a A b^3 + 16 A b^4 - 2 a^2 b^2 (8 A - C) - a^4 (A + 3 C) - a^3 (9 A b - 3 b C)\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{Csc}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a + b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a (1 - \operatorname{Sec}[c + d x])}{a + b}} \sqrt{\frac{a (1 + \operatorname{Sec}[c + d x])}{a - b}}\right) \Big/ \left(3 a^4 \sqrt{a + b} \left(a^2 - b^2\right) d \sqrt{\operatorname{Sec}[c + d x]}\right) + \frac{2 \left(A b^2 + a^2 C\right) \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{3 a \left(a^2 - b^2\right) d \left(a + b \operatorname{Cos}[c + d x]\right)^{3/2}} + \frac{4 \left(5 a^2 A b^2 - 3 A b^4 + 2 a^4 C\right) \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{3 a^2 \left(a^2 - b^2\right)^2 d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{1}{3 a^3 \left(a^2 - b^2\right)^2 d} 2 \left(8 A b^4 + a^4 (A - 5 C) - a^2 b^2 (13 A - C)\right) \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]$$

Result (type 1, 1 leaves):

???

Problem 1447: Attempted integration timed out after 120 seconds.

$$\int \frac{\left(A + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{3/2}}{\left(a + b \operatorname{Cos}[c + d x]\right)^{5/2}} \, dx$$

Optimal (type 4, 489 leaves, 6 steps):

$$\left(2\left(8\,A\,b^4+3\,a^4\,(A-C)-a^2\,b^2\,(15\,A+C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\;\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Bigg/\left(3\,a^4\,\sqrt{a+b}\;\left(a^2-b^2\right)d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\left(2\left(6\,a\,A\,b^2+8\,A\,b^3-3\,a^3\,(A-C)-a^2\,b\,(9\,A+C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\;\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Bigg/$$

$$\left(3\,a^3\,\sqrt{a+b}\;\left(a^2-b^2\right)d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{2\left(A\,b^2+a^2\,C\right)\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,a\left(a^2-b^2\right)d\,(a+b\,\text{Cos}[c+d\,x])^{3/2}}-$$

$$\frac{4\left(2\,A\,b^4-a^4\,C-a^2\,b^2\,(4\,A+C)\right)\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,a^2\left(a^2-b^2\right)^2 d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 1, 1 leaves):

???

Problem 1448: Unable to integrate problem.

$$\int\frac{\left(A+C\,\text{Cos}[c+d\,x]^2\right)\sqrt{\text{Sec}[c+d\,x]}}{(a+b\,\text{Cos}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 456 leaves, 6 steps):

$$-\left(\left(4\, b\, \left(A\, b^2-a^2\, \left(3\, A+2\, C\right)\right)\, \sqrt{\text{Cos}[c+d\, x]}\, \text{Csc}[c+d\, x]\right.\right.$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Cos}[c+d\, x]}}{\sqrt{a+b}\, \sqrt{\text{Cos}[c+d\, x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\, \left(1-\text{Sec}[c+d\, x]\right)}{a+b}}$$

$$\left.\left.\sqrt{\frac{a\, \left(1+\text{Sec}[c+d\, x]\right)}{a-b}}\right)\Big/\left(3\, a^3\, \left(a-b\right)\, \left(a+b\right)^{3/2}\, d\, \sqrt{\text{Sec}[c+d\, x]}\right)\right)-$$

$$\left(2\, \left(2\, A\, b^2+3\, a\, b\, \left(A+C\right)-a^2\, \left(3\, A+C\right)\right)\, \sqrt{\text{Cos}[c+d\, x]}\, \text{Csc}[c+d\, x]\right.$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\, \text{Cos}[c+d\, x]}}{\sqrt{a+b}\, \sqrt{\text{Cos}[c+d\, x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\, \left(1-\text{Sec}[c+d\, x]\right)}{a+b}}$$

$$\left.\sqrt{\frac{a\, \left(1+\text{Sec}[c+d\, x]\right)}{a-b}}\right)\Big/\left(3\, a^2\, \sqrt{a+b}\, \left(a^2-b^2\right)\, d\, \sqrt{\text{Sec}[c+d\, x]}\right)+$$

$$\frac{2\, \left(A\, b^2+a^2\, C\right)\, \text{Sin}[c+d\, x]}{3\, a\, \left(a^2-b^2\right)\, d\, \left(a+b\, \text{Cos}[c+d\, x]\right)^{3/2}\, \sqrt{\text{Sec}[c+d\, x]}}+$$

$$\frac{4\, b\, \left(A\, b^2-a^2\, \left(3\, A+2\, C\right)\right)\, \sqrt{\text{Sec}[c+d\, x]}\, \text{Sin}[c+d\, x]}{3\, a\, \left(a^2-b^2\right)^2\, d\, \sqrt{a+b\, \text{Cos}[c+d\, x]}}$$

Result (type 8, 39 leaves):

$$\int \frac{\left(A+C\, \text{Cos}[c+d\, x]^2\right)\, \sqrt{\text{Sec}[c+d\, x]}}{\left(a+b\, \text{Cos}[c+d\, x]\right)^{5/2}}\, dx$$

Problem 1449: Result more than twice size of optimal antiderivative.

$$\int \frac{A+C\, \text{Cos}[c+d\, x]^2}{\left(a+b\, \text{Cos}[c+d\, x]\right)^{5/2}\, \sqrt{\text{Sec}[c+d\, x]}}\, dx$$

Optimal (type 4, 618 leaves, 8 steps):

$$-\left(\left(2\left(A b^4-3 a^4 C+a^2 b^2(3 A+7 C)\right)\sqrt{\operatorname{Cos}[c+d x]}\operatorname{Csc}[c+d x]\right.\right.$$

$$\text{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}}$$

$$\left.\sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}\right)\Big/\left(3 a^2 b^2\sqrt{a+b}\left(a^2-b^2\right) d\sqrt{\operatorname{Sec}[c+d x]}\right)\Bigg)-$$

$$\left(2\left(A b^3+3 a^3 C+a^2 b C-3 a b^2(A+2 C)\right)\sqrt{\operatorname{Cos}[c+d x]}\operatorname{Csc}[c+d x]\right.$$

$$\text{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}}$$

$$\left.\sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}\right)\Big/\left(3 a(a-b) b^2(a+b)^{3/2} d\sqrt{\operatorname{Sec}[c+d x]}\right)-$$

$$\left(2\sqrt{a+b}\, C\sqrt{\operatorname{Cos}[c+d x]}\operatorname{Csc}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{b},\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\operatorname{Cos}[c+d x]}}\right],\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}\right)\Big/$$

$$\left(b^3 d\sqrt{\operatorname{Sec}[c+d x]}\right)-\frac{2\left(A b^2+a^2 C\right)\operatorname{Sin}[c+d x]}{3 b\left(a^2-b^2\right) d\,(a+b\operatorname{Cos}[c+d x])^{3/2}\sqrt{\operatorname{Sec}[c+d x]}}+$$

$$\frac{2\left(A b^4-3 a^4 C+a^2 b^2(3 A+7 C)\right)\sqrt{\operatorname{Sec}[c+d x]}\operatorname{Sin}[c+d x]}{3 b^2\left(a^2-b^2\right)^2 d\sqrt{a+b\operatorname{Cos}[c+d x]}}$$

Result (type 4, 1588 leaves):

$$\frac{1}{d}\sqrt{a+b\operatorname{Cos}[c+d x]}\sqrt{\operatorname{Sec}[c+d x]}$$

$$\left(\frac{2\left(-3 a^2 A b^2-A b^4+3 a^4 C-7 a^2 b^2 C\right)\operatorname{Sin}[c+d x]}{3 a b^2\left(a^2-b^2\right)^2}-\frac{2\left(a A b^2\operatorname{Sin}[c+d x]+a^3 C\operatorname{Sin}[c+d x]\right)}{3 b^2\left(-a^2+b^2\right)(a+b\operatorname{Cos}[c+d x])^2}+\right.$$

$$\left(4\left(a^2 A b^2\operatorname{Sin}[c+d x]+A b^4\operatorname{Sin}[c+d x]-2 a^4 C\operatorname{Sin}[c+d x]+4 a^2 b^2 C\operatorname{Sin}[c+d x]\right)\right)\Big/$$

$$\left.\left(3 b^2\left(-a^2+b^2\right)^2(a+b\operatorname{Cos}[c+d x])\right)\right)+$$

$$\left(2\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\left(3\,a^3\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+3\,a^2\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\right.\right.$$

$$a\,A\,b^4\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+A\,b^5\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-3\,a^5\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-$$

$$3\,a^4\,b\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+7\,a^3\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+7\,a^2\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-$$

$$6\,a^2\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3-2\,A\,b^5\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3+6\,a^4\,b\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3-$$

$$14\,a^2\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3-3\,a^3\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+3\,a^2\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-$$

$$a\,A\,b^4\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+A\,b^5\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+3\,a^5\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-$$

$$3\,a^4\,b\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-7\,a^3\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+7\,a^2\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-$$

$$6\,a^5\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$12\,a^3\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}-$$

$$6\,a\,b^4\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}-$$

$$6\,a^5\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$12\,a^3\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}-$$

$$6\,a\,b^4\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\ -$$

$$(a+b)\left(-A\,b^4+3\,a^4\,C-a^2\,b^2\,(3\,A+7\,C)\right)\ \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\ \frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\ \left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\ +$$

$$a\,b\,(a+b)\left(2\,a^2\,C-3\,a\,b\,(A+C)-b^2\,(A+3\,C)\right)\ \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\ \frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\ \left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\left.\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\ \right)\right)\Big/$$

$$\left(3\,a\,b^2\left(a^2-b^2\right)^2 d\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)$$

Problem 1450: Result more than twice size of optimal antiderivative.

$$\int\frac{A+C\,\text{Cos}[c+d\,x]^2}{(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 710 leaves, 9 steps):

$$\left(\left(8 A b^4-\left(15 a^4-26 a^2 b^2+3 b^4\right) C\right) \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a (a-b) b^3 (a+b)^{3/2} d \sqrt{\text{Sec}[c+d x]}\right)-$$

$$\left(\left(6 A b^4-a b^3 (2 A-3 C)-15 a^4 C-5 a^3 b C+21 a^2 b^2 C\right) \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a (a-b) b^3 (a+b)^{3/2} d \sqrt{\text{Sec}[c+d x]}\right)+$$

$$\left(5 a \sqrt{a+b}\ C \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}\right) \Big/$$

$$\left(b^4 d \sqrt{\text{Sec}[c+d x]}\right)-\frac{2 \left(A b^2+a^2 C\right) \text{Sin}[c+d x]}{3 b \left(a^2-b^2\right) d (a+b \text{Cos}[c+d x])^{3/2} \text{Sec}[c+d x]^{3/2}}+$$

$$\frac{2 \left(3 A b^4-5 a^4 C+a^2 b^2 (A+9 C)\right) \text{Sin}[c+d x]}{3 b^2 \left(a^2-b^2\right)^2 d \sqrt{a+b \text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}}-$$

$$\frac{1}{3 b^3 \left(a^2-b^2\right)^2 d}$$

$$\left(8 A b^4-\left(15 a^4-26 a^2 b^2+3 b^4\right) C\right) \sqrt{a+b \text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]$$

Result (type 4, 1609 leaves):

$$\frac{1}{d} \sqrt{a+b \text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}$$

$$\left(-\frac{4 \left(-2 A b^4+3 a^4 C-5 a^2 b^2 C\right) \text{Sin}[c+d x]}{3 b^3 \left(a^2-b^2\right)^2}+\frac{2 \left(a^2 A b^2 \text{Sin}[c+d x]+a^4 C \text{Sin}[c+d x]\right)}{3 b^3 \left(-a^2+b^2\right) (a+b \text{Cos}[c+d x])^2}+\right.$$

$$\left(2 \left(a^3 A b^2 \text{Sin}[c+d x]-5 a A b^4 \text{Sin}[c+d x]+7 a^5 C \text{Sin}[c+d x]-11 a^3 b^2 C \text{Sin}[c+d x]\right)\right) \Big/$$

$$\left(3 b^3 \left(-a^2+b^2\right)^2 \left(a+b \operatorname{Cos}[c+d x]\right)\right)\Bigg) +$$

$$\left(\sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left(8 a A b^4 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+8 A b^5 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-15 a^5 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-\right.$$

$$15 a^4 b C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+26 a^3 b^2 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]+26 a^2 b^3 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-$$

$$3 a b^4 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-3 b^5 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-16 A b^5 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+$$

$$30 a^4 b C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3-52 a^2 b^3 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3+6 b^5 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^3-$$

$$8 a A b^4 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+8 A b^5 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+15 a^5 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$

$$15 a^4 b C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-26 a^3 b^2 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$

$$26 a^2 b^3 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+3 a b^4 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-3 b^5 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$

$$30 a^5 C \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$60 a^3 b^2 C \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$30 a b^4 C \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$30 a^5 C \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right] \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$60 a^3 b^2 C \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right] \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,-$$

$$30\,a\,b^4\,C\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,-$$

$$(a+b)\left(-8\,A\,b^4+\left(15\,a^4-26\,a^2\,b^2+3\,b^4\right)C\right)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,-$$

$$2\,b\,(a+b)\left(3\,A\,b^3-5\,a^3\,C+3\,a^2\,b\,C+a\,b^2\,(A+6\,C)\right)$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left.\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\,\right)\right)\Big/$$

$$\left(3\,b^3\left(a^2-b^2\right)^2 d\,\sqrt{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\left(b\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-a\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)$$

Problem 1482: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^{7/2}}{a+b\,\mathrm{Cos}[c+d\,x]}\,dx$$

Optimal (type 4, 294 leaves, 9 steps):

$$-\frac{1}{5 a^3 d}2 \left(5 A b^2-5 a b B+a^2 (3 A+5 C)\right) \sqrt{\text{Cos}[c+d x]} \text{ EllipticE}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}-\frac{2 (A b-a B) \sqrt{\text{Cos}[c+d x]} \text{ EllipticF}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{3 a^2 d}-\frac{1}{a^3 (a+b) d}2 b \left(A b^2-a (b B-a C)\right) \sqrt{\text{Cos}[c+d x]} \text{ EllipticPi}\left[\frac{2 b}{a+b},\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}+\frac{2 \left(5 A b^2-5 a b B+a^2 (3 A+5 C)\right) \sqrt{\text{Sec}[c+d x]} \text{ Sin}[c+d x]}{5 a^3 d}-\frac{2 (A b-a B) \text{ Sec}[c+d x]^{3/2} \text{ Sin}[c+d x]}{3 a^2 d}+\frac{2 A \text{ Sec}[c+d x]^{5/2} \text{ Sin}[c+d x]}{5 a d}$$

Result (type 4, 698 leaves):

$$-\frac{1}{30 a^3 d}\left(-\left(\left(2 \left(18 a^3 A+40 a A b^2-40 a^2 b B+30 a^3 C\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]\right) \Big/ \left(b (a+b \text{ Cos}[c+d x]) \left(1-\text{Cos}[c+d x]^2\right)\right)\right)+\left(2 \left(19 a^2 A b+45 A b^3-10 a^3 B-45 a b^2 B+45 a^2 b C\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]\right) \Big/ \left(a (a+b \text{ Cos}[c+d x]) \left(1-\text{Cos}[c+d x]^2\right)\right)+\left(\left(9 a^2 A b+15 A b^3-15 a b^2 B+15 a^2 b C\right) \text{Cos}[2 (c+d x)] (b+a \text{ Sec}[c+d x]) \left(-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}\right) \text{Sin}[c+d x]\right) \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)\right)+\frac{1}{d}\sqrt{\text{Sec}[c+d x]} \left(\frac{2 \left(3 a^2 A+5 A b^2-5 a b B+5 a^2 C\right) \text{Sin}[c+d x]}{5 a^3}+\frac{2 \text{ Sec}[c+d x] (-A b \text{ Sin}[c+d x]+a B \text{ Sin}[c+d x])}{3 a^2}+\frac{2 A \text{ Sec}[c+d x] \text{ Tan}[c+d x]}{5 a}\right)$$

Problem 1483: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{5/2}}{a + b \operatorname{Cos}[c + d x]} \, dx$$

Optimal (type 4, 218 leaves, 8 steps):

$$\frac{2 \left(A b - a B\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} \left(c + d x\right), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{a^2 d} + \frac{2 A \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} \left(c + d x\right), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{3 a d} + \frac{1}{a^2 \left(a + b\right) d} 2 \left(A b^2 - a \left(b B - a C\right)\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticPi}\left[\frac{2 b}{a + b}, \frac{1}{2} \left(c + d x\right), 2\right] \sqrt{\operatorname{Sec}[c + d x]} - \frac{2 \left(A b - a B\right) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{a^2 d} + \frac{2 A \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{3 a d}$$

Result (type 4, 600 leaves):

$$\frac{1}{6 a^2 d} \Bigg(-\Bigg(\Bigg(2 \left(8 a A b - 6 a^2 B\right) \operatorname{Cos}[c + d x]^2 \operatorname{EllipticPi}\left[-\frac{a}{b}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \left(b + a \operatorname{Sec}[c + d x]\right) \sqrt{1 - \operatorname{Sec}[c + d x]^2} \operatorname{Sin}[c + d x]\Bigg) \Big/ \left(b \left(a + b \operatorname{Cos}[c + d x]\right) \left(1 - \operatorname{Cos}[c + d x]^2\right)\right)\Bigg) + \Bigg(2 \left(2 a^2 A + 9 A b^2 - 9 a b B + 6 a^2 C\right) \operatorname{Cos}[c + d x]^2 \Bigg(\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] + \operatorname{EllipticPi}\left[-\frac{a}{b}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right]\Bigg) \left(b + a \operatorname{Sec}[c + d x]\right) \sqrt{1 - \operatorname{Sec}[c + d x]^2} \operatorname{Sin}[c + d x]\Bigg) \Big/ \left(a \left(a + b \operatorname{Cos}[c + d x]\right) \left(1 - \operatorname{Cos}[c + d x]^2\right)\right) + \Bigg(\left(3 A b^2 - 3 a b B\right) \operatorname{Cos}\left[2 \left(c + d x\right)\right] \left(b + a \operatorname{Sec}[c + d x]\right) \Bigg(-4 a b + 4 a b \operatorname{Sec}[c + d x]^2 - 4 a b \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c + d x]} \sqrt{1 - \operatorname{Sec}[c + d x]^2} + 2 \left(2 a - b\right) b \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c + d x]} \sqrt{1 - \operatorname{Sec}[c + d x]^2} + 4 a^2 \operatorname{EllipticPi}\left[-\frac{a}{b}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c + d x]} \sqrt{1 - \operatorname{Sec}[c + d x]^2} - 2 b^2 \operatorname{EllipticPi}\left[-\frac{a}{b}, -\operatorname{ArcSin}\left[\sqrt{\operatorname{Sec}[c + d x]}\right], -1\right] \sqrt{\operatorname{Sec}[c + d x]} \sqrt{1 - \operatorname{Sec}[c + d x]^2}\Bigg) \operatorname{Sin}[c + d x]\Bigg) \Big/ \left(a b^2 \left(a + b \operatorname{Cos}[c + d x]\right) \left(1 - \operatorname{Cos}[c + d x]^2\right) \sqrt{\operatorname{Sec}[c + d x]} \left(2 - \operatorname{Sec}[c + d x]^2\right)\right)\Bigg) + \frac{\sqrt{\operatorname{Sec}[c + d x]} \left(\frac{2 \left(-A b + a B\right) \operatorname{Sin}[c + d x]}{a^2} + \frac{2 A \operatorname{Tan}[c + d x]}{3 a}\right)}{d}$$

Problem 1486: Result more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\left(a+b\,\text{Cos}[c+d\,x]\right)\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 207 leaves, 7 steps):

$$\frac{2\left(b\,B-a\,C\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}}{b^2\,d}+\frac{1}{3\,b^3\,d}2\left(b^2\left(3\,A+C\right)-3\,a\left(b\,B-a\,C\right)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}-\frac{1}{b^3\left(a+b\right)d}2\,a\left(A\,b^2-a\left(b\,B-a\,C\right)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[\frac{2\,b}{a+b},\frac{1}{2}\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}+\frac{2\,C\,\text{Sin}[c+d\,x]}{3\,b\,d\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 560 leaves):

$$\frac{1}{6\,b\,d}\left(-\left(\left(2\left(6\,A\,b+2\,b\,C\right)\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\left[-\frac{a}{b},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\left(b+a\,\text{Sec}[c+d\,x]\right)\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)\Big/\left(b\left(a+b\,\text{Cos}[c+d\,x]\right)\left(1-\text{Cos}[c+d\,x]^2\right)\right)\right)+\left(2\left(3\,b\,B-a\,C\right)\text{Cos}[c+d\,x]^2\left(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]+\text{EllipticPi}\left[-\frac{a}{b},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\right)\left(b+a\,\text{Sec}[c+d\,x]\right)\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\right)\Big/\left(a\left(a+b\,\text{Cos}[c+d\,x]\right)\left(1-\text{Cos}[c+d\,x]^2\right)\right)+\left(\left(3\,b\,B-3\,a\,C\right)\text{Cos}\left[2\left(c+d\,x\right)\right]\left(b+a\,\text{Sec}[c+d\,x]\right)\left(-4\,a\,b+4\,a\,b\,\text{Sec}[c+d\,x]^2-4\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]}\sqrt{1-\text{Sec}[c+d\,x]^2}+2\left(2\,a-b\right)b\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]}\sqrt{1-\text{Sec}[c+d\,x]^2}+4\,a^2\,\text{EllipticPi}\left[-\frac{a}{b},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]}\sqrt{1-\text{Sec}[c+d\,x]^2}-2\,b^2\,\text{EllipticPi}\left[-\frac{a}{b},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],-1\right]\sqrt{\text{Sec}[c+d\,x]}\sqrt{1-\text{Sec}[c+d\,x]^2}\right)\text{Sin}[c+d\,x]\right)\Big/\left(a\,b^2\left(a+b\,\text{Cos}[c+d\,x]\right)\left(1-\text{Cos}[c+d\,x]^2\right)\sqrt{\text{Sec}[c+d\,x]}\left(2-\text{Sec}[c+d\,x]^2\right)\right)\right)+\frac{C\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}\left[2\left(c+d\,x\right)\right]}{3\,b\,d}$$

Problem 1487: Result more than twice size of optimal antiderivative.

$$\int \frac{A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2}{(a + b \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^{3/2}} \, dx$$

Optimal (type 4, 270 leaves, 8 steps):

$$\frac{1}{5 b^3 d} 2 \left(5 A b^2 - 5 a b B + 5 a^2 C + 3 b^2 C\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} + \frac{1}{3 b^4 d} 2 \left(3 a^2 b B + b^3 B - 3 a^3 C - a b^2 (3 A + C)\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} + \frac{1}{b^4 (a + b) d} 2 a^2 \left(A b^2 - a (b B - a C)\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticPi}\left[\frac{2 b}{a + b}, \frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} + \frac{2 C \operatorname{Sin}[c + d x]}{5 b d \operatorname{Sec}[c + d x]^{3/2}} + \frac{2 (b B - a C) \operatorname{Sin}[c + d x]}{3 b^2 d \sqrt{\operatorname{Sec}[c + d x]}}$$

Result (type 4, 632 leaves):

$$-\frac{1}{30 b^2 d}\Bigg(-\Bigg(\bigg(2 \left(-10 b^2 B-8 a b C\right) \text{Cos}[c+d x]^2 \,\text{EllipticPi}\Big[-\frac{a}{b},-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d x]}\Big],-1\Big] \left(b+a \,\text{Sec}[c+d x]\right) \sqrt{1-\text{Sec}[c+d x]^2}\, \text{Sin}[c+d x]\bigg)\Big/ \left(b \left(a+b \,\text{Cos}[c+d x]\right) \left(1-\text{Cos}[c+d x]^2\right)\right)\Bigg)+$$

$$\bigg(2 \left(-15 A b^2+5 a b B-5 a^2 C-9 b^2 C\right) \text{Cos}[c+d x]^2 \Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d x]}\Big],-1\Big]+\text{EllipticPi}\Big[-\frac{a}{b},-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d x]}\Big],-1\Big]\Big) \left(b+a \,\text{Sec}[c+d x]\right) \sqrt{1-\text{Sec}[c+d x]^2}\, \text{Sin}[c+d x]\bigg)\Big/ \left(a \left(a+b \,\text{Cos}[c+d x]\right) \left(1-\text{Cos}[c+d x]^2\right)\right)+$$

$$\bigg(\left(-15 A b^2+15 a b B-15 a^2 C-9 b^2 C\right) \text{Cos}[2 (c+d x)] \left(b+a \,\text{Sec}[c+d x]\right) \Big(-4 a b+4 a b \,\text{Sec}[c+d x]^2-4 a b \,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d x]}\Big],-1\Big] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2}+2 (2 a-b) b \,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d x]}\Big],-1\Big] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2}+4 a^2 \,\text{EllipticPi}\Big[-\frac{a}{b},-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d x]}\Big],-1\Big] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2}-2 b^2 \,\text{EllipticPi}\Big[-\frac{a}{b},-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d x]}\Big],-1\Big] \sqrt{\text{Sec}[c+d x]} \sqrt{1-\text{Sec}[c+d x]^2}\Big) \text{Sin}[c+d x]\bigg)\Big/ \left(a b^2 \left(a+b \,\text{Cos}[c+d x]\right) \left(1-\text{Cos}[c+d x]^2\right) \sqrt{\text{Sec}[c+d x]} \left(2-\text{Sec}[c+d x]^2\right)\right)\Bigg)+$$

$$\frac{\sqrt{\text{Sec}[c+d x]} \left(\frac{C \,\text{Sin}[c+d x]}{10 b}+\frac{(b B-a C) \text{Sin}[2 (c+d x)]}{3 b^2}+\frac{C \,\text{Sin}[3 (c+d x)]}{10 b}\right)}{d}$$

Problem 1488: Result more than twice size of optimal antiderivative.

$$\int \frac{A+B \,\text{Cos}[c+d x]+C \,\text{Cos}[c+d x]^2}{\left(a+b \,\text{Cos}[c+d x]\right) \text{Sec}[c+d x]^{5/2}}\, dx$$

Optimal (type 4, 345 leaves, 9 steps):

$$\frac{1}{5 b^4 d}2 \left(5 a^2 b B+3 b^3 B-5 a^3 C-a b^2 (5 A+3 C)\right) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticE}\Big[\frac{1}{2} (c+d x),2\Big] \sqrt{\text{Sec}[c+d x]}-\frac{1}{21 b^5 d}2 \left(21 a^3 b B+7 a b^3 B-21 a^4 C-7 a^2 b^2 (3 A+C)-b^4 (7 A+5 C)\right) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticF}\Big[\frac{1}{2} (c+d x),2\Big] \sqrt{\text{Sec}[c+d x]}-\frac{1}{b^5 (a+b) d}2 a^3 \left(A b^2-a (b B-a C)\right) \sqrt{\text{Cos}[c+d x]}\, \text{EllipticPi}\Big[\frac{2 b}{a+b},\frac{1}{2} (c+d x),2\Big] \sqrt{\text{Sec}[c+d x]}+$$

$$\frac{2 C \,\text{Sin}[c+d x]}{7 b d \,\text{Sec}[c+d x]^{5/2}}+\frac{2 (b B-a C) \text{Sin}[c+d x]}{5 b^2 d \,\text{Sec}[c+d x]^{3/2}}+\frac{2 \left(7 A b^2-7 a b B+7 a^2 C+5 b^2 C\right) \text{Sin}[c+d x]}{21 b^3 d \sqrt{\text{Sec}[c+d x]}}$$

Result (type 4, 713 leaves):

$$-\frac{1}{210\,b^3\,d}\left(-\left(\left(2\left(-70\,A\,b^3-56\,a\,b^2\,B+56\,a^2\,b\,C-50\,b^3\,C\right)\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]\right)\Big/\left(b\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\left(1-\mathrm{Cos}[c+d\,x]^2\right)\right)\right)+\left(2\left(35\,a\,A\,b^2-35\,a^2\,b\,B-63\,b^3\,B+35\,a^3\,C+13\,a\,b^2\,C\right)\mathrm{Cos}[c+d\,x]^2\left(\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]\right)\left(b+a\,\mathrm{Sec}[c+d\,x]\right)\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\mathrm{Sin}[c+d\,x]\right)\Big/\left(a\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\left(1-\mathrm{Cos}[c+d\,x]^2\right)\right)+\left(\left(105\,a\,A\,b^2-105\,a^2\,b\,B-63\,b^3\,B+105\,a^3\,C+63\,a\,b^2\,C\right)\mathrm{Cos}[2\left(c+d\,x\right)]\left(b+a\,\mathrm{Sec}[c+d\,x]\right)\left(-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}\right)\mathrm{Sin}[c+d\,x]\right)\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)\right)+\frac{1}{d}\sqrt{\mathrm{Sec}[c+d\,x]}\left(\frac{\left(b\,B-a\,C\right)\mathrm{Sin}[c+d\,x]}{10\,b^2}+\frac{\left(14\,A\,b^2-14\,a\,b\,B+14\,a^2\,C+13\,b^2\,C\right)\mathrm{Sin}[2\left(c+d\,x\right)]}{42\,b^3}+\frac{\left(b\,B-a\,C\right)\mathrm{Sin}[3\left(c+d\,x\right)]}{10\,b^2}+\frac{C\,\mathrm{Sin}[4\left(c+d\,x\right)]}{28\,b}\right)$$

Problem 1491: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\sqrt{\mathrm{Sec}[c+d\,x]}}{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2}\,dx$$

Optimal (type 4, 303 leaves, 7 steps):

$$-\frac{1}{a\,b\,(a^2-b^2)\,d}\left(A\,b^2-a\,(b\,B-a\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}-\frac{1}{b^2\,(a^2-b^2)\,d}\left(A\,b^2-a\,b\,B-a^2\,C+2\,b^2\,C\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}-\left(\left(A\,b^4+a^3\,b\,B+a\,b^3\,B+a^4\,C-3\,a^2\,b^2\,(A+C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticPi}\left[\frac{2\,b}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\sqrt{\text{Sec}[c+d\,x]}\right)\Big/\left(a\,(a-b)\,b^2\,(a+b)^2\,d\right)+\frac{\left(A\,b^2-a\,(b\,B-a\,C)\right)\text{Sin}[c+d\,x]}{a\,(a^2-b^2)\,d\,(a+b\,\text{Cos}[c+d\,x])\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 4, 688 leaves):

$$\frac{1}{4\,a\,(-a+b)\,(a+b)\,d}\Bigg(-\Bigg(\Bigg(2\,(4\,a\,A\,b-4\,a^2\,B+4\,a\,b\,C)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\left[-\frac{a}{b},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\left(b+a\,\text{Sec}[c+d\,x]\right)\sqrt{1-\text{Sec}[c+d\,x]^2}\;\text{Sin}[c+d\,x]\Bigg)\Big/\left(b\,(a+b\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\right)\Bigg)+\Bigg(2\,(-4\,a^2\,A+3\,A\,b^2+a\,b\,B-a^2\,C)\,\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)\left(b+a\,\text{Sec}[c+d\,x]\right)\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)+\Bigg(\left(A\,b^2-a\,b\,B+a^2\,C\right)\text{Cos}[2\,(c+d\,x)]\,\left(b+a\,\text{Sec}[c+d\,x]\right)\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])\,(1-\text{Cos}[c+d\,x]^2)\sqrt{\text{Sec}[c+d\,x]}\,(2-\text{Sec}[c+d\,x]^2)\right)\Bigg)+\frac{1}{d}\sqrt{\text{Sec}[c+d\,x]}\left(\frac{\left(A\,b^2-a\,b\,B+a^2\,C\right)\text{Sin}[c+d\,x]}{a\,b\,(a^2-b^2)}+\frac{A\,b^2\,\text{Sin}[c+d\,x]-a\,b\,B\,\text{Sin}[c+d\,x]+a^2\,C\,\text{Sin}[c+d\,x]}{b\,(-a^2+b^2)\,(a+b\,\text{Cos}[c+d\,x])}\right)$$

Problem 1492: Result more than twice size of optimal antiderivative.

$$\int \frac{A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2}{(a + b \operatorname{Cos}[c + d x])^2 \sqrt{\operatorname{Sec}[c + d x]}} \, dx$$

Optimal (type 4, 311 leaves, 7 steps):

$$\frac{1}{b^2 (a^2 - b^2) d} \left(A b^2 - a b B + 3 a^2 C - 2 b^2 C\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} + \frac{1}{b^3 (a^2 - b^2) d} \left(a^2 b B - 2 b^3 B - 3 a^3 C + a b^2 (A + 4 C)\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} - \left(\left(A b^4 + a^3 b B - 3 a b^3 B - 3 a^4 C + a^2 b^2 (A + 5 C)\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticPi}\left[\frac{2 b}{a + b}, \frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}\right) \Big/ \left((a - b) b^3 (a + b)^2 d\right) - \frac{\left(A b^2 - a (b B - a C)\right) \operatorname{Sin}[c + d x]}{b (a^2 - b^2) d (a + b \operatorname{Cos}[c + d x]) \sqrt{\operatorname{Sec}[c + d x]}}$$

Result (type 4, 695 leaves):

$$\frac{1}{4\,(a-b)\,b\,(a+b)\,d}\Bigg(-\Bigg(\Big(2\,(4\,a\,A\,b-4\,b^2\,B+4\,a\,b\,C)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{a}{b},-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]\,(b+a\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/\left(b\,(a+b\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\right)\Bigg)+\Big(2\,(-A\,b^2+a\,b\,B+a^2\,C-2\,b^2\,C)\,\text{Cos}[c+d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]+\text{EllipticPi}\Big[-\frac{a}{b},-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]\Big)\,(b+a\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/\left(a\,(a+b\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\right)+\Big((A\,b^2-a\,b\,B+3\,a^2\,C-2\,b^2\,C)\,\text{Cos}[2\,(c+d\,x)]\,(b+a\,\text{Sec}[c+d\,x])\,\Big(-4\,a\,b+4\,a\,b\,\text{Sec}[c+d\,x]^2-4\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+2\,(2\,a-b)\,b\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+4\,a^2\,\text{EllipticPi}\Big[-\frac{a}{b},-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-2\,b^2\,\text{EllipticPi}\Big[-\frac{a}{b},-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Big)\,\text{Sin}[c+d\,x]\Big)\Big/\left(a\,b^2\,(a+b\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\,\sqrt{\text{Sec}[c+d\,x]}\,(2-\text{Sec}[c+d\,x]^2)\right)\Bigg)+\frac{1}{d}\sqrt{\text{Sec}[c+d\,x]}\left(\frac{(A\,b^2-a\,b\,B+a^2\,C)\,\text{Sin}[c+d\,x]}{b^2\,(-a^2+b^2)}+\frac{-a\,A\,b^2\,\text{Sin}[c+d\,x]+a^2\,b\,B\,\text{Sin}[c+d\,x]-a^3\,C\,\text{Sin}[c+d\,x]}{b^2\,(-a^2+b^2)\,(a+b\,\text{Cos}[c+d\,x])}\right)$$

Problem 1502: Attempted integration timed out after 120 seconds.

$$\int\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{11/2}\,dx$$

Optimal (type 4, 592 leaves, 8 steps):

$$-\left(\left(2\,(a-b)\,\sqrt{a+b}\,\left(16\,A\,b^4-57\,a^3\,b\,B-24\,a\,b^3\,B+6\,a^2\,b^2\,(4\,A+7\,C)-21\,a^4\,(7\,A+9\,C)\right)\right.\right.$$

$$\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(315\,a^5\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)-$$

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(16\,A\,b^3+12\,a\,b^2\,(A-2\,B)+6\,a^2\,b\,(6\,A-3\,B+7\,C)+3\,a^3\,(49\,A-25\,B+63\,C)\right)\right.$$

$$\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(315\,a^4\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\frac{1}{315\,a^3\,d}2\,\left(8\,A\,b^3+75\,a^3\,B-12\,a\,b^2\,B+a^2\,b\,(13\,A+21\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]-\frac{1}{315\,a^2\,d}$$

$$2\,\left(6\,A\,b^2-9\,a\,b\,B-7\,a^2\,(7\,A+9\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]+$$

$$\frac{2\,(A\,b+9\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{63\,a\,d}+$$

$$\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{9\,d}$$

Result (type 1, 1 leaves):

???

Problem 1503: Attempted integration timed out after 120 seconds.

$$\int\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{9/2}\,dx$$

Optimal (type 4, 487 leaves, 7 steps):

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(8\,A\,b^3+63\,a^3\,B-14\,a\,b^2\,B+a^2\,b\,(19\,A+35\,C)\right)\right.$$
$$\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(105\,a^4\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$
$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(8\,A\,b^2+2\,a\,b\,(3\,A-7\,B)+a^2\,(25\,A-63\,B+35\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\right.$$
$$\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(105\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-\frac{1}{105\,a^2\,d}$$
$$2\left(4\,A\,b^2-7\,a\,b\,B-5\,a^2\,(5\,A+7\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]+$$
$$\frac{2\,(A\,b+7\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{35\,a\,d}+$$
$$\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 1, 1 leaves):

???

Problem 1504: Attempted integration timed out after 120 seconds.

$$\int\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{7/2}\,dx$$

Optimal (type 4, 400 leaves, 6 steps):

$$-\left(\left(2\,(a-b)\,\sqrt{a+b}\,\left(2\,A\,b^2-5\,a\,b\,B-3\,a^2\,(3\,A+5\,C)\right)\right.\right.$$

$$\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(15\,a^3\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)\Bigg)-$$

$$\Bigg(2\,(a-b)\,\sqrt{a+b}\,\left(2\,A\,b+a\,(9\,A-5\,B+15\,C)\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{Csc}[c+d\,x]$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(15\,a^2\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)+$$

$$\frac{2\,(A\,b+5\,a\,B)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{15\,a\,d}+$$

$$\frac{2\,A\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{5\,d}$$

Result (type 1, 1 leaves):

???

Problem 1507: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 543 leaves, 8 steps):

$$-\left(\left((a-b)\sqrt{a+b}\,(4bB+aC)\sqrt{\text{Cos}[c+dx]}\right.\right.$$
$$\text{Csc}[c+dx]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\left.\sqrt{\frac{a(1-\text{Sec}[c+dx])}{a+b}}\,\sqrt{\frac{a(1+\text{Sec}[c+dx])}{a-b}}\right)\Big/\left(4abd\sqrt{\text{Sec}[c+dx]}\right)\right)+$$
$$\left(\sqrt{a+b}\,(8Ab+aC+2b(2B+C))\sqrt{\text{Cos}[c+dx]}\,\text{Csc}[c+dx]\right.$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a(1-\text{Sec}[c+dx])}{a+b}}\,\sqrt{\frac{a(1+\text{Sec}[c+dx])}{a-b}}\right)\Big/\left(4bd\sqrt{\text{Sec}[c+dx]}\right)-$$
$$\left(\sqrt{a+b}\,(8Ab^2+4abB-a^2C+4b^2C)\sqrt{\text{Cos}[c+dx]}\,\text{Csc}[c+dx]\right.$$
$$\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a(1-\text{Sec}[c+dx])}{a+b}}\,\sqrt{\frac{a(1+\text{Sec}[c+dx])}{a-b}}\right)\Big/$$
$$\left(4b^2d\sqrt{\text{Sec}[c+dx]}\right)+\frac{C\sqrt{a+b\,\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{2d\sqrt{\text{Sec}[c+dx]}}+$$
$$\frac{(4bB+aC)\sqrt{a+b\,\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{4bd}$$

Result (type 4, 1816 leaves):

$$\frac{C\sqrt{a+b\,\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[2(c+dx)]}{4d}+$$
$$\left(-4ab\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-4b^2\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-\right.$$
$$a^2\sqrt{\frac{a-b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-ab\sqrt{\frac{a-b}{a+b}}\,C\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]+$$

$$8\,b^2\sqrt{\frac{a-b}{a+b}}\;B\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3+2\,a\,b\sqrt{\frac{a-b}{a+b}}\;C\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3+$$

$$4\,a\,b\sqrt{\frac{a-b}{a+b}}\;B\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-4\,b^2\sqrt{\frac{a-b}{a+b}}\;B\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+$$

$$a^2\sqrt{\frac{a-b}{a+b}}\;C\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-a\,b\sqrt{\frac{a-b}{a+b}}\;C\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+$$

$$16\,\mathrm{i}\,A\,b^2\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;+$$

$$8\,\mathrm{i}\,a\,b\,B\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;-$$

$$2\,\mathrm{i}\,a^2\,C\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;+$$

$$8\,\mathrm{i}\,b^2\,C\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;+$$

$$16\,\mathrm{i}\,A\,b^2\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\;\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;+$$

$$8\,\mathrm{i}\,a\,b\,B\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$2\,\mathrm{i}\,a^2\,C\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$8\,\mathrm{i}\,b^2\,C\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$\mathrm{i}\,(a-b)\,(4\,b\,B+a\,C)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+2\,\mathrm{i}\,(a-b)\,(4\,A\,b+(a+2\,b)\,C)$$

$$\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\Bigg/$$

$$\left(4\,b\,\sqrt{\frac{a-b}{a+b}}\,d\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\right.$$

$$\left.\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)$$

Problem 1508: Result more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 646 leaves, 9 steps):

$$-\left(\left((a-b)\,\sqrt{a+b}\,\left(8\,b^2\,(3\,A+2\,C)+3\,a\,(2\,b\,B-a\,C)\right)\right.\right.$$
$$\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Csc}[c+d\,x]\,\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]$$
$$\left.\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(24\,a\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)+$$
$$\left(\sqrt{a+b}\,\left(24\,A\,b^2+(a+2\,b)\,(6\,b\,B-3\,a\,C+8\,b\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Csc}[c+d\,x]\right.$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(24\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$
$$\left(\sqrt{a+b}\,\left(2\,a^2\,b\,B-8\,b^3\,B-a^3\,C-4\,a\,b^2\,(2\,A+C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Csc}[c+d\,x]\right.$$
$$\text{EllipticPi}\left[\frac{a+b}{b},\,\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(8\,b^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$
$$\frac{(2\,b\,B-a\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{4\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{C\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}}+$$
$$\frac{1}{24\,b^2\,d}$$
$$\left(8\,b^2\,(3\,A+2\,C)+3\,a\,(2\,b\,B-a\,C)\right)$$
$$\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]$$

Result (type 4, 3904 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}\left(\frac{1}{12}\,C\,\text{Sin}[c+d\,x]+\frac{(6\,b\,B+a\,C)\,\text{Sin}[2\,(c+d\,x)]}{24\,b}+\frac{1}{12}\,C\,\text{Sin}[3\,(c+d\,x)]\right)+$$

$$\left(\left(\frac{a\,A}{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{b\,B}{2\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\right.\right.$$

$$\frac{7\,a\,C}{12\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{A\,b\,\sqrt{\text{Sec}[c+d\,x]}}{2\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{3\,a\,B\,\sqrt{\text{Sec}[c+d\,x]}}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-$$

$$\frac{a^2\,C\,\sqrt{\text{Sec}[c+d\,x]}}{48\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{b\,C\,\sqrt{\text{Sec}[c+d\,x]}}{3\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{A\,b\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{2\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{a\,B\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-\frac{a^2\,C\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{16\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\left.\frac{b\,C\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\right)\left(\left(\left(24\,A\,b^2+6\,a\,b\,B-3\,a^2\,C+16\,b^2\,C\right)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right.\right.$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)\Bigg/\left(24\,b^2\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)+$$

$$\left(\left((a+b)\,\left(-24\,A\,b^2-6\,a\,b\,B+3\,a^2\,C-16\,b^2\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+\right.\right.$$

$$2\,b\,\left(12\,b^2\,B-a^2\,C+2\,a\,b\,(12\,A-3\,B+7\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\right.$$

$$\left.\frac{-a+b}{a+b}\right]+6\,\left(-2\,a^2\,b\,B+8\,b^3\,B+a^3\,C+4\,a\,b^2\,(2\,A+C)\right)$$

$$\left.\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\right)$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\;\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)\Bigg/$$

$$\left(24\,b^2\,(a+b)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right.$$

$$\left.\left.\left.\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\right)\right)\Big/$$

$$\left(d\left(\left((24\,A\,b^2+6\,a\,b\,B-3\,a^2\,C+16\,b^2\,C)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right.\right.\right.$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)\Big/\left(48\,b^2\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)-$$

$$\left(\left((a+b)\,(-24\,A\,b^2-6\,a\,b\,B+3\,a^2\,C-16\,b^2\,C)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+\right.\right.$$

$$2\,b\,(12\,b^2\,B-a^2\,C+2\,a\,b\,(12\,A-3\,B+7\,C))\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\right.$$

$$\left.\frac{-a+b}{a+b}\right]+6\,(-2\,a^2\,b\,B+8\,b^3\,B+a^3\,C+4\,a\,b^2\,(2\,A+C))$$

$$\left.\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\left.\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right)\Big/$$

$$\left(24\,b^2\,(a+b)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}\right)-$$

$$\left(\left((a+b)\,(-24\,A\,b^2-6\,a\,b\,B+3\,a^2\,C-16\,b^2\,C)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+\right.\right.$$

$$2\,b\,(12\,b^2\,B-a^2\,C+2\,a\,b\,(12\,A-3\,B+7\,C))\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\right.$$

$$\left.\frac{-a+b}{a+b}\right]+6\,(-2\,a^2\,b\,B+8\,b^3\,B+a^3\,C+4\,a\,b^2\,(2\,A+C))$$

$$\left.\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\right)$$

$$\left(a\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-b\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)\Big/$$

$$\left(48\,b^2\,(a+b)^2\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right.$$

$$\left.\left(\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}\right)^{3/2}\right)-$$

$$\left(\left((a+b)\,\left(-24\,A\,b^2-6\,a\,b\,B+3\,a^2\,C-16\,b^2\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+\right.\right.$$

$$2\,b\,\left(12\,b^2\,B-a^2\,C+2\,a\,b\,(12\,A-3\,B+7\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\right.$$

$$\left.\frac{-a+b}{a+b}\right]+6\,\left(-2\,a^2\,b\,B+8\,b^3\,B+a^3\,C+4\,a\,b^2\,(2\,A+C)\right)\,\text{EllipticPi}\left[-1,\right.$$

$$\left.\left.-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)\Big/$$

$$\left(24\,b^2\,(a+b)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right.$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)-$$

$$\left(\left((a+b)\,\left(-24\,A\,b^2-6\,a\,b\,B+3\,a^2\,C-16\,b^2\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+\right.\right.$$

$$2\,b\,\left(12\,b^2\,B-a^2\,C+2\,a\,b\,(12\,A-3\,B+7\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\right.$$

$$\left.\frac{-a+b}{a+b}\right]+6\,\left(-2\,a^2\,b\,B+8\,b^3\,B+a^3\,C+4\,a\,b^2\,(2\,A+C)\right)$$

$$\left.\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\right)$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\right) \Big/$$

$$\left(48 b^2 (a+b) \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right) -$$

$$\left(\left(24 A b^2+6 a b B-3 a^2 C+16 b^2 C\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right.$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}$$

$$\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}+\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right.\right.$$

$$\left.\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right) \Big/ \left(1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right) \Big/$$

$$\left(48 b^2 \left(\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)^{3/2}\right)+\left(\left(24 A b^2+6 a b B-3 a^2 C+16 b^2 C\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right.$$

$$\left(\left(a\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]-b\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right) \Big/\right.$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-\left(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right.$$

$$\left.\left.\left.\left(a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right) \Big/ \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right)\right) \Big/$$

$$\left(48 b^2 \sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)+$$

$$\left(\left((a+b)\left(-24 A b^2-6 a b B+3 a^2 C-16 b^2 C\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right]+\right.\right.$$

$$2 b \left(12 b^2 B-a^2 C+2 a b (12 A-3 B+7 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\right.$$

$$\frac{-a+b}{a+b}\Big] + 6\left(-2 a^2 b B + 8 b^3 B + a^3 C + 4 a b^2 (2 A + C)\right)$$

$$\text{EllipticPi}\Big[-1, -\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\Big], \frac{-a+b}{a+b}\Big]\Big) \sqrt{1-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^4}$$

$$\left(\left(a \,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2 \text{Tan}\Big[\frac{1}{2}(c+d x)\Big] - b\,\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2 \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\right)\Big/\right.$$

$$\left(1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\right) - \left(\text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2 \text{Tan}\Big[\frac{1}{2}(c+d x)\Big]\right.$$

$$\left.\left.\left(a+b+a\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2 - b\,\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\right)\right)\Big/\left(1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\right)^2\right)\Big/$$

$$\left(48 b^2 (a+b) \sqrt{\frac{1}{1-\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}} \left(-1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\right)\right.$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2 - b\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}}$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2 - b\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{1+\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}}\right) +$$

$$\left(\sqrt{\frac{a+b+a\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2 - b\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{1+\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}} \sqrt{1-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^4}\right.$$

$$\left(\frac{b\left(12 b^2 B - a^2 C + 2 a b (12 A - 3 B + 7 C)\right) \text{Sec}\big[\frac{1}{2}(c+d x)\big]^2}{\sqrt{1-\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}\sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}} -\right.$$

$$\left(3\left(-2 a^2 b B + 8 b^3 B + a^3 C + 4 a b^2 (2 A + C)\right) \text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\right)\Big/$$

$$\left(\sqrt{1-\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2}\left(1+\text{Tan}\Big[\frac{1}{2}(c+d x)\Big]^2\right)\sqrt{1-\frac{(-a+b)\,\text{Tan}\big[\frac{1}{2}(c+d x)\big]^2}{a+b}}\right) +$$

$$\left((a+b)\left(-24 A b^2 - 6 a b B + 3 a^2 C - 16 b^2 C\right) \text{Sec}\Big[\frac{1}{2}(c+d x)\Big]^2\right.$$

$$\left.\left.\sqrt{1-\frac{(-a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\middle/\left(2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\right)\right)\Big/$$

$$\left(24\,b^2\,(a+b)\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\left.\left.\left.\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\right)$$

Problem 1509: Result more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{\mathrm{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 766 leaves, 10 steps):

$$\left((a-b)\sqrt{a+b}\left(24 a^2 b B-128 b^3 B-15 a^3 C-4 a b^2 (12 A+7 C)\right)\right.$$
$$\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(192\,a\,b^3\,d\,\sqrt{\text{Sec}[c+d x]}\right)+$$
$$\left(\sqrt{a+b}\left(15 a^3 C-2 a^2 b\,(12 B+5 C)+4 a b^2\,(12 A+4 B+7 C)+8 b^3\,(12 A+16 B+9 C)\right)\right.$$
$$\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(192\,b^3\,d\,\sqrt{\text{Sec}[c+d x]}\right)-$$
$$\left(\sqrt{a+b}\left(8 a^3 b B+32 a b^3 B-5 a^4 C-8 a^2 b^2\,(2 A+C)+16 b^4\,(4 A+3 C)\right)\sqrt{\text{Cos}[c+d x]}\right.$$
$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/$$
$$\left(64\,b^4\,d\,\sqrt{\text{Sec}[c+d x]}\right)+\frac{C\,(a+b\,\text{Cos}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{4\,b\,d\,\text{Sec}[c+d x]^{3/2}}+$$
$$\frac{\left(16 A b^2-8 a b B+5 a^2 C+12 b^2 C\right)\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{32\,b^2\,d\,\sqrt{\text{Sec}[c+d x]}}+$$
$$\frac{(8 b B-5 a C)\,(a+b\,\text{Cos}[c+d x])^{3/2}\,\text{Sin}[c+d x]}{24\,b^2\,d\,\sqrt{\text{Sec}[c+d x]}}-\frac{1}{192\,b^3\,d}$$
$$\left(24 a^2 b B-128 b^3 B-15 a^3 C-4 a b^2\,(12 A+7 C)\right)\sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]$$

Result (type 4, 4399 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}$$
$$\left(\frac{(8 b B+a C)\,\text{Sin}[c+d x]}{96\,b}+\frac{\left(48 A b^2+8 a b B-5 a^2 C+48 b^2 C\right)\text{Sin}[2\,(c+d x)]}{192\,b^2}+\right.$$

$$\frac{(8 b B + a C) \operatorname{Sin}[3 (c + d x)]}{96 b} + \frac{1}{32} C \operatorname{Sin}[4 (c + d x)]\Bigg) +$$

$$\Bigg(\Bigg(\frac{A b}{2 \sqrt{a + b \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}} + \frac{7 a B}{12 \sqrt{a + b \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}} +$$

$$\frac{a^2 C}{96 b \sqrt{a + b \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}} + \frac{3 b C}{8 \sqrt{a + b \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}} +$$

$$\frac{3 a A \sqrt{\operatorname{Sec}[c + d x]}}{8 \sqrt{a + b \operatorname{Cos}[c + d x]}} - \frac{a^2 B \sqrt{\operatorname{Sec}[c + d x]}}{48 b \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{b B \sqrt{\operatorname{Sec}[c + d x]}}{3 \sqrt{a + b \operatorname{Cos}[c + d x]}} +$$

$$\frac{25 a C \sqrt{\operatorname{Sec}[c + d x]}}{96 \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{5 a^3 C \sqrt{\operatorname{Sec}[c + d x]}}{384 b^2 \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{a A \operatorname{Cos}[2 (c + d x)] \sqrt{\operatorname{Sec}[c + d x]}}{8 \sqrt{a + b \operatorname{Cos}[c + d x]}} -$$

$$\frac{a^2 B \operatorname{Cos}[2 (c + d x)] \sqrt{\operatorname{Sec}[c + d x]}}{16 b \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{b B \operatorname{Cos}[2 (c + d x)] \sqrt{\operatorname{Sec}[c + d x]}}{3 \sqrt{a + b \operatorname{Cos}[c + d x]}} +$$

$$\frac{7 a C \operatorname{Cos}[2 (c + d x)] \sqrt{\operatorname{Sec}[c + d x]}}{96 \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{5 a^3 C \operatorname{Cos}[2 (c + d x)] \sqrt{\operatorname{Sec}[c + d x]}}{128 b^2 \sqrt{a + b \operatorname{Cos}[c + d x]}}\Bigg)$$

$$\Bigg(-\Bigg(\Bigg(\Bigg((a + b) (-24 a^2 b B + 128 b^3 B + 15 a^3 C + 4 a b^2 (12 A + 7 C)) \operatorname{EllipticE}\Big[\operatorname{ArcSin}\Big[$$

$$\operatorname{Tan}\Big[\frac{1}{2} (c + d x)\Big]\Big], \frac{-a + b}{a + b}\Big] - 2 b (5 a^3 C + 2 a^2 b (-4 B + C) + 24 b^3 (4 A + 3 C) -$$

$$4 a b^2 (12 A - 28 B + 9 C)) \operatorname{EllipticF}\Big[\operatorname{ArcSin}\Big[\operatorname{Tan}\Big[\frac{1}{2} (c + d x)\Big]\Big], \frac{-a + b}{a + b}\Big] +$$

$$6 (-8 a^3 b B - 32 a b^3 B + 5 a^4 C + 8 a^2 b^2 (2 A + C) - 16 b^4 (4 A + 3 C))$$

$$\operatorname{EllipticPi}\Big[-1, -\operatorname{ArcSin}\Big[\operatorname{Tan}\Big[\frac{1}{2} (c + d x)\Big]\Big], \frac{-a + b}{a + b}\Big]\Bigg)$$

$$\sqrt{\frac{a + b + a \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]^2 - b \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]^2}{1 + \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]^2}} \sqrt{1 - \operatorname{Tan}\Big[\frac{1}{2} (c + d x)\Big]^4}\Bigg) \Bigg/$$

$$\Bigg(192 b^3 (a + b) \sqrt{\frac{1}{1 - \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]^2}} \left(-1 + \operatorname{Tan}\Big[\frac{1}{2} (c + d x)\Big]^2\right)$$

$$\sqrt{\frac{a + b + a \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]^2 - b \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]^2}{a + b}}\Bigg)\Bigg) +$$

$$\left(\left(48\,a\,A\,b^2-24\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+28\,a\,b^2\,C\right)\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right.$$

$$\left.\sqrt{a+\frac{b-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)\Big/$$

$$\left(192\,b^3\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right)\Bigg)\Bigg)\Big/$$

$$\Bigg(d\,\Bigg(\Bigg(\Big(\left(a+b\right)\,\left(-24\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+4\,a\,b^2\,(12\,A+7\,C)\right)\,\mathrm{EllipticE}\Big[$$

$$\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\Big]-2\,b\,\left(5\,a^3\,C+2\,a^2\,b\,(-4\,B+C)+24\,b^3\,(4\,A+3\,C)-\right.$$

$$\left.4\,a\,b^2\,(12\,A-28\,B+9\,C)\right)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$6\,\left(-8\,a^3\,b\,B-32\,a\,b^3\,B+5\,a^4\,C+8\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\right)$$

$$\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\Big)\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\left.\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)\Big/$$

$$\left(192\,b^3\,(a+b)\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right.$$

$$\left.\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)+$$

$$\Big(\Big(\left(a+b\right)\,\left(-24\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+4\,a\,b^2\,(12\,A+7\,C)\right)\,\mathrm{EllipticE}\Big[$$

$$\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\Big]-2\,b\,\left(5\,a^3\,C+2\,a^2\,b\,(-4\,B+C)+24\,b^3\,(4\,A+3\,C)-\right.$$

$$\left.4\,a\,b^2\,(12\,A-28\,B+9\,C)\right)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$6\,\left(-8\,a^3\,b\,B-32\,a\,b^3\,B+5\,a^4\,C+8\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\right)$$

$$\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\Big)$$

$$\left(a\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-b\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)\Bigg/$$

$$\left(384\,b^3\,(a+b)^2\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right.$$

$$\left.\left(\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}\right)^{3/2}\right)+$$

$$\left(\left((a+b)\,\left(-24\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+4\,a\,b^2\,(12\,A+7\,C)\right)\,\text{EllipticE}\right[\right.$$

$$\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\Big]-2\,b\,\left(5\,a^3\,C+2\,a^2\,b\,(-4\,B+C)+24\,b^3\,(4\,A+3\,C)-\right.$$

$$\left.4\,a\,b^2\,(12\,A-28\,B+9\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$6\,\left(-8\,a^3\,b\,B-32\,a\,b^3\,B+5\,a^4\,C+8\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\right)\,\text{EllipticPi}\Big[$$

$$\left.-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\Bigg)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)\Bigg/$$

$$\left(192\,b^3\,(a+b)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right.$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)+$$

$$\left(\left((a+b)\,\left(-24\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+4\,a\,b^2\,(12\,A+7\,C)\right)\,\text{EllipticE}\right[\right.$$

$$\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\Big]-2\,b\,\left(5\,a^3\,C+2\,a^2\,b\,(-4\,B+C)+24\,b^3\,(4\,A+3\,C)-\right.$$

$$\left.4\,a\,b^2\,(12\,A-28\,B+9\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$6\,\left(-8\,a^3\,b\,B-32\,a\,b^3\,B+5\,a^4\,C+8\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\right)$$

$$\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right]\Bigg)$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right] \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}$$

$$\sqrt{\frac{a+b+a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\Bigg) \Bigg/ \Bigg(384 b^3$$

$$(a+b)\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b+a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\Bigg)+$$

$$\Bigg(\left(48 a A b^2-24 a^2 b B+128 b^3 B+15 a^3 C+28 a b^2 C\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]$$

$$\Bigg(-\frac{b \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}-\Bigg(\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]$$

$$\left(b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\Bigg) \Bigg/ \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\Bigg)\Bigg) \Bigg/$$

$$\Bigg(384 b^3 \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{a+\frac{b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\Bigg)-$$

$$\Bigg(\left(48 a A b^2-24 a^2 b B+128 b^3 B+15 a^3 C+28 a b^2 C\right) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{a+\frac{b-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\Bigg) \Bigg/$$

$$\Bigg(384 b^3 \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2}\Bigg)+$$

$$\Bigg(\left(48 a A b^2-24 a^2 b B+128 b^3 B+15 a^3 C+28 a b^2 C\right)$$

$$\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{a+\frac{b-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\Bigg) \Bigg/$$

$$\left(384 b^3 \sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \sqrt{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right) -$$

$$\Bigg(\left(48 a A b^2-24 a^2 b B+128 b^3 B+15 a^3 C+28 a b^2 C\right) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2 \sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}$$

$$\sqrt{a+\frac{b-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\Bigg) \Bigg/ \left(384 b^3 \sqrt{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right) -$$

$$\Bigg(\Bigg((a+b)\left(-24 a^2 b B+128 b^3 B+15 a^3 C+4 a b^2 (12 A+7 C)\right) \operatorname{EllipticE}\Big[$$

$$\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\Big]-2 b\left(5 a^3 C+2 a^2 b(-4 B+C)+24 b^3 (4 A+3 C)-\right.$$

$$\left.4 a b^2 (12 A-28 B+9 C)\right) \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right]+$$

$$6\left(-8 a^3 b B-32 a b^3 B+5 a^4 C+8 a^2 b^2 (2 A+C)-16 b^4 (4 A+3 C)\right)$$

$$\operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right]\Bigg) \sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^4}$$

$$\Bigg(\left(a \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]-b \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right) \Bigg/$$

$$\left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-\Bigg(\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]$$

$$\left(a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\Bigg) \Bigg/ \left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\Bigg)\Bigg) \Bigg/$$

$$\Bigg(384 b^3 (a+b) \sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}} \left(-1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\Bigg) -$$

$$\left(\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\ \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}\right.$$

$$\left(-\left(\left(b\left(5\,a^3\,C+2\,a^2\,b\,(-4\,B+C)+24\,b^3\,(4\,A+3\,C)-4\,a\,b^2\,(12\,A-28\,B+9\,C)\right)\text{Sec}\left[\frac{1}{2}(c+\right.\right.\right.$$

$$\left.d\,x)\right]^2\Bigg)\Bigg/\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\ \sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\Bigg) -$$

$$\left(3\left(-8\,a^3\,b\,B-32\,a\,b^3\,B+5\,a^4\,C+8\,a^2\,b^2\,(2\,A+C)-16\,b^4\,(4\,A+3\,C)\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\Bigg/$$

$$\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\ \left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right) +$$

$$\left((a+b)\left(-24\,a^2\,b\,B+128\,b^3\,B+15\,a^3\,C+4\,a\,b^2\,(12\,A+7\,C)\right)\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\right.$$

$$\left.\sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\Bigg/\left(2\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)\Bigg)\Bigg)\Bigg/$$

$$\left(192\,b^3\,(a+b)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right.$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\Bigg)\Bigg)$$

Problem 1510: Attempted integration timed out after 120 seconds.

$$\int (a+b\,\text{Cos}[c+d\,x])^{3/2}\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^{11/2}\,dx$$

Optimal (type 4, 590 leaves, 8 steps):

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(8\,A\,b^4+246\,a^3\,b\,B-18\,a\,b^3\,B+21\,a^4\,(7\,A+9\,C)+3\,a^2\,b^2\,(11\,A+21\,C)\right)\right.$$
$$\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(315\,a^4\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)+$$
$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(8\,A\,b^3+6\,a\,b^2\,(A-3\,B)+3\,a^2\,b\,(13\,A-57\,B+21\,C)-3\,a^3\,(49\,A-25\,B+63\,C)\right)\right.$$
$$\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(315\,a^3\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)-\frac{1}{315\,a^2\,d}$$
$$2\,\left(4\,A\,b^3-75\,a^3\,B-9\,a\,b^2\,B-2\,a^2\,b\,(44\,A+63\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]+$$
$$\frac{1}{315\,a\,d}2\,\left(3\,A\,b^2+72\,a\,b\,B+7\,a^2\,(7\,A+9\,C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]+$$
$$\frac{2\,(A\,b+3\,a\,B)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sec}[c+d\,x]^{7/2}\,\mathrm{Sin}[c+d\,x]}{21\,d}+$$
$$\frac{2\,A\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sec}[c+d\,x]^{9/2}\,\mathrm{Sin}[c+d\,x]}{9\,d}$$

Result (type 1, 1 leaves):

???

Problem 1511: Attempted integration timed out after 120 seconds.

$$\int (a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^{9/2}\,dx$$

Optimal (type 4, 490 leaves, 7 steps):

$$-\left(\left(2\,(a-b)\,\sqrt{a+b}\,\left(6\,A\,b^3-63\,a^3\,B-21\,a\,b^2\,B-2\,a^2\,b\,(41\,A+70\,C)\right)\right.\right.$$

$$\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Csc}[c+d\,x]\,\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\bigg/\left(105\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)-$$

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(6\,A\,b^2-a^2\,(25\,A-63\,B+35\,C)+3\,a\,b\,(19\,A-7\,B+35\,C)\right)\,\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\text{Csc}[c+d\,x]\,\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\bigg/\left(105\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\frac{1}{105\,a\,d}2\,\left(3\,A\,b^2+42\,a\,b\,B+5\,a^2\,(5\,A+7\,C)\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]+$$

$$\frac{2\,(3\,A\,b+7\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{35\,d}+$$

$$\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 1, 1 leaves):

???

Problem 1514: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{3/2}\,dx$$

Optimal (type 4, 595 leaves, 9 steps):

$$\left((a-b)\sqrt{a+b}\,(8aA-4bB-5aC)\sqrt{\text{Cos}[c+dx]}\;\text{Csc}[c+dx]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+dx])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+dx])}{a-b}}\right)\Big/\left(4ad\sqrt{\text{Sec}[c+dx]}\right)-$$

$$\left(\sqrt{a+b}\,(a\,(8A-8B-5C)-2b\,(8A+2B+C))\sqrt{\text{Cos}[c+dx]}\;\text{Csc}[c+dx]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+dx])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+dx])}{a-b}}\right)\Big/\left(4d\sqrt{\text{Sec}[c+dx]}\right)-$$

$$\left(\sqrt{a+b}\,(8Ab^2+12abB+3a^2C+4b^2C)\sqrt{\text{Cos}[c+dx]}\;\text{Csc}[c+dx]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+dx])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+dx])}{a-b}}\right)\Big/$$

$$\left(4bd\sqrt{\text{Sec}[c+dx]}\right)-\frac{b\,(4A-C)\sqrt{a+b\,\text{Cos}[c+dx]}\;\text{Sin}[c+dx]}{2d\sqrt{\text{Sec}[c+dx]}}-$$

$$\frac{(8aA-4bB-5aC)\sqrt{a+b\,\text{Cos}[c+dx]}\;\sqrt{\text{Sec}[c+dx]}\;\text{Sin}[c+dx]}{4d}+$$

$$\frac{2A\,(a+b\,\text{Cos}[c+dx])^{3/2}\sqrt{\text{Sec}[c+dx]}\;\text{Sin}[c+dx]}{d}$$

Result (type 4, 1469 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+dx]}\;\sqrt{\text{Sec}[c+dx]}\;\left(2aA\,\text{Sin}[c+dx]+\frac{1}{4}bC\,\text{Sin}[2\,(c+dx)]\right)+$$

$$\Big(8a^2A\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]+8aAb\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-4abB\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-$$

$$4b^2B\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-5a^2C\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-5abC\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-$$

$$16aAb\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^3+8b^2B\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^3+10abC\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^3-$$

$$8 a^2 A \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+8 a A b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+4 a b B \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$
$$4 b^2 B \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+5 a^2 C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5-5 a b C \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$
$$16 A b^2 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$
$$24 a b B \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$
$$6 a^2 C \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$
$$8 b^2 C \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$
$$16 A b^2 \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right] \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$
$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$
$$24 a b B \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right] \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$
$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$
$$6 a^2 C \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right] \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$
$$\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b+a \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$
$$8 b^2 C \operatorname{EllipticPi}\left[-1,-\operatorname{ArcSin}\left[\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right] \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+(a+b)$$

$$(8\,a\,A-4\,b\,B-5\,a\,C)\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$2\,\left(4\,a^2\,(A+B-C)-2\,b^2\,(2\,A+C)+a\,b\,(8\,A-8\,B+C)\right)$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\Bigg/$$

$$\left(4\,d\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\right.$$

$$\left.\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)$$

Problem 1516: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)}{\sqrt{\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 764 leaves, 10 steps):

$$-\left(\left(\left((a-b)\sqrt{a+b}\left(24 a^2 b B+128 b^3 B-9 a^3 C+12 a b^2 (20 A+13 C)\right)\right.\right.\right.$$
$$\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(192\, a\, b^2\, d\,\sqrt{\text{Sec}[c+d x]}\right)\right)-$$
$$\left(\sqrt{a+b}\left(9 a^3 C-6 a^2 b (4 B+C)-8 b^3 (12 A+16 B+9 C)-4 a b^2 (60 A+28 B+39 C)\right)\right.$$
$$\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(192\, b^2\, d\,\sqrt{\text{Sec}[c+d x]}\right)+$$
$$\left(\sqrt{a+b}\left(8 a^3 b B-96 a b^3 B-3 a^4 C-24 a^2 b^2 (2 A+C)-16 b^4 (4 A+3 C)\right)\sqrt{\text{Cos}[c+d x]}\right.$$
$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(64\, b^3\, d\,\sqrt{\text{Sec}[c+d x]}\right)+$$
$$\frac{\left(4 b^2 (4 A+3 C)+a (8 b B-3 a C)\right)\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{32\, b\, d\,\sqrt{\text{Sec}[c+d x]}}+$$
$$\frac{(8 b B-3 a C)\left(a+b\,\text{Cos}[c+d x]\right)^{3/2}\text{Sin}[c+d x]}{24\, b\, d\,\sqrt{\text{Sec}[c+d x]}}+$$
$$\frac{C\left(a+b\,\text{Cos}[c+d x]\right)^{5/2}\text{Sin}[c+d x]}{4\, b\, d\,\sqrt{\text{Sec}[c+d x]}}+$$
$$\frac{1}{192\, b^2\, d}$$
$$\left(24 a^2 b B+128 b^3 B-9 a^3 C+12 a b^2 (20 A+13 C)\right)$$
$$\sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]$$

Result (type 4, 4478 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}$$

$$\left(\frac{1}{96}\left(8\,b\,B+9\,a\,C\right)\,\text{Sin}\left[c+d\,x\right]+\frac{\left(48\,A\,b^2+56\,a\,b\,B+3\,a^2\,C+48\,b^2\,C\right)\,\text{Sin}\left[2\,\left(c+d\,x\right)\right]}{192\,b}+\right.$$

$$\left.\frac{1}{96}\left(8\,b\,B+9\,a\,C\right)\,\text{Sin}\left[3\,\left(c+d\,x\right)\right]+\frac{1}{32}\,b\,C\,\text{Sin}\left[4\,\left(c+d\,x\right)\right]\right)+$$

$$\left(\left(\frac{a^2\,A}{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{A\,b^2}{2\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\right.\right.$$

$$\frac{13\,a\,b\,B}{12\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{19\,a^2\,C}{32\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{3\,b^2\,C}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{7\,a\,A\,b\,\sqrt{\text{Sec}[c+d\,x]}}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{17\,a^2\,B\,\sqrt{\text{Sec}[c+d\,x]}}{48\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{b^2\,B\,\sqrt{\text{Sec}[c+d\,x]}}{3\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-\frac{a^3\,C\,\sqrt{\text{Sec}[c+d\,x]}}{128\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{19\,a\,b\,C\,\sqrt{\text{Sec}[c+d\,x]}}{32\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{5\,a\,A\,b\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{a^2\,B\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{16\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{b^2\,B\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-$$

$$\left.\frac{3\,a^3\,C\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{128\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{13\,a\,b\,C\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{32\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\right)$$

$$\left(\left(\left(24\,a^2\,b\,B+128\,b^3\,B-9\,a^3\,C+12\,a\,b^2\,\left(20\,A+13\,C\right)\right)\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right.\right.$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\right)\Big/\left(192\,b^2\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\right)+$$

$$\left(\left(\left(a+b\right)\,\left(-24\,a^2\,b\,B-128\,b^3\,B+9\,a^3\,C-12\,a\,b^2\,\left(20\,A+13\,C\right)\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]+2\,b\,\left(-3\,a^3\,C+24\,b^3\,\left(4\,A+3\,C\right)-4\,a\,b^2\,\left(12\,A-52\,B+9\,C\right)+\right.$$

$$\left.2\,a^2\,b\,\left(96\,A-28\,B+57\,C\right)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$6\,\left(-8\,a^3\,b\,B+96\,a\,b^3\,B+3\,a^4\,C+24\,a^2\,b^2\,\left(2\,A+C\right)+16\,b^4\,\left(4\,A+3\,C\right)\right)$$

$$\left.\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\Bigg)\Bigg/$$

$$\left(192\,b^2\,(a+b)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right.$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(d\,\Bigg(\Bigg(\left(24\,a^2\,b\,B+128\,b^3\,B-9\,a^3\,C+12\,a\,b^2\,(20\,A+13\,C)\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\Bigg)\Bigg/\left(384\,b^2\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)-$$

$$\Bigg(\Bigg((a+b)\,\left(-24\,a^2\,b\,B-128\,b^3\,B+9\,a^3\,C-12\,a\,b^2\,(20\,A+13\,C)\right)\,\text{EllipticE}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}$$

$$(c+d\,x)\Big]\Big],\,\frac{-a+b}{a+b}\Big]+2\,b\,\left(-3\,a^3\,C+24\,b^3\,(4\,A+3\,C)-4\,a\,b^2\,(12\,A-52\,B+9\,C)+\right.$$

$$\left.2\,a^2\,b\,(96\,A-28\,B+57\,C)\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$6\,\left(-8\,a^3\,b\,B+96\,a\,b^3\,B+3\,a^4\,C+24\,a^2\,b^2\,(2\,A+C)+16\,b^4\,(4\,A+3\,C)\right)$$

$$\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\Bigg)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\Bigg)\Bigg/$$

$$\left(192\,b^2\,(a+b)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right.$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\right)-$$

$$\left(\left((a+b)\left(-24 a^2 b B-128 b^3 B+9 a^3 C-12 a b^2 (20 A+13 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{-a+b}{a+b}\right]+2 b \left(-3 a^3 C+24 b^3 (4 A+3 C)-4 a b^2 (12 A-52 B+9 C)+2 a^2 b (96 A-28 B+57 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{-a+b}{a+b}\right]+6 \left(-8 a^3 b B+96 a b^3 B+3 a^4 C+24 a^2 b^2 (2 A+C)+16 b^4 (4 A+3 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{-a+b}{a+b}\right]\right) \left(a \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]-b \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right]\right) \sqrt{\frac{a+b+a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2-b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}} \sqrt{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^4}\right) \Big/ \left(384 b^2 (a+b)^2 \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}} \left(-1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right) \left(\frac{a+b+a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2-b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}\right)^{3/2}\right)-$$

$$\left(\left((a+b)\left(-24 a^2 b B-128 b^3 B+9 a^3 C-12 a b^2 (20 A+13 C)\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{-a+b}{a+b}\right]+2 b \left(-3 a^3 C+24 b^3 (4 A+3 C)-4 a b^2 (12 A-52 B+9 C)+2 a^2 b (96 A-28 B+57 C)\right) \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{-a+b}{a+b}\right]+6 \left(-8 a^3 b B+96 a b^3 B+3 a^4 C+24 a^2 b^2 (2 A+C)+16 b^4 (4 A+3 C)\right) \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} (c+d x)\right]\right], \frac{-a+b}{a+b}\right]\right) \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \text{Tan}\left[\frac{1}{2} (c+d x)\right] \sqrt{\frac{a+b+a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2-b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}} \sqrt{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^4}\right) \Big/ \left(192 b^2 (a+b) \sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}} \left(-1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2\right)^2\right.$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg)-$$

$$\Bigg(\Big((a+b)\left(-24\,a^2\,b\,B-128\,b^3\,B+9\,a^3\,C-12\,a\,b^2\,(20\,A+13\,C)\right)$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$2\,b\left(-3\,a^3\,C+24\,b^3\,(4\,A+3\,C)-4\,a\,b^2\,(12\,A-52\,B+9\,C)+2\,a^2\,b\,(96\,A-28\,B+57\,C)\right)$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$6\left(-8\,a^3\,b\,B+96\,a\,b^3\,B+3\,a^4\,C+24\,a^2\,b^2\,(2\,A+C)+16\,b^4\,(4\,A+3\,C)\right)$$

$$\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\Big)$$

$$\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}\Bigg)\Bigg/\Bigg(384\,b^2$$

$$(a+b)\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\Bigg)-$$

$$\Bigg(\left(24\,a^2\,b\,B+128\,b^3\,B-9\,a^3\,C+12\,a\,b^2\,(20\,A+13\,C)\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(\frac{\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+\right.$$

$$\left(\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Bigg/$$

$$\left.\left(1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\Bigg)\Bigg/\left(384\,b^2\left(\frac{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{3/2}\right)+$$

$$\Bigg(\left(24\,a^2\,b\,B+128\,b^3\,B-9\,a^3\,C+12\,a\,b^2\,(20\,A+13\,C)\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\left(\left(a\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-b\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right/$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)-\left(\text{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right.$$

$$\left.\left(a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)\right)\Big/\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)^2\Bigg)\Bigg)\Big/$$

$$\left(384\,b^2\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\right)+$$

$$\Bigg(\bigg(\left(a+b\right)\,\left(-24\,a^2\,b\,B-128\,b^3\,B+9\,a^3\,C-12\,a\,b^2\,\left(20\,A+13\,C\right)\right)$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$2\,b\,\left(-3\,a^3\,C+24\,b^3\,\left(4\,A+3\,C\right)-4\,a\,b^2\,\left(12\,A-52\,B+9\,C\right)+2\,a^2\,b\,\left(96\,A-28\,B+57\,C\right)\right)$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$6\,\left(-8\,a^3\,b\,B+96\,a\,b^3\,B+3\,a^4\,C+24\,a^2\,b^2\,\left(2\,A+C\right)+16\,b^4\,\left(4\,A+3\,C\right)\right)$$

$$\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\frac{-a+b}{a+b}\right]\bigg)\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4}$$

$$\Bigg(\bigg(a\,\text{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-b\,\text{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\bigg)\Big/$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)-\left(\text{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right.$$

$$\left.\left(a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)\right)\Big/\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)^2\Bigg)\Bigg)\Big/$$

$$\Bigg(384\,b^2\,\left(a+b\right)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\Bigg)+$$

$$\left(\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4}\right.$$

$$\left(\left(b\left(-3a^3C+24b^3(4A+3C)-4ab^2(12A-52B+9C)+2a^2b(96A-28B+57C)\right)\right.\right.$$

$$\left.\mathrm{Sec}\left[\frac{1}{2}(c+dx)\right]^2\right)\bigg/\left(\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\sqrt{1-\frac{(-a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}\right)-$$

$$\left(3\left(-8a^3bB+96ab^3B+3a^4C+24a^2b^2(2A+C)+16b^4(4A+3C)\right)\right.$$

$$\left.\mathrm{Sec}\left[\frac{1}{2}(c+dx)\right]^2\right)\bigg/$$

$$\left(\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\sqrt{1-\frac{(-a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}\right)+$$

$$\left((a+b)\left(-24a^2bB-128b^3B+9a^3C-12ab^2(20A+13C)\right)\mathrm{Sec}\left[\frac{1}{2}(c+dx)\right]^2\right.$$

$$\left.\left.\sqrt{1-\frac{(-a+b)\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}\right)\bigg/\left(2\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}\right)\right)\right)\bigg/$$

$$\left(192b^2(a+b)\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right.$$

$$\left.\left.\left.\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}\right)\right)\right)$$

Problem 1517: Attempted integration timed out after 120 seconds.

$$\int(a+b\,\mathrm{Cos}[c+dx])^{5/2}\left(A+B\,\mathrm{Cos}[c+dx]+C\,\mathrm{Cos}[c+dx]^2\right)\mathrm{Sec}[c+dx]^{13/2}\,dx$$

Optimal (type 4, 705 leaves, 9 steps):

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(40\,A\,b^5+1617\,a^5\,B+3069\,a^3\,b^2\,B-110\,a\,b^4\,B+15\,a^2\,b^3\,(17\,A+33\,C)+15\,a^4\,b\,(247\,A+319\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3465\,a^4\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(40\,A\,b^4+10\,a\,b^3\,(3\,A-11\,B)+15\,a^2\,b^2\,(19\,A-121\,B+33\,C)+3\,a^4\,(225\,A-539\,B+275\,C)-6\,a^3\,b\,(505\,A-209\,B+660\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3465\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-\frac{1}{3465\,a^2\,d}$$

$$2\,\left(20\,A\,b^4-1793\,a^3\,b\,B-55\,a\,b^3\,B-75\,a^4\,(9\,A+11\,C)-5\,a^2\,b^2\,(205\,A+297\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]+\frac{1}{3465\,a\,d}2\,\left(15\,A\,b^3+539\,a^3\,B+825\,a\,b^2\,B+5\,a^2\,b\,(229\,A+297\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]+\frac{1}{231\,d}2\,\left(5\,A\,b^2+44\,a\,b\,B+3\,a^2\,(9\,A+11\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]+\frac{2\,(5\,A\,b+11\,a\,B)\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{99\,d}+\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{11/2}\,\text{Sin}[c+d\,x]}{11\,d}$$

Result (type 1, 1 leaves):

???

Problem 1518: Attempted integration timed out after 120 seconds.

$$\int (a+b\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\text{Sec}[c+d\,x]^{11/2}\,dx$$

Optimal (type 4, 592 leaves, 8 steps):

$$-\left(\left(2\,(a-b)\,\sqrt{a+b}\,\left(10\,A\,b^4-435\,a^3\,b\,B-45\,a\,b^3\,B-21\,a^4\,(7\,A+9\,C)-3\,a^2\,b^2\,(93\,A+161\,C)\right)\right.\right.$$

$$\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(315\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\Bigg)-$$

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(10\,A\,b^3+15\,a\,b^2\,(11\,A-3\,B+21\,C)-6\,a^2\,b\,(19\,A-60\,B+28\,C)+\right.\right.$$

$$\left.3\,a^3\,(49\,A-25\,B+63\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}$$

$$\left.\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(315\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{1}{315\,a\,d}$$

$$2\,\left(5\,A\,b^3+75\,a^3\,B+135\,a\,b^2\,B+a^2\,b\,(163\,A+231\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]+\frac{1}{315\,d}$$

$$2\,\left(15\,A\,b^2+90\,a\,b\,B+7\,a^2\,(7\,A+9\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]+$$

$$\frac{2\,(5\,A\,b+9\,a\,B)\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{63\,d}+$$

$$\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{9\,d}$$

Result (type 1, 1 leaves):

???

Problem 1521: Result more than twice size of optimal antiderivative.

$$\int(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{5/2}\,dx$$

Optimal (type 4, 682 leaves, 10 steps):

$$\left((a-b)\sqrt{a+b}\left(24 a^2 B-12 b^2 B+a b (56 A-27 C)\right)\sqrt{\mathrm{Cos}[c+d x]}\,\mathrm{Csc}[c+d x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\mathrm{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\mathrm{Sec}[c+d x])}{a-b}}\right)\Big/\left(12 a d\sqrt{\mathrm{Sec}[c+d x]}\right)-$$

$$\left(\sqrt{a+b}\left(a b (56 A-72 B-27 C)-6 b^2 (12 A+2 B+C)-8 a^2 (A-3 B+3 C)\right)\sqrt{\mathrm{Cos}[c+d x]}\,\mathrm{Csc}[c+d x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\mathrm{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\mathrm{Sec}[c+d x])}{a-b}}\right)\Big/\left(12 d\sqrt{\mathrm{Sec}[c+d x]}\right)-$$

$$\left(\sqrt{a+b}\left(8 A b^2+20 a b B+15 a^2 C+4 b^2 C\right)\sqrt{\mathrm{Cos}[c+d x]}\,\mathrm{Csc}[c+d x]\,\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\mathrm{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\mathrm{Sec}[c+d x])}{a-b}}\right)\Big/$$

$$\left(4 d\sqrt{\mathrm{Sec}[c+d x]}\right)-\frac{b(8 A b+4 a B-b C)\sqrt{a+b\,\mathrm{Cos}[c+d x]}\,\mathrm{Sin}[c+d x]}{2 d\sqrt{\mathrm{Sec}[c+d x]}}-\frac{1}{12 d}$$

$$\left(24 a^2 B-12 b^2 B+a b (56 A-27 C)\right)\sqrt{a+b\,\mathrm{Cos}[c+d x]}\sqrt{\mathrm{Sec}[c+d x]}\,\mathrm{Sin}[c+d x]+$$

$$\frac{2(5 A b+3 a B)(a+b\,\mathrm{Cos}[c+d x])^{3/2}\sqrt{\mathrm{Sec}[c+d x]}\,\mathrm{Sin}[c+d x]}{3 d}+$$

$$\frac{2 A (a+b\,\mathrm{Cos}[c+d x])^{5/2}\,\mathrm{Sec}[c+d x]^{3/2}\,\mathrm{Sin}[c+d x]}{3 d}$$

Result (type 4, 1640 leaves):

$$\left(56 a^2 A b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+56 a A b^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$24 a^3 B\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]+24 a^2 b B\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]-12 a b^2 B\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]-$$

$$12 b^3 B\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]-27 a^2 b C\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]-27 a b^2 C\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]-$$

$$112 a A b^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^3-48 a^2 b B\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^3+24 b^3 B\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^3+$$

$$54\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3 - 56\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 + 56\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 -$$

$$24\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 + 24\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 + 12\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 -$$

$$12\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 + 27\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 - 27\,a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 +$$

$$48\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$120\,a\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$90\,a^2\,b\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$24\,b^3\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$48\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$120\,a\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$90\,a^2\,b\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$24\,b^3\,C\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$(a+b)\left(24 a^2 B-12 b^2 B+a b(56 A-27 C)\right)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$2\left(4 a^2 b(7 A+9 B-9 C)-6 b^3(2 A+C)+3 a b^2(12 A-12 B+C)+4 a^3(A+3(B+C))\right)$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\Bigg/$$

$$\left(12 d\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2}\right.$$

$$\left.\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)+\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\ \sqrt{\mathrm{Sec}[c+d x]}$$

$$\left(\frac{2}{3}a(7 A b+3 a B)\,\mathrm{Sin}[c+d x]+\frac{1}{4}b^2 C\,\mathrm{Sin}[2(c+d x)]+\frac{2}{3}a^2 A\,\mathrm{Tan}[c+d x]\right)$$

Problem 1522: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\mathrm{Cos}[c+d x])^{5/2}\left(A+B\,\mathrm{Cos}[c+d x]+C\,\mathrm{Cos}[c+d x]^2\right)\mathrm{Sec}[c+d x]^{3/2}\,dx$$

Optimal (type 4, 707 leaves, 10 steps):

$$-\left(\left((a-b)\sqrt{a+b}\left(54\,a\,b\,B-a^2\,(48\,A-33\,C)+8\,b^2\,(3\,A+2\,C)\right)\right.\right.$$
$$\sqrt{\text{Cos}[c+d\,x]}\ \text{Csc}[c+d\,x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(24\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\Bigg)-$$
$$\left(\sqrt{a+b}\left(a^2\,(48\,A-48\,B-33\,C)-4\,b^2\,(6\,A+3\,B+4\,C)-2\,a\,b\,(72\,A+27\,B+13\,C)\right)\right.$$
$$\sqrt{\text{Cos}[c+d\,x]}\ \text{Csc}[c+d\,x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(24\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$
$$\left(\sqrt{a+b}\left(30\,a^2\,b\,B+8\,b^3\,B+5\,a^3\,C+20\,a\,b^2\,(2\,A+C)\right)\sqrt{\text{Cos}[c+d\,x]}\ \text{Csc}[c+d\,x]\right.$$
$$\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(8\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$
$$\frac{b\,(8\,a\,A-2\,b\,B-3\,a\,C)\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{4\,d\,\sqrt{\text{Sec}[c+d\,x]}}-$$
$$\frac{b\,(6\,A-C)\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}+$$
$$\frac{1}{24\,d}\left(54\,a\,b\,B-a^2\,(48\,A-33\,C)+8\,b^2\,(3\,A+2\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]+$$
$$\frac{2\,A\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{d}$$

Result (type 4, 1940 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \sqrt{\text{Sec}[c+d\,x]}$$

$$\left(\frac{1}{12}\left(24 a^2 A+b^2 C\right) \text{Sin}[c+d x]+\frac{1}{24} b\,(6 b B+13 a C) \text{Sin}[2 (c+d x)]+\frac{1}{12} b^2 C\, \text{Sin}[3 (c+d x)]\right)+$$

$$\Bigg(48 a^3 A \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+48 a^2 A b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-24 a A b^2 \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-$$
$$24 A b^3 \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-54 a^2 b B \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-54 a b^2 B \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-$$
$$33 a^3 C \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-33 a^2 b C \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-16 a b^2 C \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-$$
$$16 b^3 C \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-96 a^2 A b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+48 A b^3 \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+$$
$$108 a b^2 B \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+66 a^2 b C \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+32 b^3 C \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-$$
$$48 a^3 A \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+48 a^2 A b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+24 a A b^2 \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$
$$24 A b^3 \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+54 a^2 b B \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-54 a b^2 B \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$
$$33 a^3 C \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-33 a^2 b C \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+16 a b^2 C \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$
$$16 b^3 C \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+240 a A b^2 \,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$
$$180 a^2 b B \,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$
$$48 b^3 B \,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$
$$30 a^3 C \,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$
$$120 a b^2 C \,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$240\,a\,A\,b^2\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$180\,a^2\,b\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$48\,b^3\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$30\,a^3\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$120\,a\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$(a+b)\left(-54\,a\,b\,B+a^2(48\,A-33\,C)-8\,b^2(3\,A+2\,C)\right)$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$2\left(-12\,b^3\,B+24\,a^3(A+B-C)+a^2\,b\,(72\,A-72\,B+13\,C)-2\,a\,b^2(36\,A-3\,B+19\,C)\right)$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\Bigg) \Bigg/$$

$$\left(24\,d\sqrt{\frac{1}{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(-1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\left(1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2}\right.$$

$$\left.\sqrt{\frac{a+b+a\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)$$

Problem 1524: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(a+b\operatorname{Cos}[c+d x])^{5/2}\left(A+B\operatorname{Cos}[c+d x]+C\operatorname{Cos}[c+d x]^2\right)}{\sqrt{\operatorname{Sec}[c+d x]}}\,dx$$

Optimal (type 4, 894 leaves, 11 steps):

$$-\left(\left((a-b)\sqrt{a+b}\,\left(150\,a^3\,b\,B+2840\,a\,b^3\,B-45\,a^4\,C+256\,b^4\,(5\,A+4\,C)+12\,a^2\,b^2\,(220\,A+141\,C)\right)\right.\right.$$
$$\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Bigg/\left(1920\,a\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\Bigg)-$$
$$\left(\sqrt{a+b}\,\left(45\,a^4\,C-30\,a^3\,b\,(5\,B+C)-16\,b^4\,(80\,A+45\,B+64\,C)-8\,a\,b^3\,(260\,A+355\,B+193\,C)-\right.\right.$$
$$\left.4\,a^2\,b^2\,(660\,A+295\,B+423\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}$$
$$\left.\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Bigg/\left(1920\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$
$$\left(\sqrt{a+b}\,\left(10\,a^4\,b\,B-240\,a^2\,b^3\,B-96\,b^5\,B-3\,a^5\,C-40\,a^3\,b^2\,(2\,A+C)-80\,a\,b^4\,(4\,A+3\,C)\right)\right.$$
$$\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Bigg/\left(128\,b^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$
$$\left(\left(50\,a^2\,b\,B+120\,b^3\,B-15\,a^3\,C+4\,a\,b^2\,(60\,A+43\,C)\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(320\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$
$$\left(\left(80\,A\,b^2+50\,a\,b\,B-15\,a^2\,C+64\,b^2\,C\right)(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(240\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$
$$\frac{(10\,b\,B-3\,a\,C)\,(a+b\,\text{Cos}[c+d\,x])^{5/2}\,\text{Sin}[c+d\,x]}{40\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}}+$$
$$\frac{C\,(a+b\,\text{Cos}[c+d\,x])^{7/2}\,\text{Sin}[c+d\,x]}{5\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}}+$$
$$\frac{1}{1920\,b^2\,d}$$
$$\left(150\,a^3\,b\,B+2840\,a\,b^3\,B-45\,a^4\,C+256\,b^4\,(5\,A+4\,C)+12\,a^2\,b^2\,(220\,A+141\,C)\right)$$
$$\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]$$

Result (type 4, 803 leaves) :

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\left(\frac{1}{960}\left(80\,A\,b^2+170\,a\,b\,B+93\,a^2\,C+88\,b^2\,C\right)\text{Sin}[c+d\,x]+\right.$$
$$\frac{1}{1920\,b}\left(1040\,a\,A\,b^2+590\,a^2\,b\,B+480\,b^3\,B+15\,a^3\,C+1024\,a\,b^2\,C\right)\text{Sin}\left[2\,\left(c+d\,x\right)\right]+$$
$$\frac{1}{960}\left(80\,A\,b^2+170\,a\,b\,B+93\,a^2\,C+100\,b^2\,C\right)\text{Sin}\left[3\,\left(c+d\,x\right)\right]+$$
$$\left.\frac{1}{320}\,b\,\left(10\,b\,B+21\,a\,C\right)\text{Sin}\left[4\,\left(c+d\,x\right)\right]+\frac{1}{80}\,b^2\,C\,\text{Sin}\left[5\,\left(c+d\,x\right)\right]\right)+$$

$$\frac{1}{1920\,b^2\,d\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}$$

$$\left(\left(150\,a^3\,b\,B+2840\,a\,b^3\,B-45\,a^4\,C+256\,b^4\,\left(5\,A+4\,C\right)+12\,a^2\,b^2\,\left(220\,A+141\,C\right)\right)\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\right.$$

$$\frac{1}{\sqrt{\frac{a-b}{a+b}}\,\left(a-a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^4+b\,\left(-1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2\right)^2\right)}$$

$$i\,\left(\left(a-b\right)\,\left(-150\,a^3\,b\,B-2840\,a\,b^3\,B+45\,a^4\,C-256\,b^4\,\left(5\,A+4\,C\right)-12\,a^2\,b^2\,\left(220\,A+141\,C\right)\right)\right.$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],-\frac{a+b}{a-b}\right]-$$
$$2\,\left(a-b\right)\,\left(-720\,b^4\,B-30\,a^3\,b\,\left(5\,B-C\right)+45\,a^4\,C-4\,a^2\,b^2\,\left(180\,A+185\,B+129\,C\right)-8\,a\,b^3\right.$$
$$\left.\left(220\,A+45\,B+161\,C\right)\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],-\frac{a+b}{a-b}\right]+$$
$$30\,\left(-10\,a^4\,b\,B+240\,a^2\,b^3\,B+96\,b^5\,B+3\,a^5\,C+40\,a^3\,b^2\,\left(2\,A+C\right)+80\,a\,b^4\,\left(4\,A+3\,C\right)\right)$$
$$\left.\text{EllipticPi}\left[\frac{a+b}{a-b},i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],-\frac{a+b}{a-b}\right]\right)$$

$$\left(-1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2\right)\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}\right)$$

Problem 1525: Attempted integration timed out after 120 seconds.

$$\int \frac{\left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{9/2}}{\sqrt{a + b \operatorname{Cos}[c + d x]}} \, dx$$

Optimal (type 4, 506 leaves, 7 steps):

$$-\left(\left(2 (a-b) \sqrt{a+b} \left(48 A b^3 - 63 a^3 B - 56 a b^2 B + a^2 (44 A b + 70 b C)\right) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Csc}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/ \left(105 a^5 d \sqrt{\operatorname{Sec}[c+d x]}\right)\right) + \left(2 \sqrt{a+b} \left(48 A b^3 - 4 a b^2 (3 A + 14 B) + a^3 (25 A - 63 B + 35 C) + 2 a^2 b (22 A + 7 (B + 5 C))\right) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/ \left(105 a^4 d \sqrt{\operatorname{Sec}[c+d x]}\right) + \frac{1}{105 a^3 d} 2 \left(24 A b^2 - 28 a b B + 5 a^2 (5 A + 7 C)\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x] - \frac{2 (6 A b - 7 a B) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x]^{5/2} \operatorname{Sin}[c+d x]}{35 a^2 d} + \frac{2 A \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x]^{7/2} \operatorname{Sin}[c+d x]}{7 a d}$$

Result (type 1, 1 leaves):

???

Problem 1526: Attempted integration timed out after 120 seconds.

$$\int \frac{\left(A + B \operatorname{Cos}[c + d x] + C \operatorname{Cos}[c + d x]^2\right) \operatorname{Sec}[c + d x]^{7/2}}{\sqrt{a + b \operatorname{Cos}[c + d x]}} \, dx$$

Optimal (type 4, 412 leaves, 6 steps):

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(8\,A\,b^2-10\,a\,b\,B+3\,a^2\,(3\,A+5\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Bigg/\left(15\,a^4\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$
$$\left(2\,\sqrt{a+b}\,\left(8\,A\,b^2-2\,a\,b\,(A+5\,B)+a^2\,(9\,A-5\,B+15\,C)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Bigg/\left(15\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$
$$\frac{2\,(4\,A\,b-5\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{15\,a^2\,d}+\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,a\,d}$$

Result (type 1, 1 leaves):

???

Problem 1527: Unable to integrate problem.

$$\int \frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{5/2}}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 333 leaves, 5 steps):

$$-\left(\left(2\,(a-b)\,\sqrt{a+b}\,(2\,A\,b-3\,a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\right.\right.$$
$$\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]$$
$$\left.\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)+$$
$$\left(2\,\sqrt{a+b}\,(2\,A\,b+a\,(A-3\,B+3\,C))\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\right.\right.$$
$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/$$
$$\left(3\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,a\,d}$$

Result (type 8, 47 leaves):

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\,\text{Sec}[c+d\,x]^{5/2}}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Problem 1530: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 545 leaves, 8 steps):

$$-\left(\left((a-b)\sqrt{a+b}\,(4\,b\,B-3\,a\,C)\,\sqrt{\text{Cos}[c+d\,x]}\right.\right.$$

$$\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(4\,a\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\Bigg)-$$

$$\left(\sqrt{a+b}\,(3\,a\,C-2\,b\,(2\,B+C))\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\right.$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(4\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\left(\sqrt{a+b}\,\left(8\,A\,b^2-4\,a\,b\,B+3\,a^2\,C+4\,b^2\,C\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\right.$$

$$\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/$$

$$\left(4\,b^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{C\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{(4\,b\,B-3\,a\,C)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,b^2\,d}$$

Result (type 4, 1376 leaves) :

$$\frac{C\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[2\,(c+d\,x)]}{4\,b\,d}+$$

$$\left(\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left(-4\,a\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-4\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,a^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\right.$$

$$3\,a\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+8\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-6\,a\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+$$

$$4\,a\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-4\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-3\,a^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$3\,a\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+16\,A\,b^2\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$8\,a\,b\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$6\,a^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$8\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$16\,A\,b^2\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$8\,a\,b\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$6\,a^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$8\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+(a+b)$$

$$(-4\,b\,B+3\,a\,C)\ \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\ \frac{-a+b}{a+b}\right]\ \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}+$$

$$2\,b\,(4\,A\,b-a\,C+2\,b\,C)\ \text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\ \frac{-a+b}{a+b}\right]\ \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(4\,b^2\,d\,\sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\ \left(b\left(-1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)-a\left(1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\right)$$

Problem 1531: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2}{\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 653 leaves, 9 steps):

$$-\left(\left((a-b)\sqrt{a+b}\,\left(24 A b^2-18 a b B+15 a^2 C+16 b^2 C\right)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(24 a b^3 d\sqrt{\text{Sec}[c+d x]}\right)\right)+$$

$$\left(\sqrt{a+b}\,\left(24 A b^2-18 a b B+12 b^2 B+15 a^2 C-10 a b C+16 b^2 C\right)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(24 b^3 d\sqrt{\text{Sec}[c+d x]}\right)-$$

$$\left(\sqrt{a+b}\,\left(6 a^2 b B+8 b^3 B-5 a^3 C-4 a b^2\,(2 A+C)\right)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(8 b^4 d\sqrt{\text{Sec}[c+d x]}\right)+$$

$$\frac{C\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{3 b d\,\text{Sec}[c+d x]^{3/2}}+\frac{(6 b B-5 a C)\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{12 b^2 d\sqrt{\text{Sec}[c+d x]}}+$$

$$\frac{1}{24 b^3 d}\left(24 A b^2-18 a b B+15 a^2 C+16 b^2 C\right)\sqrt{a+b\,\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]$$

Result (type 4, 1837 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}$$

$$\left(\frac{C\,\text{Sin}[c+d x]}{12 b}+\frac{(6 b B-5 a C)\,\text{Sin}[2\,(c+d x)]}{24 b^2}+\frac{C\,\text{Sin}[3\,(c+d x)]}{12 b}\right)-$$

$$\left(\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d x)\right]^2}}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d x)\right]^2}}\right.$$

$$\Bigg(24\,a\,A\,b^2\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+24\,A\,b^3\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-18\,a^2\,b\,B\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-$$

$$18\,a\,b^2\,B\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+15\,a^3\,C\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+15\,a^2\,b\,C\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+$$

$$16\,a\,b^2\,C\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]+16\,b^3\,C\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-48\,A\,b^3\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^3+$$

$$36\,a\,b^2\,B\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^3-30\,a^2\,b\,C\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^3-$$

$$32\,b^3\,C\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^3-24\,a\,A\,b^2\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5+24\,A\,b^3\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5+$$

$$18\,a^2\,b\,B\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5-18\,a\,b^2\,B\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5-15\,a^3\,C\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5+$$

$$15\,a^2\,b\,C\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5-16\,a\,b^2\,C\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5+16\,b^3\,C\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^5+$$

$$48\,a\,A\,b^2\,\mathrm{EllipticPi}\Big[-1,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{-a+b}{a+b}\Big]$$

$$\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2-b\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}-$$

$$36\,a^2\,b\,B\,\mathrm{EllipticPi}\Big[-1,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{-a+b}{a+b}\Big]$$

$$\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2-b\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}-$$

$$48\,b^3\,B\,\mathrm{EllipticPi}\Big[-1,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{-a+b}{a+b}\Big]$$

$$\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2-b\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}+$$

$$30\,a^3\,C\,\mathrm{EllipticPi}\Big[-1,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{-a+b}{a+b}\Big]$$

$$\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2-b\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}+$$

$$24\,a\,b^2\,C\,\mathrm{EllipticPi}\Big[-1,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{-a+b}{a+b}\Big]$$

$$\sqrt{1-\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2-b\,\mathrm{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{a+b}}+$$

$$48\,a\,A\,b^2\,\mathrm{EllipticPi}\Big[-1,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{-a+b}{a+b}\Big]\,\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ -$$

$$36\,a^2\,b\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ -$$

$$48\,b^3\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ +$$

$$30\,a^3\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ +$$

$$24\,a\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ +$$

$$(a+b)\left(24\,A\,b^2-18\,a\,b\,B+15\,a^2\,C+16\,b^2\,C\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ -2\,b\left(12\,b^2\,B+5\,a^2\,C+2\,a\,b\,(-3\,B+C)\right)$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(24\,b^3\,d\,\sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \left(b\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-a\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

Problem 1533: Attempted integration timed out after 120 seconds.

$$\int \frac{\left(A + B\, \text{Cos}[c + d\, x] + C\, \text{Cos}[c + d\, x]^2\right) \text{Sec}[c + d\, x]^{7/2}}{\left(a + b\, \text{Cos}[c + d\, x]\right)^{3/2}} \, dx$$

Optimal (type 4, 585 leaves, 7 steps):

$$-\left(\left(2 \left(48\, A\, b^4 + 25\, a^3\, b\, B - 40\, a\, b^3\, B - 6\, a^2\, b^2 \left(4\, A - 5\, C\right) - 3\, a^4 \left(3\, A + 5\, C\right)\right) \sqrt{\text{Cos}[c + d\, x]}\; \text{Csc}[c + d\, x]\; \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a + b\, \text{Cos}[c + d\, x]}}{\sqrt{a + b}\, \sqrt{\text{Cos}[c + d\, x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a \left(1 - \text{Sec}[c + d\, x]\right)}{a + b}}\, \sqrt{\frac{a \left(1 + \text{Sec}[c + d\, x]\right)}{a - b}}\right) \Big/ \left(15\, a^5\, \sqrt{a + b}\; d\, \sqrt{\text{Sec}[c + d\, x]}\right)\right) -$$

$$\left(2 \left(48\, A\, b^3 + 4\, a\, b^2 \left(9\, A - 10\, B\right) + 6\, a^2\, b \left(2\, A - 5\, B + 5\, C\right) + a^3 \left(9\, A - 5\, B + 15\, C\right)\right) \sqrt{\text{Cos}[c + d\, x]}\; \text{Csc}[c + d\, x]\; \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a + b\, \text{Cos}[c + d\, x]}}{\sqrt{a + b}\, \sqrt{\text{Cos}[c + d\, x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a \left(1 - \text{Sec}[c + d\, x]\right)}{a + b}}\, \sqrt{\frac{a \left(1 + \text{Sec}[c + d\, x]\right)}{a - b}}\right) \Big/ \left(15\, a^4\, \sqrt{a + b}\; d\, \sqrt{\text{Sec}[c + d\, x]}\right) +$$

$$\frac{1}{15\, a^3 \left(a^2 - b^2\right) d} 2 \left(24\, A\, b^3 + 5\, a^3\, B - 20\, a\, b^2\, B - a^2 \left(9\, A\, b - 15\, b\, C\right)\right) \sqrt{a + b\, \text{Cos}[c + d\, x]}\; \text{Sec}[c + d\, x]^{3/2}\, \text{Sin}[c + d\, x] + \frac{2 \left(A\, b^2 - a \left(b\, B - a\, C\right)\right) \text{Sec}[c + d\, x]^{5/2}\, \text{Sin}[c + d\, x]}{a \left(a^2 - b^2\right) d\, \sqrt{a + b\, \text{Cos}[c + d\, x]}} -$$

$$\frac{1}{5\, a^2 \left(a^2 - b^2\right) d} 2 \left(6\, A\, b^2 - 5\, a\, b\, B - a^2 \left(A - 5\, C\right)\right) \sqrt{a + b\, \text{Cos}[c + d\, x]}\; \text{Sec}[c + d\, x]^{5/2}\, \text{Sin}[c + d\, x]$$

Result (type 1, 1 leaves):

???

Problem 1534: Attempted integration timed out after 120 seconds.

$$\int \frac{\left(A + B\, \text{Cos}[c + d\, x] + C\, \text{Cos}[c + d\, x]^2\right) \text{Sec}[c + d\, x]^{5/2}}{\left(a + b\, \text{Cos}[c + d\, x]\right)^{3/2}} \, dx$$

Optimal (type 4, 464 leaves, 6 steps):

$$\left(2\left(8 A b^3+3 a^3 B-6 a b^2 B-a^2 (5 A b-3 b C)\right) \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}\right) \Bigg/ \left(3 a^4 \sqrt{a+b}\ d \sqrt{\text{Sec}[c+d x]}\right)+$$

$$\left(2\left(8 A b^2+6 a b (A-B)+a^2 (A-3 B+3 C)\right) \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}\right) \Bigg/ \left(3 a^3 \sqrt{a+b}\ d \sqrt{\text{Sec}[c+d x]}\right)+\frac{2\left(A b^2-a (b B-a C)\right) \text{Sec}[c+d x]^{3/2}\ \text{Sin}[c+d x]}{a \left(a^2-b^2\right) d \sqrt{a+b\,\text{Cos}[c+d x]}}-$$

$$\frac{1}{3 a^2 \left(a^2-b^2\right) d} 2\left(4 A b^2-3 a b B-a^2 (A-3 C)\right) \sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sec}[c+d x]^{3/2}\ \text{Sin}[c+d x]$$

Result (type 1, 1 leaves):

???

Problem 1535: Attempted integration timed out after 120 seconds.

$$\int \frac{\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right) \text{Sec}[c+d x]^{3/2}}{(a+b\,\text{Cos}[c+d x])^{3/2}}\,dx$$

Optimal (type 4, 362 leaves, 5 steps):

$$-\left(\left(2\left(2\,A\,b^2-a\,b\,B-a^2\,(A-C)\right)\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\;\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(a^3\,\sqrt{a+b}\;d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)\right)-$$

$$\left(2\left(2\,A\,b+a\,(A-B-C)\right)\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\;\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/$$

$$\left(a^2\,\sqrt{a+b}\;d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)+\frac{2\left(A\,b^2-a\,(b\,B-a\,C)\right)\sqrt{\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{a\,(a^2-b^2)\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 1, 1 leaves):

???

Problem 1536: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\sqrt{\mathrm{Sec}[c+d\,x]}}{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 4, 496 leaves, 7 steps):

$$\left(2\left(A b^2-a\left(b B-a C\right)\right)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(a^2 b\sqrt{a+b}\;d\sqrt{\text{Sec}[c+d x]}\right)+$$

$$\left(2\left(A b+b B-a C\right)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\right.$$

$$\left.\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(a b\sqrt{a+b}\;d\sqrt{\text{Sec}[c+d x]}\right)-$$

$$\left(2\sqrt{a+b}\;C\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/$$

$$\left(b^2 d\sqrt{\text{Sec}[c+d x]}\right)-\frac{2\left(A b^2-a\left(b B-a C\right)\right)\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{b\left(a^2-b^2\right)d\sqrt{a+b\,\text{Cos}[c+d x]}}$$

Result (type 4, 1141 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}$$

$$\left(\frac{2\left(A b^2-a b B+a^2 C\right)\text{Sin}[c+d x]}{a b\left(a^2-b^2\right)}+\frac{2\left(A b^2\,\text{Sin}[c+d x]-a b B\,\text{Sin}[c+d x]+a^2 C\,\text{Sin}[c+d x]\right)}{b\left(-a^2+b^2\right)\left(a+b\,\text{Cos}[c+d x]\right)}\right)-$$

$$\left(2\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(a A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+A b^3\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-\right.\right.$$

$$a^2 b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-a b^2 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+a^3 C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+$$

$$a^2 b C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-2 A b^3\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+2 a b^2 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-$$

$$2 a^2 b C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-a A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+A b^3\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$

$$a^2 b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-a b^2 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5-a^3 C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+$$

$$a^2 b C\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^5+2 a^3 C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$2\,a\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$2\,a^3\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$2\,a\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$(a+b)\left(A\,b^2+a\,(-b\,B+a\,C)\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$a\,b\,(a+b)\,(A-B+C)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(b\,(a^3-a\,b^2)\,d\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^{3/2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right)$$

Problem 1537: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2}{(a+b\,\text{Cos}[c+d x])^{3/2}\sqrt{\text{Sec}[c+d x]}}\,dx$$

Optimal (type 4, 595 leaves, 8 steps):

$$-\left(\left(\left(2 A b^2-2 a b B+3 a^2 C-b^2 C\right) \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(a b^2 \sqrt{a+b}\ d \sqrt{\text{Sec}[c+d x]}\right)\right.+$$

$$\left(\left(2 A b^2-a (b (2 B-C)-3 a C)\right) \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}\right)\Big/$$

$$\left(a b^2 \sqrt{a+b}\ d \sqrt{\text{Sec}[c+d x]}\right)-\left(\sqrt{a+b}\ (2 b B-3 a C) \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(b^3 d \sqrt{\text{Sec}[c+d x]}\right)-$$

$$\frac{2 \left(A b^2-a (b B-a C)\right) \text{Sin}[c+d x]}{b \left(a^2-b^2\right) d \sqrt{a+b \text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}+\frac{1}{b^2 \left(a^2-b^2\right) d}\left(2 A b^2-2 a b B+3 a^2 C-b^2 C\right) \sqrt{a+b \text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]$$

Result (type 4, 1683 leaves):

$$\frac{1}{d}\sqrt{a+b \text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]} \left(\frac{2 \left(A b^2-a b B+a^2 C\right) \text{Sin}[c+d x]}{b^2 \left(-a^2+b^2\right)}-\frac{2 \left(a A b^2 \text{Sin}[c+d x]-a^2 b B \text{Sin}[c+d x]+a^3 C \text{Sin}[c+d x]\right)}{b^2 \left(-a^2+b^2\right) (a+b \text{Cos}[c+d x])}\right)-$$

$$\left(\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}} \sqrt{\frac{a+b+a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2-b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}\right.$$

$$\left(-2\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-2\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\right.$$

$$2\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+2\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-3\,a^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$

$$3\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+b^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$4\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-4\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+6\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-$$

$$2\,b^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+2\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-2\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$2\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+2\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+3\,a^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$3\,a^2\,b\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-a\,b^2\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+b^3\,C\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$4\,a^2\,b\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$4\,b^3\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$6\,a^3\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$6\,a\,b^2\,C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$4\,a^2\,b\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$4\,b^3\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$6 a^3 C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$6 a b^2 C\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$(a+b)\left(2 A b^2-2 a b B+3 a^2 C-b^2 C\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+2 b (a+b)(A b-b B+a C)$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(b^2\left(-a^2+b^2\right)d\sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(b\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-a\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

Problem 1538: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2}{(a+b\,\text{Cos}[c+d x])^{3/2}\,\text{Sec}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 720 leaves, 9 steps):

$$-\left(\left(\left(12 a^2 b B-4 b^3 B-a b^2 (8 A-7 C)-15 a^3 C\right) \sqrt{\text{Cos}[c+d x]}\right.\right.$$

$$\text{Csc}[c+d x] \,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(4 a b^3 \sqrt{a+b} \, d \sqrt{\text{Sec}[c+d x]}\right)\right)-$$

$$\left(\left(8 A b^2-a b (12 B-5 C)+15 a^2 C-2 b^2 (2 B+C)\right) \sqrt{\text{Cos}[c+d x]} \,\text{Csc}[c+d x]\right.$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}}$$

$$\left.\sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(4 b^3 \sqrt{a+b} \, d \sqrt{\text{Sec}[c+d x]}\right)-$$

$$\left(\sqrt{a+b} \left(8 A b^2-12 a b B+15 a^2 C+4 b^2 C\right) \sqrt{\text{Cos}[c+d x]} \,\text{Csc}[c+d x]\right.$$

$$\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b \,\text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(4 b^4 d \sqrt{\text{Sec}[c+d x]}\right)-$$

$$\frac{2 \left(A b^2-a (b B-a C)\right) \text{Sin}[c+d x]}{b \left(a^2-b^2\right) d \sqrt{a+b \,\text{Cos}[c+d x]} \,\text{Sec}[c+d x]^{3/2}}+$$

$$\frac{\left(4 A b^2-4 a b B+5 a^2 C-b^2 C\right) \sqrt{a+b \,\text{Cos}[c+d x]} \,\text{Sin}[c+d x]}{2 b^2 \left(a^2-b^2\right) d \sqrt{\text{Sec}[c+d x]}}+$$

$$\frac{1}{4 b^3 \left(a^2-b^2\right) d}$$

$$\left(12 a^2 b B-4 b^3 B-a b^2 (8 A-7 C)-15 a^3 C\right)$$

$$\sqrt{a+b \,\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]} \,\text{Sin}[c+d x]$$

Result (type 4, 656 leaves) :

$$\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}\left(\frac{2\,a\,\left(A\,b^2-a\,b\,B+a^2\,C\right)\,\mathrm{Sin}[c+d\,x]}{b^3\,\left(a^2-b^2\right)}+\frac{2\,\left(a^2\,A\,b^2\,\mathrm{Sin}[c+d\,x]-a^3\,b\,B\,\mathrm{Sin}[c+d\,x]+a^4\,C\,\mathrm{Sin}[c+d\,x]\right)}{b^3\,\left(-a^2+b^2\right)\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)}+\frac{C\,\mathrm{Sin}\left[2\,\left(c+d\,x\right)\right]}{4\,b^2}\right)+$$

$$\frac{1}{4\,b^3\,\left(a^2-b^2\right)\,d\,\sqrt{\frac{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$

$$\left(-\left(-12\,a^2\,b\,B+4\,b^3\,B+a\,b^2\,\left(8\,A-7\,C\right)+15\,a^3\,C\right)\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\right.$$

$$\frac{1}{\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}}$$

$$\mathrm{i}\,\sqrt{\frac{a-b}{a+b}}\,\left(\left(-12\,a^2\,b\,B+4\,b^3\,B+a\,b^2\,\left(8\,A-7\,C\right)+15\,a^3\,C\right)\,\mathrm{EllipticE}\left[\right.\right.$$

$$\left.\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,-\frac{a+b}{a-b}\right]-2\,\left(-2\,a^2\,b\,\left(6\,B-5\,C\right)+15\,a^3\,C+\right.$$

$$\left.2\,b^3\,\left(2\,A+C\right)+a\,b^2\,\left(8\,A-8\,B+C\right)\right)\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\right.$$

$$\left.-\frac{a+b}{a-b}\right]+2\,\left(a+b\right)\,\left(8\,A\,b^2-12\,a\,b\,B+15\,a^2\,C+4\,b^2\,C\right)\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\right.$$

$$\left.\left.\left.\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,-\frac{a+b}{a-b}\right]\right)\,\left(-1-\mathrm{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2\right)\right)$$

Problem 1539: Attempted integration timed out after 120 seconds.

$$\int\frac{\left(A+B\,\mathrm{Cos}[c+d\,x]+C\,\mathrm{Cos}[c+d\,x]^2\right)\,\mathrm{Sec}[c+d\,x]^{5/2}}{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 660 leaves, 7 steps):

$$-\left(\left(2\left(16 A b^5-3 a^5 B+15 a^3 b^2 B-8 a b^4 B-2 a^2 b^3(14 A-C)+a^4(8 A b-6 b C)\right)\right.\right.$$
$$\sqrt{\operatorname{Cos}[c+d x]} \operatorname{Csc}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\left.\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/\left(3 a^5 \sqrt{a+b}\left(a^2-b^2\right) d \sqrt{\operatorname{Sec}[c+d x]}\right)\right)-$$
$$\left(2\left(16 A b^4+4 a b^3(3 A-2 B)-3 a^3 b(3 A-3 B-C)-2 a^2 b^2(8 A+3 B-C)-a^4(A-3 B+3 C)\right)\right.$$
$$\sqrt{\operatorname{Cos}[c+d x]} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/\left(3 a^4 \sqrt{a+b}\left(a^2-b^2\right) d \sqrt{\operatorname{Sec}[c+d x]}\right)+$$
$$\frac{2\left(A b^2-a(b B-a C)\right) \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]}{3 a\left(a^2-b^2\right) d(a+b \operatorname{Cos}[c+d x])^{3/2}}+$$
$$\left(2\left(10 a^2 A b^2-6 A b^4-7 a^3 b B+3 a b^3 B+4 a^4 C\right) \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]\right) \Big/$$
$$\left(3 a^2\left(a^2-b^2\right)^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\frac{1}{3 a^3\left(a^2-b^2\right)^2 d}$$
$$2\left(8 A b^4+8 a^3 b B-4 a b^3 B+a^4(A-5 C)-a^2 b^2(13 A-C)\right)$$
$$\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]$$

Result (type 1, 1 leaves):

???

Problem 1540: Attempted integration timed out after 120 seconds.

$$\int \frac{\left(A+B \operatorname{Cos}[c+d x]+C \operatorname{Cos}[c+d x]^2\right) \operatorname{Sec}[c+d x]^{3/2}}{(a+b \operatorname{Cos}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 535 leaves, 6 steps):

$$\left(2\left(8\,A\,b^4+6\,a^3\,b\,B-2\,a\,b^3\,B+3\,a^4\,(A-C)-a^2\,b^2\,(15\,A+C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\right.$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}$$
$$\left.\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,a^4\,\sqrt{a+b}\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$
$$\left(2\left(8\,A\,b^3+2\,a\,b^2\,(3\,A-B)-3\,a^3\,(A-B-C)-a^2\,b\,(9\,A+3\,B+C)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\right.$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}$$
$$\left.\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,a^3\,\sqrt{a+b}\,\left(a^2-b^2\right)\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$
$$\frac{2\left(A\,b^2-a\,(b\,B-a\,C)\right)\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a\,\left(a^2-b^2\right)\,d\,(a+b\,\text{Cos}[c+d\,x])^{3/2}}-$$
$$\left(2\left(4\,A\,b^4+5\,a^3\,b\,B-a\,b^3\,B-2\,a^4\,C-2\,a^2\,b^2\,(4\,A+C)\right)\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(3\,a^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)$$

Result (type 1, 1 leaves):

???

Problem 1541: Unable to integrate problem.

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]+C\,\text{Cos}[c+d\,x]^2\right)\sqrt{\text{Sec}[c+d\,x]}}{(a+b\,\text{Cos}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 495 leaves, 6 steps):

$$-\left(\left(2\left(2 A b^3+3 a^3 B+a b^2 B-2 a^2 b (3 A+2 C)\right)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\right.\right.$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\text{Sec}[c+d x])}{a+b}}$$

$$\left.\sqrt{\frac{a(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(3 a^3 (a-b)(a+b)^{3/2} d\sqrt{\text{Sec}[c+d x]}\right)\Bigg)-$$

$$\left(2\left(2 A b^2-a^2(3 A+3 B+C)+a b(3 A+B+3 C)\right)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\right.$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\text{Sec}[c+d x])}{a+b}}$$

$$\left.\sqrt{\frac{a(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(3 a^2\sqrt{a+b}\,(a^2-b^2)\, d\sqrt{\text{Sec}[c+d x]}\right)+$$

$$\frac{2\left(A b^2-a(b B-a C)\right)\text{Sin}[c+d x]}{3 a (a^2-b^2) d (a+b\,\text{Cos}[c+d x])^{3/2}\sqrt{\text{Sec}[c+d x]}}+$$

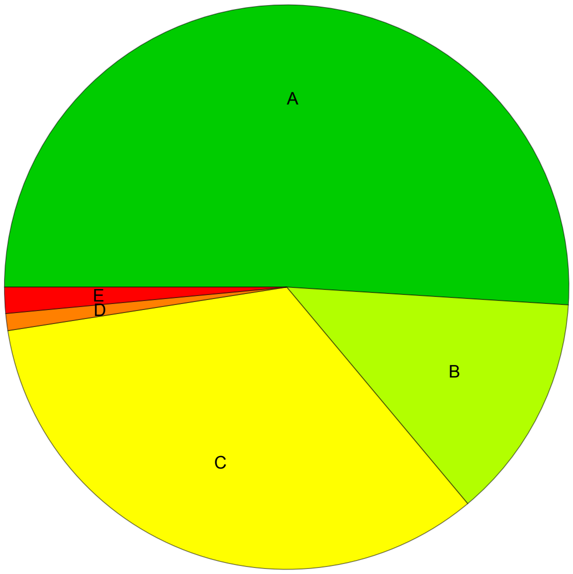
$$\left(2\left(2 A b^3+3 a^3 B+a b^2 B-2 a^2 b(3 A+2 C)\right)\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]\right)\Big/$$
$$\left(3 a (a^2-b^2)^2 d\sqrt{a+b\,\text{Cos}[c+d x]}\right)$$

Result (type 8, 47 leaves) :

$$\int\frac{\left(A+B\,\text{Cos}[c+d x]+C\,\text{Cos}[c+d x]^2\right)\sqrt{\text{Sec}[c+d x]}}{(a+b\,\text{Cos}[c+d x])^{5/2}}\,dx$$

Summary of Integration Test Results

1541 integration problems



A - 786 optimal antiderivatives

B - 199 more than twice size of optimal antiderivatives

C - 518 unnecessarily complex antiderivatives

D - 15 unable to integrate problems

E - 23 integration timeouts