Mathematica 7 Test Results

For Integration Problems of the Form $\text{Sin}[x]^m \left(A + B\,\text{Sin}[x] + C\,\text{Sin}[x]^2\right) (a + b\,\text{Sin}[x])^n$

Problems of the form $\text{Sin}[x]^m \left(A + B\,\text{Sin}[x] + C\,\text{Sin}[x]^2\right) (a + b\,\text{Sin}[x])^n$ when $a^2 = b^2$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Sin}[x]^3}{a + a\,\text{Sin}[x]},\ x,\ 3,\ 0\right\}$$

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

$$\frac{\left(\text{Cos}\left[\frac{x}{2}\right] + \text{Sin}\left[\frac{x}{2}\right]\right)\left(4\,(1 + 3\,x)\,\text{Cos}\left[\frac{x}{2}\right] + 3\,\text{Cos}\left[\frac{3\,x}{2}\right] + \text{Cos}\left[\frac{5\,x}{2}\right] - 20\,\text{Sin}\left[\frac{x}{2}\right] + 12\,x\,\text{Sin}\left[\frac{x}{2}\right] + 3\,\text{Sin}\left[\frac{3\,x}{2}\right] - \text{Sin}\left[\frac{5\,x}{2}\right]\right)}{8\,a\,(1 + \text{Sin}[x])}$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Sin}[x]}{a + a\,\text{Sin}[x]},\ x,\ 2,\ 0\right\}$$

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

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

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Csc}[x]}{a + a\,\text{Sin}[x]},\ x,\ 3,\ 0\right\}$$

$$-\frac{\text{ArcTanh}[\text{Cos}[x]]}{a} + \frac{\text{Cos}[x]}{a + a\,\text{Sin}[x]}$$

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

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Csc}[x]^2}{a + a\,\text{Sin}[x]},\ x,\ 4,\ 0\right\}$$

$$\frac{\text{ArcTanh}[\text{Cos}[x]]}{a} - \frac{2\,\text{Cot}[x]}{a} + \frac{\text{Cot}[x]}{a + a\,\text{Sin}[x]}$$

$$\frac{1}{2\,a\,(1 + \text{Sin}[x])}\left(-\text{Cos}\left[\frac{x}{2}\right]^2\left(8 + \text{Cot}\left[\frac{x}{2}\right] - 2\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right] + 2\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\right) + 2\left(\left(\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right] - \text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\right)\text{Sin}\left[\frac{x}{2}\right]^2 + \text{Csc}[x]\,\text{Sin}\left[\frac{x}{2}\right]^4 + \left(-2 + \text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right] - \text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\right)\text{Sin}[x]\right)\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Csc}[x]^3}{a+a\,\text{Sin}[x]},\ x,\ 5,\ 0\right\}$$

$$-\frac{3\,\text{ArcTanh}[\text{Cos}[x]]}{2\,a}+\frac{2\,\text{Cot}[x]}{a}-\frac{3\,\text{Cot}[x]\,\text{Csc}[x]}{2\,a}+\frac{\text{Cot}[x]\,\text{Csc}[x]}{a+a\,\text{Sin}[x]}$$

$$-\frac{1}{8\,a\,(1+\text{Sin}[x])}\left(2\,\text{Cot}\left[\frac{x}{2}\right]+\text{Cot}\left[\frac{x}{2}\right]^2-4\,\text{Cos}\left[\frac{x}{2}\right]^2\left(2+\text{Cot}\left[\frac{x}{2}\right]-3\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]+3\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\right)+\right.$$
$$24\,\text{Sin}\left[\frac{x}{2}\right]^2+12\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]\text{Sin}\left[\frac{x}{2}\right]^2-12\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\text{Sin}\left[\frac{x}{2}\right]^2+8\,\text{Csc}[x]\,\text{Sin}\left[\frac{x}{2}\right]^4+$$
$$\left.8\,\text{Sin}[x]+12\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]\text{Sin}[x]-12\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\text{Sin}[x]-2\,\text{Tan}\left[\frac{x}{2}\right]-\text{Tan}\left[\frac{x}{2}\right]^2\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Csc}[x]^4}{a+a\,\text{Sin}[x]},\ x,\ 6,\ 0\right\}$$

$$\frac{3\,\text{ArcTanh}[\text{Cos}[x]]}{2\,a}-\frac{8\,\text{Cot}[x]}{3\,a}+\frac{3\,\text{Cot}[x]\,\text{Csc}[x]}{2\,a}-\frac{4\,\text{Cot}[x]\,\text{Csc}[x]^2}{3\,a}+\frac{\text{Cot}[x]\,\text{Csc}[x]^2}{a+a\,\text{Sin}[x]}$$

$$\frac{1}{24\,a\,(1+\text{Sin}[x])}\left(5\,\text{Cot}\left[\frac{x}{2}\right]+\text{Cot}\left[\frac{x}{2}\right]^2-\text{Cot}\left[\frac{x}{2}\right]^3+4\,\text{Cos}\left[\frac{x}{2}\right]^2\left(-10+9\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]-9\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\right)+\right.$$
$$88\,\text{Sin}\left[\frac{x}{2}\right]^2+36\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]\text{Sin}\left[\frac{x}{2}\right]^2-36\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\text{Sin}\left[\frac{x}{2}\right]^2+40\,\text{Csc}[x]\,\text{Sin}\left[\frac{x}{2}\right]^4+24\,\text{Sin}[x]+$$
$$\left.36\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]\text{Sin}[x]-36\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\text{Sin}[x]-\frac{5}{2}\,\text{Csc}\left[\frac{x}{2}\right]^4\text{Sin}[x]^3-5\,\text{Tan}\left[\frac{x}{2}\right]-\text{Tan}\left[\frac{x}{2}\right]^2+\text{Tan}\left[\frac{x}{2}\right]^3\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Csc}[x]}{(a+a\,\text{Sin}[x])^2},\ x,\ 3,\ 0\right\}$$

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

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

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Csc}[x]^2}{(a+a\,\text{Sin}[x])^2},\ x,\ 5,\ 0\right\}$$

$$\frac{2\,\text{ArcTanh}[\text{Cos}[x]]}{a^2}-\frac{10\,\text{Cot}[x]}{3\,a^2}+\frac{\text{Cot}[x]}{3\,(a+a\,\text{Sin}[x])^2}+\frac{2\,\text{Cot}[x]}{a\,(a+a\,\text{Sin}[x])}$$

$$\frac{1}{6\,(a+a\,\text{Sin}[x])^2}$$
$$\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)\left(4\,\text{Sin}\left[\frac{x}{2}\right]-2\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)+28\,\text{Sin}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^2-3\,\text{Cot}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3+\right.$$
$$\left.12\,\text{Log}\left[2\,\text{Cos}\left[\frac{x}{2}\right]\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3-12\,\text{Log}\left[2\,\text{Sin}\left[\frac{x}{2}\right]\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3+3\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3\text{Tan}\left[\frac{x}{2}\right]\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Csc}[x]^3}{(a+a\,\text{Sin}[x])^2},\ x,\ 6,\ 0\right\}$$

$$-\frac{7\,\text{ArcTanh}[\text{Cos}[x]]}{2\,a^2}+\frac{16\,\text{Cot}[x]}{3\,a^2}-\frac{7\,\text{Cot}[x]\,\text{Csc}[x]}{2\,a^2}+\frac{\text{Cot}[x]\,\text{Csc}[x]}{3\,(a+a\,\text{Sin}[x])^2}+\frac{8\,\text{Cot}[x]\,\text{Csc}[x]}{3\,a\,(a+a\,\text{Sin}[x])}$$

$$\frac{1}{24\,(a+a\,\text{Sin}[x])^2}\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)\left(-16\,\text{Sin}\left[\frac{x}{2}\right]+8\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)-160\,\text{Sin}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^2+24\,\text{Cot}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3-\right.$$
$$3\,\text{Csc}\left[\frac{x}{2}\right]^2\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3-84\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3+$$
$$\left.84\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3+3\,\text{Sec}\left[\frac{x}{2}\right]^2\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3-24\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3\text{Tan}\left[\frac{x}{2}\right]\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Csc}[x]^4}{(a+a\,\text{Sin}[x])^2},\ x,\ 7,\ 0\right\}$$

$$\frac{5\,\text{ArcTanh}[\text{Cos}[x]]}{a^2}-\frac{4\,\text{Cot}[x]}{a^2}-\frac{\text{Cot}[x]^3}{3\,a^2}+\frac{\text{Cot}[x]\,\text{Csc}[x]}{a^2}-\frac{\text{Cos}[x]}{3\,(a+a\,\text{Sin}[x])^2}-\frac{13\,\text{Cos}[x]}{3\,a\,(a+a\,\text{Sin}[x])}$$

$$\frac{1}{24\,a^2\,(1+\text{Sin}[x])^2}\left(18\,\text{Cos}\left[\frac{x}{2}\right]^2-4\,\text{Cos}\left[\frac{x}{2}\right]^4\left(44+11\,\text{Cot}\left[\frac{x}{2}\right]-30\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]+30\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\right)-\right.$$
$$12\left(-32+3\,\text{Csc}[x]-10\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]+10\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\right)\text{Sin}\left[\frac{x}{2}\right]^4-8\,(-11+\text{Csc}[x])\,\text{Csc}[x]\,\text{Sin}\left[\frac{x}{2}\right]^6+$$
$$8\,\text{Csc}[x]^3\,\text{Sin}\left[\frac{x}{2}\right]^8+2\,\text{Sin}\left[\frac{x}{2}\right]^2\left(-9+\left(211+120\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]-120\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\right)\text{Sin}[x]\right)-$$
$$\frac{1}{32}\,\text{Sin}[x]^2\left(-96\,\text{Cot}\left[\frac{x}{2}\right]\left(-1+40\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]-40\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\right)-\right.$$
$$\left.\left.384\left(13+15\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]-15\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\right)-72\,\text{Csc}\left[\frac{x}{2}\right]^4\text{Sin}[x]-4\,\text{Csc}\left[\frac{x}{2}\right]^6\text{Sin}[x]^2+\text{Csc}\left[\frac{x}{2}\right]^8\text{Sin}[x]^3\right)\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Sin}[x]^4}{(a+a\,\text{Sin}[x])^3},\ x,\ 5,\ 0\right\}$$

$$-\frac{3\,x}{a^3}-\frac{9\,\text{Cos}[x]}{5\,a^3}+\frac{\text{Cos}[x]\,\text{Sin}[x]^3}{5\,(a+a\,\text{Sin}[x])^3}+\frac{3\,\text{Cos}[x]\,\text{Sin}[x]^2}{5\,a\,(a+a\,\text{Sin}[x])^2}-\frac{3\,\text{Cos}[x]}{a^2\,(a+a\,\text{Sin}[x])}$$

$$\frac{1}{5\,(a+a\,\text{Sin}[x])^3}\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)\left(-\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]-12\,\text{Sin}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^2+\right.$$
$$\left.6\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3+48\,\text{Sin}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^4-15\,x\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5-5\,\text{Cos}[x]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Csc}[x]}{(a+a\,\text{Sin}[x])^3},\ x,\ 4,\ 0\right\}$$

$$-\frac{\text{ArcTanh}[\text{Cos}[x]]}{a^3}+\frac{\text{Cos}[x]}{5\,(a+a\,\text{Sin}[x])^3}+\frac{7\,\text{Cos}[x]}{15\,a\,(a+a\,\text{Sin}[x])^2}+\frac{22\,\text{Cos}[x]}{15\,a^2\,(a+a\,\text{Sin}[x])}$$

$$\frac{1}{15\,(a+a\,\text{Sin}[x])^3}\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)\left(-6\,\text{Sin}\left[\frac{x}{2}\right]+3\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)-14\,\text{Sin}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^2+7\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3-44\,\text{Sin}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^4-15\,\text{Log}\left[2\,\text{Cos}\left[\frac{x}{2}\right]\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5+15\,\text{Log}\left[2\,\text{Sin}\left[\frac{x}{2}\right]\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Csc}[x]^2}{(a+a\,\text{Sin}[x])^3},\ x,\ 6,\ 0\right\}$$

$$\frac{3\,\text{ArcTanh}[\text{Cos}[x]]}{a^3}-\frac{24\,\text{Cot}[x]}{5\,a^3}+\frac{\text{Cot}[x]}{5\,(a+a\,\text{Sin}[x])^3}+\frac{3\,\text{Cot}[x]}{5\,a\,(a+a\,\text{Sin}[x])^2}+\frac{3\,\text{Cot}[x]}{a^2\,(a+a\,\text{Sin}[x])}$$

$$\frac{1}{10\,(a+a\,\text{Sin}[x])^3}\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)\left(4\,\text{Sin}\left[\frac{x}{2}\right]-2\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)+16\,\text{Sin}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^2-8\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3+76\,\text{Sin}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^4-5\,\text{Cot}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5+30\,\text{Log}\left[2\,\text{Cos}\left[\frac{x}{2}\right]\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5-30\,\text{Log}\left[2\,\text{Sin}\left[\frac{x}{2}\right]\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5+5\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5\text{Tan}\left[\frac{x}{2}\right]\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Csc}[x]^3}{(a+a\,\text{Sin}[x])^3},\ x,\ 7,\ 0\right\}$$

$$-\frac{13\,\text{ArcTanh}[\text{Cos}[x]]}{2\,a^3}+\frac{152\,\text{Cot}[x]}{15\,a^3}-\frac{13\,\text{Cot}[x]\,\text{Csc}[x]}{2\,a^3}+\frac{\text{Cot}[x]\,\text{Csc}[x]}{5\,(a+a\,\text{Sin}[x])^3}+\frac{11\,\text{Cot}[x]\,\text{Csc}[x]}{15\,a\,(a+a\,\text{Sin}[x])^2}+\frac{76\,\text{Cot}[x]\,\text{Csc}[x]}{15\,a^2\,(a+a\,\text{Sin}[x])}$$

$$\frac{1}{120\,(a+a\,\text{Sin}[x])^3}\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)\left(-48\,\text{Sin}\left[\frac{x}{2}\right]+24\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)-272\,\text{Sin}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^2+136\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^3-1712\,\text{Sin}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^4+180\,\text{Cot}\left[\frac{x}{2}\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5-15\,\text{Csc}\left[\frac{x}{2}\right]^2\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5-780\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5+780\,\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5+15\,\text{Sec}\left[\frac{x}{2}\right]^2\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5-180\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^5\text{Tan}\left[\frac{x}{2}\right]\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{\text{Csc}[x]^4}{(a+a\,\text{Sin}[x])^3},\ x,\ 8,\ 0\right\}$$

$$\frac{23\,\text{ArcTanh}[\text{Cos}[x]]}{2\,a^3}-\frac{272\,\text{Cot}[x]}{15\,a^3}+\frac{23\,\text{Cot}[x]\,\text{Csc}[x]}{2\,a^3}-\frac{136\,\text{Cot}[x]\,\text{Csc}[x]^2}{15\,a^3}+\frac{\text{Cot}[x]\,\text{Csc}[x]^2}{5\,(a+a\,\text{Sin}[x])^3}+\frac{13\,\text{Cot}[x]\,\text{Csc}[x]^2}{15\,a\,(a+a\,\text{Sin}[x])^2}+\frac{23\,\text{Cot}[x]\,\text{Csc}[x]^2}{3\,a^2\,(a+a\,\text{Sin}[x])}$$

$$\frac{1}{120\,(a+a\,\mathrm{Sin}[x])^3}\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)\left(48\,\mathrm{Sin}\left[\frac{x}{2}\right]-24\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)+352\,\mathrm{Sin}\left[\frac{x}{2}\right]\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)^2-176\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)^3+\right.$$
$$2752\,\mathrm{Sin}\left[\frac{x}{2}\right]\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)^4-400\,\mathrm{Cot}\left[\frac{x}{2}\right]\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)^5+45\,\mathrm{Csc}\left[\frac{x}{2}\right]^2\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)^5-$$
$$5\,\mathrm{Cot}\left[\frac{x}{2}\right]\mathrm{Csc}\left[\frac{x}{2}\right]^2\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)^5+1380\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{x}{2}\right]\right]\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)^5-1380\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{x}{2}\right]\right]\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)^5-$$
$$\left.45\,\mathrm{Sec}\left[\frac{x}{2}\right]^2\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)^5+400\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)^5\mathrm{Tan}\left[\frac{x}{2}\right]+5\,\mathrm{Sec}\left[\frac{x}{2}\right]^2\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)^5\mathrm{Tan}\left[\frac{x}{2}\right]\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\sqrt{a+a\,\mathrm{Sin}[c+d\,x]}\,,\ x,\ 1,\ 0\right\}$$

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

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

Valid but unnecessarily complicated antiderivative:

$$\left\{\sqrt{a-a\,\mathrm{Sin}[c+d\,x]}\,,\ x,\ 1,\ 0\right\}$$

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

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

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{1}{\sqrt{\mathrm{Sin}[x]}\,\sqrt{1+\mathrm{Sin}[x]}},\ x,\ 1,\ 0\right\}$$

$$-\sqrt{2}\,\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{\pi}{4}-\frac{x}{2}\right]\right]$$

$$\left(8\,\mathrm{Cos}\left[\frac{x}{2}\right]\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{1}{\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}}\right],-1\right]+\mathrm{EllipticPi}\left[1-\sqrt{2}\,,-\mathrm{ArcSin}\left[\frac{1}{\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}}\right],-1\right]+\right.\right.$$
$$\left.\left.\mathrm{EllipticPi}\left[1+\sqrt{2}\,,-\mathrm{ArcSin}\left[\frac{1}{\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}}\right],-1\right]\right)\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)\right)\Big/$$
$$\left(\sqrt{-\mathrm{Cos}\left[\frac{x}{2}\right]\mathrm{Csc}\left[\frac{x}{4}\right]^2}\,\sqrt{\mathrm{Sin}[x]}\,\sqrt{1+\mathrm{Sin}[x]}\,\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{1}{\sqrt{\mathrm{Sin}[x]}\ \sqrt{a+a\,\mathrm{Sin}[x]}},\ x,\ 1,\ 0\right\}$$

$$-\frac{\sqrt{2}\ \mathrm{ArcTan}\left[\frac{\sqrt{a}\ \mathrm{Cos}[x]}{\sqrt{2}\ \sqrt{\mathrm{Sin}[x]}\ \sqrt{a+a\,\mathrm{Sin}[x]}}\right]}{\sqrt{a}}$$

$$\left(8\,\mathrm{Cos}\left[\frac{x}{2}\right]\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{1}{\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}}\right],-1\right]+\mathrm{EllipticPi}\left[1-\sqrt{2},-\mathrm{ArcSin}\left[\frac{1}{\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}}\right],-1\right]+\mathrm{EllipticPi}\left[1+\sqrt{2},-\mathrm{ArcSin}\left[\frac{1}{\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}}\right],-1\right]\right)\left(\mathrm{Cos}\left[\frac{x}{2}\right]+\mathrm{Sin}\left[\frac{x}{2}\right]\right)\right)\Big/$$

$$\left(\sqrt{-\mathrm{Cos}\left[\frac{x}{2}\right]\mathrm{Csc}\left[\frac{x}{4}\right]^2}\ \sqrt{\mathrm{Sin}[x]}\ \sqrt{a\,(1+\mathrm{Sin}[x])}\ \sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{1}{\sqrt{1-\mathrm{Sin}[x]}\ \sqrt{\mathrm{Sin}[x]}},\ x,\ 1,\ 0\right\}$$

$$\sqrt{2}\ \mathrm{ArcTanh}\left[\frac{\mathrm{Cos}[x]}{\sqrt{2}\ \sqrt{1-\mathrm{Sin}[x]}\ \sqrt{\mathrm{Sin}[x]}}\right]$$

$$\left(8\,\mathrm{Cos}\left[\frac{x}{2}\right]\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{1}{\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}}\right],-1\right]+\mathrm{EllipticPi}\left[-1-\sqrt{2},-\mathrm{ArcSin}\left[\frac{1}{\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}}\right],-1\right]+\mathrm{EllipticPi}\left[-1+\sqrt{2},-\mathrm{ArcSin}\left[\frac{1}{\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}}\right],-1\right]\right)\left(\mathrm{Cos}\left[\frac{x}{2}\right]-\mathrm{Sin}\left[\frac{x}{2}\right]\right)\right)\Big/$$

$$\left(\sqrt{-\mathrm{Cos}\left[\frac{x}{2}\right]\mathrm{Csc}\left[\frac{x}{4}\right]^2}\ \sqrt{-(-1+\mathrm{Sin}[x])\,\mathrm{Sin}[x]}\ \sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{1}{\sqrt{\mathrm{Sin}[x]}\ \sqrt{a-a\,\mathrm{Sin}[x]}},\ x,\ 1,\ 0\right\}$$

$$\frac{\sqrt{2}\ \mathrm{ArcTan}\left[\frac{\sqrt{-a}\ \mathrm{Cos}[x]}{\sqrt{2}\ \sqrt{\mathrm{Sin}[x]}\ \sqrt{a-a\,\mathrm{Sin}[x]}}\right]}{\sqrt{-a}}$$

$$\left(8\,\mathrm{Cos}\left[\frac{x}{2}\right]\left(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{1}{\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}}\right],-1\right]+\mathrm{EllipticPi}\left[-1-\sqrt{2},-\mathrm{ArcSin}\left[\frac{1}{\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}}\right],-1\right]+\right.\right.$$

$$\left.\left.\mathrm{EllipticPi}\left[-1+\sqrt{2},-\mathrm{ArcSin}\left[\frac{1}{\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}}\right],-1\right]\right)\left(\mathrm{Cos}\left[\frac{x}{2}\right]-\mathrm{Sin}\left[\frac{x}{2}\right]\right)\right)\Big/$$

$$\left(\sqrt{-\mathrm{Cos}\left[\frac{x}{2}\right]\mathrm{Csc}\left[\frac{x}{4}\right]^2}\,\sqrt{\mathrm{Sin}[x]}\,\sqrt{a-a\,\mathrm{Sin}[x]}\,\sqrt{\mathrm{Tan}\left[\frac{x}{4}\right]}\right)$$

Problems of the form $\mathrm{Sin}[x]^m \left(A + B\,\mathrm{Sin}[x] + C\,\mathrm{Sin}[x]^2\right) (a + b\,\mathrm{Sin}[x])^n$ when $a^2 \neq b^2$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{1}{3+5\,\mathrm{Sin}[c+d\,x]},\ x,\ 1,\ 0\right\}$$

$$-\frac{\mathrm{ArcTanh}\left[\frac{1}{4}\left(5+3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right]}{2\,d}$$

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

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{1}{(3+5\,\mathrm{Sin}[c+d\,x])^2},\ x,\ 3,\ 0\right\}$$

$$\frac{3\,\mathrm{ArcTanh}\left[\frac{1}{4}\left(5+3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right]}{32\,d}-\frac{5\,\mathrm{Cos}[c+d\,x]}{16\,d\,(3+5\,\mathrm{Sin}[c+d\,x])}$$

$$\frac{1}{192\,d}\left(9\left(\mathrm{Log}\left[3\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+3\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+\right.$$
$$\left.20\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\left(\frac{1}{3\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}+\frac{3}{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+3\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}\right)\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{1}{(3+5\,\mathrm{Sin}[c+d\,x])^3},\ x,\ 4,\ 0\right\}$$

$$-\frac{43\,\mathrm{ArcTanh}\left[\frac{1}{4}\left(5+3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right]}{1024\,d}-\frac{5\,\mathrm{Cos}[c+d\,x]}{32\,d\,(3+5\,\mathrm{Sin}[c+d\,x])^2}+\frac{45\,\mathrm{Cos}[c+d\,x]}{512\,d\,(3+5\,\mathrm{Sin}[c+d\,x])}$$

$$\frac{1}{2048\,d}\left(-43\,\mathrm{Log}\left[3\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+43\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+3\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+\right.$$
$$\frac{40}{\left(3\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-\frac{40}{\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+3\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+$$
$$\left.\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\left(-\frac{60}{3\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}-\frac{180}{\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+3\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}\right)\right)$$

Valid but unnecessarily complicated antiderivative:

$$\left\{\frac{1}{(3+5\,\mathrm{Sin}[c+d\,x])^4},\ x,\ 5,\ 0\right\}$$

$$\frac{279\,\mathrm{ArcTanh}\left[\frac{1}{4}\left(5+3\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right]}{16\,384\,d}-\frac{5\,\mathrm{Cos}[c+d\,x]}{48\,d\,(3+5\,\mathrm{Sin}[c+d\,x])^3}+\frac{25\,\mathrm{Cos}[c+d\,x]}{512\,d\,(3+5\,\mathrm{Sin}[c+d\,x])^2}-\frac{995\,\mathrm{Cos}[c+d\,x]}{24\,576\,d\,(3+5\,\mathrm{Sin}[c+d\,x])}$$

$$\frac{1}{294912\,d}\left(2511\,\mathrm{Log}\left[3\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-2511\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\right.$$

$$\frac{2320}{\left(3\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+\frac{720}{\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$

$$20\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\left(\frac{80}{\left(3\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+\frac{199}{3\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}+\right.$$

$$\left.\left.\frac{240}{\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3}+\frac{597}{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+3\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}\right)\right)$$