`os_md.integrate(`f`,`x`|dviout=2)`

$$\int \frac{bx^2+ca}{cb}\,dx = \frac{bx^3+3cax}{3cb} = \frac{1}{3c}x^3+\frac{a}{b}x$$

$$\int \exp(x)x^2\,dx = \left(x^2-2x+2\right)\exp(x)$$

$$\int a^x x\,dx = \frac{a^x\left(\log(a)x-1\right)}{\left(\log(a)\right)^2} = \frac{\log(a)x-1}{\left(\log(a)\right)^2}a^x$$

$$\int \sin(cx)x^2\,dx = \left(-\cos(cx)c^4x^2+2\sin(cx)c^3x+2\cos(cx)c^2\right)/\left(c^5\right) = \frac{2x}{c^2}\cos(cx)\tan(cx)-\frac{c^2x^2-2}{c^3}\cos(cx)$$

$$\int 4\left(\log|x+1|\right)^2x\,dx = 2(x-1)(x+1)\left(\log|x+1|\right)^2-2(x-3)(x+1)\log|x+1|+x(x-6)$$

$$\int \frac{2dx}{\left(x^2+a^2\right)^2} = \frac{1}{a^3}\arctan\left(\frac{x}{a}\right)+\frac{x}{a^2\left(x^2+a^2\right)}$$

$$\begin{aligned}\int \frac{4dx}{(x-a)^2(x+a)^2} &= \int\left(\frac{1}{a^3(x+a)}+\frac{1}{a^2(x+a)^2}+\frac{-1}{a^3(x-a)}+\frac{1}{a^2(x-a)^2}\right)dx\\ &= \frac{\log|x+a|}{a^3}+\int\left(\frac{1}{a^2(x+a)^2}+\frac{-1}{a^3(x-a)}+\frac{1}{a^2(x-a)^2}\right)dx\\ &= \frac{\log|x+a|x+\left(\log|x+a|-1\right)a}{a^3(x+a)}+\int\left(\frac{-1}{a^3(x-a)}+\frac{1}{a^2(x-a)^2}\right)dx\\ &= \frac{\left(\log|x+a|-\log|x-a|\right)x+\left(\log|x+a|-\log|x-a|-1\right)a}{a^3(x+a)}+\int\frac{1}{a^2(x-a)^2}\,dx\\ &= \left(\left(\log|x+a|-\log|x-a|\right)x^2-2ax+\left(-\log|x+a|+\log|x-a|\right)a^2\right)/\left(a^3x^2-a^5\right)\\ &= \frac{1}{a^3}\log\left|\frac{x+a}{x-a}\right|-\frac{2x}{a^2(x-a)(x+a)}\end{aligned}$$

$$\int \frac{dx}{x^2-2} = -\frac{1}{4}\sqrt{2}\log\left|\frac{x+\sqrt{2}}{x-\sqrt{2}}\right|$$

$$\begin{aligned}\int \frac{dx}{x^4+1} &= \int\left(\frac{x+\sqrt{2}}{2\sqrt{2}\left(x^2+\sqrt{2}x+1\right)}+\frac{-\left(x-\sqrt{2}\right)}{2\sqrt{2}\left(x^2-\sqrt{2}x+1\right)}\right)dx\\ &= \frac{1}{8}\left(\log\left(x^2+\sqrt{2}x+1\right)+2\arctan\left(\sqrt{2}x+1\right)\right)\sqrt{2}+\int\frac{-\left(x-\sqrt{2}\right)}{2\sqrt{2}\left(x^2-\sqrt{2}x+1\right)}\,dx\\ &= \frac{1}{8}\left(\log\left(x^2+\sqrt{2}x+1\right)+2\arctan\left(\sqrt{2}x+1\right)-\log\left(x^2-\sqrt{2}x+1\right)+2\arctan\left(\sqrt{2}x-1\right)\right)\sqrt{2}\\ &= \frac{1}{4}\sqrt{2}\arctan\left(\sqrt{2}x+1\right)+\frac{1}{4}\sqrt{2}\arctan\left(\sqrt{2}x-1\right)+\frac{1}{8}\sqrt{2}\log\left(\frac{x^2+\sqrt{2}x+1}{x^2-\sqrt{2}x+1}\right)\end{aligned}$$

$$\begin{aligned}
\int \frac{dx}{x^6+1} &= \int \left(\frac{\sqrt{3}x+2}{6\left(x^2+\sqrt{3}x+1\right)} + \frac{-\left(\sqrt{3}x-2\right)}{6\left(x^2-\sqrt{3}x+1\right)} + \frac{1}{3\left(x^2+1\right)} \right) dx \\
&= \frac{1}{12}\left(\log\left|x^2+\sqrt{3}x+1\right|\sqrt{3} + 2\arctan\left(2x+\sqrt{3}\right)\right) + \int \left(\frac{-\left(\sqrt{3}x-2\right)}{6\left(x^2-\sqrt{3}x+1\right)} + \frac{1}{3\left(x^2+1\right)} \right) dx \\
&= \frac{1}{12}\left(\left(\log\left|x^2+\sqrt{3}x+1\right| - \log\left|x^2-\sqrt{3}x+1\right|\right)\sqrt{3} + 2\arctan\left(2x+\sqrt{3}\right) + 2\arctan\left(2x-\sqrt{3}\right)\right) + \int \frac{1}{3\left(x^2+1\right)}\, dx \\
&= \frac{1}{12}\left(\left(\log\left|x^2+\sqrt{3}x+1\right| - \log\left|x^2-\sqrt{3}x+1\right|\right)\sqrt{3} + 2\arctan\left(2x+\sqrt{3}\right) + 2\arctan\left(2x-\sqrt{3}\right) + 4\arctan(x)\right) \\
&= \frac{1}{6}\arctan\left(2x+\sqrt{3}\right) + \frac{1}{6}\arctan\left(2x-\sqrt{3}\right) + \frac{1}{3}\arctan(x) + \frac{1}{12}\sqrt{3}\log\left|\frac{x^2+\sqrt{3}x+1}{x^2-\sqrt{3}x+1}\right|
\end{aligned}$$

$$\begin{aligned}
\int 2\exp(x)\sin(x)x\, dx &= \exp(x)\left(\left(\sin(x)-\cos(x)\right)x + \cos(x)\right) \\
&= x\tan(x)\cos(x)\exp(x) - (x-1)\cos(x)\exp(x)
\end{aligned}$$

$$\int \tan(x)\, dx = -\log\left|\cos(x)\right|$$

$$\begin{aligned}
\int 2\tan(2x)\sin(2x)\, dx \qquad & (t = \tan(x)) \\
&= \int \frac{-8t^2}{t^6+t^4-t^2-1}\, dt \\
&= \int \left(\frac{2}{t^2+1} + \frac{-4}{\left(t^2+1\right)^2} + \frac{1}{t+1} + \frac{-1}{t-1} \right) dt \\
&= 2\arctan(t) + \int \left(\frac{-4}{\left(t^2+1\right)^2} + \frac{1}{t+1} + \frac{-1}{t-1} \right) dt \\
&= \frac{-2t}{t^2+1} + \int \left(\frac{1}{t+1} + \frac{-1}{t-1} \right) dt \\
&= \frac{\log|t+1|t^2 - 2t + \log|t+1|}{t^2+1} + \int \frac{-1}{t-1}\, dt \\
&= \frac{\left(\log|t+1| - \log|t-1|\right)t^2 - 2t + \log|t+1| - \log|t-1|}{t^2+1} \\
&= \frac{\log\left|\frac{t+1}{t-1}\right| t^2 - 2t + \log\left|\frac{t+1}{t-1}\right|}{t^2+1} \\
&= \log\left|\frac{t+1}{t-1}\right| + \frac{-2t}{t^2+1} \\
&= \log\left|\frac{\tan(x)+1}{\tan(x)-1}\right| + \frac{-2t}{t^2+1} \\
&= \log\left|\frac{\tan(x)+1}{\tan(x)-1}\right| + \left(-\sin(2x)\right) \\
&= -\sin(2x) + \log\left|\frac{\tan(x)+1}{\tan(x)-1}\right|
\end{aligned}$$

$$\int (\tan(x))^2 \, dx \qquad (t = \tan(x))$$

$$\begin{aligned}
&= \int \frac{t^2}{t^2+1} \, dt \\
&= \int \left(1 + \frac{-1}{t^2+1}\right) dt \\
&= t + \int \frac{-1}{t^2+1} \, dt \\
&= t - \arctan(t) \\
&= -x + \frac{\sin(x)}{\cos(x)} \\
&= \frac{-\cos(x)x + \sin(x)}{\cos(x)} \\
&= \tan(x) - x
\end{aligned}$$

$$\int \frac{dx}{4\sin(x) + 3\cos(x)} \qquad \left(t = \tan\left(\tfrac{1}{2}x\right)\right)$$

$$\begin{aligned}
&= \int \frac{-2}{3t^2 - 8t - 3} \, dt \\
&= \int \left(\frac{3}{5(3t+1)} + \frac{-1}{5(t-3)}\right) dt \\
&= \frac{1}{5} \log|3t+1| + \int \frac{-1}{5(t-3)} \, dt \\
&= \frac{1}{5} \left(\log|3t+1| - \log|t-3|\right) \\
&= \frac{1}{5} \log\left|\frac{3t+1}{t-3}\right| \\
&= \frac{1}{5} \log\left|\frac{3\tan\left(\frac{1}{2}x\right) + 1}{\tan\left(\frac{1}{2}x\right) - 3}\right|
\end{aligned}$$

$$\begin{aligned}
\int \arctan(x) \, dx &= \arctan(x)x + \int \frac{-x}{x^2+1} \, dx \\
&= \arctan(x)x + \left(-\tfrac{1}{2}\log\left(x^2+1\right)\right) \\
&= x\arctan(x) - \frac{1}{2}\log\left(x^2+1\right)
\end{aligned}$$

$$\begin{aligned}
\int \left(6\arctan\left(\frac{1}{x}\right)x^2 + 6\arctan\left(\frac{1}{x}\right)\right) dx &= 2\arctan\left(\frac{1}{x}\right)x\left(x^2+3\right) + \int \frac{2x\left(x^2+3\right)}{x^2+1} \, dx \\
&= 2\arctan\left(\frac{1}{x}\right)x\left(x^2+3\right) + \int \frac{2x^3+6x}{x^2+1} \, dx \\
&= 2\arctan\left(\frac{1}{x}\right)x\left(x^2+3\right) + \int \left(\frac{2x}{1} + \frac{4x}{x^2+1}\right) dx \\
&= 2\arctan\left(\frac{1}{x}\right)x\left(x^2+3\right) + x^2 + \int \frac{4x}{x^2+1} \, dx \\
&= 2\arctan\left(\frac{1}{x}\right)x\left(x^2+3\right) + x^2 + 2\log\left(x^2+1\right) \\
&= 2\log\left(x^2+1\right) + 2x\left(x^2+3\right)\arctan\left(\frac{1}{x}\right) + x^2
\end{aligned}$$

$$\int \left(-a^2x^2 + 2bx\right)^{-\frac{1}{2}} \, dx \qquad \left(\frac{a^2x - b}{a} = \frac{\sin(t)b}{a}\right)$$

$$\begin{aligned}
&= \int \frac{1}{a} \, dt \\
&= \frac{t}{a} \\
&= \frac{1}{a}\arcsin\left(\frac{a^2x - b}{b}\right)
\end{aligned}$$

$$\int \sqrt{-x^2+a^2}\,dx \qquad (x = \sin(t)a)$$

$$= \int (\cos(t))^2\, a^2\, dt$$

$$= \int \frac{1}{2}\left(\cos(2t)+1\right) a^2\, dt$$

$$= \frac{1}{2}a^2\left(t+\cos(t)\sin(t)\right)$$

$$= \frac{1}{2}x\sqrt{-x^2+a^2}+\frac{1}{2}a^2\arcsin\left(\frac{x}{a}\right)$$

$$\int \left(x^2-1\right)^{-\frac{1}{2}}\,dx \qquad \left(x = \frac{1}{\cos(t)}\right)$$

$$= \int \frac{1}{\cos(t)}\,dt$$

$$\left(s = \tan\left(\tfrac{1}{2}t\right)\right)$$

$$= \int \frac{-2}{s^2-1}\,ds$$

$$= \int \left(\frac{1}{s+1}+\frac{-1}{s-1}\right) ds$$

$$= \log|s+1| + \int \frac{-1}{s-1}\,ds$$

$$= \log|s+1| - \log|s-1|$$

$$= \log\left|\frac{s+1}{s-1}\right|$$

$$= \log\left|\frac{\tan\left(\frac{1}{2}t\right)+1}{\tan\left(\frac{1}{2}t\right)-1}\right|$$

$$= \log\left|\frac{\sin(t)+\cos(t)+1}{\sin(t)-\cos(t)-1}\right|$$

$$= \log\left|x+\sqrt{x^2-1}\right|$$

$$\int \sqrt{x^2-1}\,dx \qquad \left(x = \frac{1}{\cos(t)}\right)$$

$$= \int \frac{(\sin(t))^2}{(\cos(t))^3}\,dt$$

$$\left(s = \tan\left(\tfrac{1}{2}t\right)\right)$$

$$= \int \frac{-8s^2}{(s-1)^3(s+1)^3}\,ds$$

$$= \int \left(\frac{-1}{2(s+1)} + \frac{-1}{2(s+1)^2} + \frac{1}{(s+1)^3} + \frac{1}{2(s-1)} + \frac{-1}{2(s-1)^2} + \frac{-1}{(s-1)^3}\right)\,ds$$

$$= -\tfrac{1}{2}\log|s+1| + \int \left(\frac{-1}{2(s+1)^2} + \frac{1}{(s+1)^3} + \frac{1}{2(s-1)} + \frac{-1}{2(s-1)^2} + \frac{-1}{(s-1)^3}\right)\,ds$$

$$= \frac{-(\log|s+1|s + \log|s+1| - 1)}{2(s+1)} + \int \left(\frac{1}{(s+1)^3} + \frac{1}{2(s-1)} + \frac{-1}{2(s-1)^2} + \frac{-1}{(s-1)^3}\right)\,ds$$

$$= \frac{-\left(\log|s+1|s^2 + (2\log|s+1| - 1)\,s + \log|s+1|\right)}{2(s+1)^2} + \int \left(\frac{1}{2(s-1)} + \frac{-1}{2(s-1)^2} + \frac{-1}{(s-1)^3}\right)\,ds$$

$$= \frac{-\left((\log|s+1| - \log|s-1|)\,s^2 + (2\log|s+1| - 2\log|s-1| - 1)\,s + \log|s+1| - \log|s-1|\right)}{2(s+1)^2} + \int \left(\frac{-1}{2(s-1)^2} + \frac{-1}{(s-$$

$$= \frac{-\left((\log|s+1| - \log|s-1|)\,s^3 + (\log|s+1| - \log|s-1| - 2)\,s^2 + (-\log|s+1| + \log|s-1| - 1)\,s - \log|s+1| + \log}{2(s-1)(s+1)^2}$$

$$= \frac{-\left((\log|s+1| - \log|s-1|)\,s^4 - 2s^3 + (-2\log|s+1| + 2\log|s-1|)\,s^2 - 2s + \log|s+1| - \log|s-1|\right)}{2(s-1)^2(s+1)^2}$$

$$= \frac{\log\left|\frac{s-1}{s+1}\right| s^4 + 2s^3 - 2\log\left|\frac{s-1}{s+1}\right| s^2 + 2s + \log\left|\frac{s-1}{s+1}\right|}{2(s-1)^2(s+1)^2}$$

$$= \frac{1}{2}\log\left|\frac{s-1}{s+1}\right| + \frac{s^3+s}{s^4-2s^2+1}$$

$$= -\tfrac{1}{2}\log\left|\frac{\tan\left(\tfrac{1}{2}t\right)+1}{\tan\left(\tfrac{1}{2}t\right)-1}\right| + \frac{s^3+s}{s^4-2s^2+1}$$

$$= -\tfrac{1}{2}\log\left|\frac{\tan\left(\tfrac{1}{2}t\right)+1}{\tan\left(\tfrac{1}{2}t\right)-1}\right| + \frac{\sin(t)}{\cos(2t)+1}$$

$$= \frac{2\sin(t) - \log\left|\frac{\tan\left(\frac{1}{2}t\right)+1}{\tan\left(\frac{1}{2}t\right)-1}\right|\cos(2t) - \log\left|\frac{\tan\left(\frac{1}{2}t\right)+1}{\tan\left(\frac{1}{2}t\right)-1}\right|}{2\left(\cos(2t)+1\right)}$$

$$= \frac{\sin(t) - \log\left|\frac{\sin\left(\frac{1}{2}t\right)+\cos\left(\frac{1}{2}t\right)}{\sin\left(\frac{1}{2}t\right)-\cos\left(\frac{1}{2}t\right)}\right|(\cos(t))^2}{2\left(\cos(t)\right)^2}$$

$$= \frac{1}{2}x\sqrt{x^2-1} - \frac{1}{2}\log\left|x + \sqrt{x^2-1}\right|$$

$$
\begin{aligned}
\int \left(x^2+a^2\right)^{-\frac{1}{2}}\,dx \qquad & \left(x = \frac{\sin(t)a}{\cos(t)}\right) \\
&= \int \frac{1}{\cos(t)}\,dt \\
&\quad \left(s = \tan\left(\tfrac{1}{2}t\right)\right) \\
&= \int \frac{-2}{s^2-1}\,ds \\
&= \int \left(\frac{1}{s+1} + \frac{-1}{s-1}\right)\,ds \\
&= \log|s+1| + \int \frac{-1}{s-1}\,ds \\
&= \log|s+1| - \log|s-1| \\
&= \log\left|\frac{s+1}{s-1}\right| \\
&= \log\left|\frac{\tan\left(\frac{1}{2}t\right)+1}{\tan\left(\frac{1}{2}t\right)-1}\right| \\
&= \log\left|\frac{\sin(t)+\cos(t)+1}{\sin(t)-\cos(t)-1}\right| \\
&= \log\left|x+\sqrt{x^2+a^2}\right|
\end{aligned}
$$

$$\int 2\sqrt{x^2+a^2}\,dx \qquad \left(x = \frac{\sin(t)a}{\cos(t)}\right)$$

$$= \int \frac{2a^2}{(\cos(t))^3}\,dt$$

$$\left(s = \tan\left(\tfrac{1}{2}t\right)\right)$$

$$= \int \frac{-4a^2\left(s^2+1\right)^2}{(s-1)^3(s+1)^3}\,ds$$

$$= \int \left(\frac{a^2}{s+1} + \frac{-a^2}{(s+1)^2} + \frac{2a^2}{(s+1)^3} + \frac{-a^2}{s-1} + \frac{-a^2}{(s-1)^2} + \frac{-2a^2}{(s-1)^3}\right)\,ds$$

$$= \log|s+1|a^2 + \int \left(\frac{-a^2}{(s+1)^2} + \frac{2a^2}{(s+1)^3} + \frac{-a^2}{s-1} + \frac{-a^2}{(s-1)^2} + \frac{-2a^2}{(s-1)^3}\right)\,ds$$

$$= \frac{a^2\left(\log|s+1|s + \log|s+1| + 1\right)}{s+1} + \int \left(\frac{2a^2}{(s+1)^3} + \frac{-a^2}{s-1} + \frac{-a^2}{(s-1)^2} + \frac{-2a^2}{(s-1)^3}\right)\,ds$$

$$= \frac{a^2\left(\log|s+1|s^2 + \left(2\log|s+1|+1\right)s + \log|s+1|\right)}{(s+1)^2} + \int \left(\frac{-a^2}{s-1} + \frac{-a^2}{(s-1)^2} + \frac{-2a^2}{(s-1)^3}\right)\,ds$$

$$= \frac{a^2\left(\left(\log|s+1| - \log|s-1|\right)s^2 + \left(2\log|s+1| - 2\log|s-1| + 1\right)s + \log|s+1| - \log|s-1|\right)}{(s+1)^2} + \int \left(\frac{-a^2}{(s-1)^2} + \frac{-}{(s-}\right.$$

$$= \frac{a^2\left(\left(\log|s+1| - \log|s-1|\right)s^3 + \left(\log|s+1| - \log|s-1| + 2\right)s^2 + \left(-\log|s+1| + \log|s-1| + 1\right)s - \log|s+1| + l\right.}{(s-1)(s+1)^2}$$

$$= \frac{a^2\left(\left(\log|s+1| - \log|s-1|\right)s^4 + 2s^3 + \left(-2\log|s+1| + 2\log|s-1|\right)s^2 + 2s + \log|s+1| - \log|s-1|\right)}{(s-1)^2(s+1)^2}$$

$$= \frac{a^2\left(\log\left|\frac{s+1}{s-1}\right|s^4 + 2s^3 - 2\log\left|\frac{s+1}{s-1}\right|s^2 + 2s + \log\left|\frac{s+1}{s-1}\right|\right)}{(s-1)^2(s+1)^2}$$

$$= \log\left|\frac{s+1}{s-1}\right|a^2 + \frac{2a^2s^3 + 2a^2s}{s^4 - 2s^2 + 1}$$

$$= \log\left|\frac{\tan\left(\frac{1}{2}t\right)+1}{\tan\left(\frac{1}{2}t\right)-1}\right|a^2 + \frac{2a^2s^3 + 2a^2s}{s^4 - 2s^2 + 1}$$

$$= \log\left|\frac{\tan\left(\frac{1}{2}t\right)+1}{\tan\left(\frac{1}{2}t\right)-1}\right|a^2 + \frac{2\sin(t)a^2}{\cos(2t)+1}$$

$$= \left(\left(2\sin(t) + \log\left|\frac{\tan\left(\frac{1}{2}t\right)+1}{\tan\left(\frac{1}{2}t\right)-1}\right|\cos(2t) + \log\left|\frac{\tan\left(\frac{1}{2}t\right)+1}{\tan\left(\frac{1}{2}t\right)-1}\right|\right)a^2\right) / \left(\cos(2t)+1\right)$$

$$= \left(\left(\sin(t) + \log\left|\frac{\sin\left(\frac{1}{2}t\right)+\cos\left(\frac{1}{2}t\right)}{\sin\left(\frac{1}{2}t\right)-\cos\left(\frac{1}{2}t\right)}\right|(\cos(t))^2\right)a^2\right) / \left((\cos(t))^2\right)$$

$$= x\sqrt{x^2+a^2} + a^2\log\left|x + \sqrt{x^2+a^2}\right|$$

$$\int \frac{\sqrt{x}}{x+1}\,dx \qquad \left(t = \sqrt{x}\right)$$

$$= \int \frac{2t^2}{t^2+1}\,dt$$

$$= \int \left(2 + \frac{-2}{t^2+1}\right)\,dt$$

$$= 2t + \int \frac{-2}{t^2+1}\,dt$$

$$= 2\sqrt{x} - 2\arctan\left(\sqrt{x}\right)$$

$$\int \frac{\sqrt[3]{x}}{x+1}\,dx \qquad (t=\sqrt[3]{x})$$

$$\begin{aligned}
&= \int \frac{3t^3}{t^3+1}\,dt\\
&= \int \left(3+\frac{t-2}{t^2-t+1}+\frac{-1}{t+1}\right)\,dt\\
&= 3t+\int \left(\frac{t-2}{t^2-t+1}+\frac{-1}{t+1}\right)\,dt\\
&= 3t-\arctan\left(\tfrac{2}{3}\sqrt{3}t-\tfrac{1}{3}\sqrt{3}\right)\sqrt{3}+\tfrac{1}{2}\log\left|t^2-t+1\right|+\int \frac{-1}{t+1}\,dt\\
&= 3\sqrt[3]{x}-\sqrt{3}\arctan\left((\tfrac{2}{3}\sqrt[3]{x}-\tfrac{1}{3})\sqrt{3}\right)-\log\left|\sqrt[3]{x}+1\right|+\frac{1}{2}\log\left|(\sqrt[3]{x})^2-\sqrt[3]{x}+1\right|
\end{aligned}$$

$$\int \sqrt{\frac{-x+2}{x}}\,dx \qquad \left(t=\sqrt{\frac{-x+2}{x}}\right)$$

$$\begin{aligned}
&= \int \frac{-4t^2}{\left(t^2+1\right)^2}\,dt\\
&= \int \left(\frac{-4}{t^2+1}+\frac{4}{\left(t^2+1\right)^2}\right)\,dt\\
&= -4\arctan(t)+\int \frac{4}{\left(t^2+1\right)^2}\,dt\\
&= x\sqrt{\frac{-x+2}{x}}-2\arctan\left(\sqrt{\frac{-x+2}{x}}\right)
\end{aligned}$$

$$\int \frac{dx}{\exp(x)+\exp(-x)} \qquad (t=\exp(x))$$

$$\begin{aligned}
&= \int \frac{1}{t^2+1}\,dt\\
&= \arctan\left(\exp(x)\right)
\end{aligned}$$

$$\begin{aligned}
\int \frac{\sin(x)x+\cos(x)}{\cos(x)x}\,dx &= \int \left(\frac{\sin(x)}{\cos(x)}+\frac{1}{x}\right)\,dx\\
&= -\log\left|\cos(x)\right|+\int \frac{1}{x}\,dx\\
&= \log|x|-\log\left|\cos(x)\right|
\end{aligned}$$

$$\begin{aligned}
\int \frac{dx}{x^4+4} &= \int \left(\frac{x+2}{8\left(x^2+2x+2\right)}+\frac{-(x-2)}{8\left(x^2-2x+2\right)}\right)\,dx\\
&= \frac{1}{16}\left(\log\left(x^2+2x+2\right)+2\arctan(x+1)\right)+\int \frac{-(x-2)}{8\left(x^2-2x+2\right)}\,dx\\
&= \frac{1}{16}\left(\log\left(x^2+2x+2\right)+2\arctan(x+1)-\log\left(x^2-2x+2\right)+2\arctan(x-1)\right)\\
&= \frac{1}{8}\arctan(x+1)+\frac{1}{8}\arctan(x-1)+\frac{1}{16}\log\left(\frac{x^2+2x+2}{x^2-2x+2}\right)
\end{aligned}$$

$$\int \left(\frac{-\cos(x)+1}{-\cos(x)+\frac{1}{2}}\right)^{\frac{1}{2}} dx \qquad \left(t=\tan\left(\tfrac{1}{2}x\right)\right)$$

$$= \int \frac{4\sqrt{\frac{1}{3t^2-1}}\,t}{t^2+1}\,dt$$

$$\left(\sqrt{3}t=\frac{1}{\cos(s)}\right)$$

$$= \int \frac{-4\left(\sin(s)\right)^2}{3\left(\cos(s)\right)^4-2\left(\cos(s)\right)^2-1}\,ds$$

$$(u=\tan(s))$$

$$= \int \frac{4}{u^2+4}\,du$$

$$= 2\arctan\left(\tfrac{1}{2}u\right)$$

$$= 2\arctan\left(\frac{\frac{1}{2}\sin(s)}{\cos(s)}\right)$$

$$= 2\arctan\left(\tfrac{1}{2}\sqrt{3t^2-1}\right)$$

$$= 2\arctan\left(\tfrac{1}{2}\sqrt{3\left(\tan\left(\tfrac{1}{2}x\right)\right)^2-1}\right)$$

$$\int \log\left(x^2+1\right)\,dx = \log\left(x^2+1\right)x + \int \frac{-2x^2}{x^2+1}\,dx$$

$$= \log\left(x^2+1\right)x + \int \left((-2)+\frac{2}{x^2+1}\right)dx$$

$$= \log\left(x^2+1\right)x + (-2x) + \int \frac{2}{x^2+1}\,dx$$

$$= \log\left(x^2+1\right)x + (-2x+2\arctan(x))$$

$$= 2\arctan(x) + x\log\left(x^2+1\right) - 2x$$

$$\int \arctan\left(\sqrt{x}\right)dx = \arctan\left(\sqrt{x}\right)x + \int \frac{-x^{-\frac{1}{2}}x}{2\left(\left(\sqrt{x}\right)^2+1\right)}\,dx$$

$$= \arctan\left(\sqrt{x}\right)x + \int \frac{-\sqrt{x}}{2(x+1)}\,dx$$

$$\left(t=\sqrt{x}\right)$$

$$= \arctan\left(\sqrt{x}\right)x + \int \frac{-t^2}{t^2+1}\,dt$$

$$= \arctan\left(\sqrt{x}\right)x + \int \left((-1)+\frac{1}{t^2+1}\right)dt$$

$$= \arctan\left(\sqrt{x}\right)x + (-t) + \int \frac{1}{t^2+1}\,dt$$

$$= \arctan\left(\sqrt{x}\right)x + \left(-\sqrt{x}+\arctan\left(\sqrt{x}\right)\right)$$

$$= -\sqrt{x} + (x+1)\arctan\left(\sqrt{x}\right)$$

$$\int \left(\arcsin(x)\right)^2 dx = \left(\arcsin(x)\right)^2 x + \int \left(-2\left(-x^2+1\right)^{-\frac{1}{2}}\arcsin(x)x\right)dx$$

$$= \left(\arcsin(x)\right)^2 x + 2\sqrt{-x^2+1}\arcsin(x) + \int \left(-2\sqrt{-x^2+1}\left(-x^2+1\right)^{-\frac{1}{2}}\right)dx$$

$$= \arcsin(x)\left(\arcsin(x)x+2\sqrt{-x^2+1}\right) + \int (-2)\,dx$$

$$= \arcsin(x)\left(\arcsin(x)x+2\sqrt{-x^2+1}\right) + (-2x)$$

$$= x\arcsin(x)^2 + 2\arcsin(x)\sqrt{-x^2+1} - 2x$$

$$\begin{aligned}
\int \frac{\log|x|\left(x+\log|x|+1\right)}{x^2}\,dx &= \frac{-\left(\log|x|\right)^2}{x} + \int \frac{\log|x|(x+3)}{x^2}\,dx \\
&= \frac{-\left(\log|x|\right)^2}{x} + \frac{\log|x|\left(\log|x|x-6\right)}{2x} + \int \frac{3}{x^2}\,dx \\
&= \frac{\log|x|\left(\log|x|x-2\log|x|-6\right)}{2x} + \int \frac{3}{x^2}\,dx \\
&= \frac{\log|x|\left(\log|x|x-2\log|x|-6\right)}{2x} + \frac{-3}{x} \\
&= \frac{x-2}{2x}\left(\log|x|\right)^2 - \frac{3}{x}\log|x| - \frac{3}{x}
\end{aligned}$$

$$\int \frac{dx}{\log|x|x} = \log\left|\log|x|\right|$$