List of Derivatives and Integrals of Elementary Functions

$$\frac{\mathrm{d}x^n}{\mathrm{d}x} = nx^{n-1}.$$

$$\frac{\mathrm{d}\ln(x)}{\mathrm{d}x} = \frac{1}{x}.$$

$$\frac{\mathrm{d}a^x}{\mathrm{d}x} = \ln(a)a^x.$$

$$\frac{\mathrm{d}\sin(x)}{\mathrm{d}x} = \cos(x).$$

$$\frac{\mathrm{d}\cos(x)}{\mathrm{d}x} = -\sin(x).$$

$$\frac{\mathrm{d}\tan(x)}{\mathrm{d}x} = \sec^2(x).$$

$$\frac{\mathrm{d}\cot(x)}{\mathrm{d}x} = -\csc^2(x).$$

$$\frac{\mathrm{d}\sec(x)}{\mathrm{d}x} = \sec(x)\tan(x).$$

$$\frac{\mathrm{d}\csc(x)}{\mathrm{d}x} = -\csc(x)\cot(x).$$

$$\frac{\mathrm{d}\arcsin(x)}{\mathrm{d}x} = \frac{1}{\sqrt{1-x^2}}.$$

$$\frac{\mathrm{d}\arccos(x)}{\mathrm{d}x} = -\frac{1}{\sqrt{1-x^2}}.$$

$$\frac{\mathrm{d}\arctan(x)}{\mathrm{d}x} = \frac{1}{x^2+1}.$$

$$\frac{\mathrm{d}\operatorname{arccot}(x)}{\mathrm{d}x} = -\frac{1}{x^2+1}.$$

$$\frac{\mathrm{d}\operatorname{arcsec}(x)}{\mathrm{d}x} = \frac{1}{|x|\sqrt{x^2+1}}.$$

$$\frac{\mathrm{d}\operatorname{arccsc}(x)}{\mathrm{d}x} = -\frac{1}{|x|\sqrt{x^2+1}}.$$

$$\int x^n\,\mathrm{d}x = \begin{cases} \dfrac{1}{n+1}x^{n+1} + C, & n \neq -1 \\ \ln|x| + C, & n = -1 \end{cases}.$$

$$\int \ln(x)\,\mathrm{d}x = x\ln(x) - x + C.$$

$$\int \left(\ln(x)\right)^n \mathrm{d}x = x\left(\ln(x)\right)^n - n\int \left(\ln(x)\right)^{n-1} \mathrm{d}x\,.$$

$$\int e^{nx}\,\mathrm{d}x = \frac{1}{n}e^{nx} + C, \quad n \neq 0.$$

$$\int \sin(x)\,\mathrm{d}x = -\cos(x) + C.$$

$$\int \sin^2(x)\,\mathrm{d}x = \frac{x}{2} - \frac{\sin(2x)}{4} + C.$$

$$\int \sin^n(x)\,\mathrm{d}x = -\frac{1}{n}\sin^{n-1}(x)\cos(x) + \frac{n-1}{n}\int \sin^{n-2}(x)\,\mathrm{d}x\,, \quad n \in \mathbb{N}_{>2}.$$

$$\int \cos(x)\,\mathrm{d}x = \sin(x) + C.$$

$$\int \cos^2(x)\,\mathrm{d}x = \frac{x}{2} + \frac{\sin(2x)}{4} + C.$$

$$\int \cos^n(x)\,\mathrm{d}x = \frac{1}{n}\cos^{n-1}(x)\sin(x) + \frac{n-1}{n}\int \cos^{n-2}(x)\,\mathrm{d}x\,, \quad n \in \mathbb{N}_{>2}.$$

$$\int \tan(x)\,\mathrm{d}x = -\ln|\cos(x)| + C = \ln|\sec(x)| + C.$$

$$\int \tan^2(x)\,\mathrm{d}x = \tan(x) - x + C.$$

$$\int \tan^n(x)\,\mathrm{d}x = \frac{1}{n-1}\tan^{n-1}(x) - \int \tan^{n-2}(x)\,\mathrm{d}x\,, \quad n \in \mathbb{N}_{>2}.$$

$$\int \cot(x)\,\mathrm{d}x = \ln|\sin(x)| + C.$$

$$\int \cot^2(x)\,\mathrm{d}x = -\cot(x) - x + C.$$

$$\int \cot^n(x)\,\mathrm{d}x = -\frac{1}{n-1}\cot^{n-1}(x) - \int \cot^{n-2}(x)\,\mathrm{d}x\,, \quad n \in \mathbb{N}_{>2}.$$

$$\int \sec(x)\,\mathrm{d}x = \ln|\sec(x) + \tan(x)| + C.$$

$$\int \sec^2(x)\,\mathrm{d}x = \tan(x) + C.$$

$$\int \sec^n(x)\,\mathrm{d}x = \frac{1}{n-1}\sec^{n-2}(x)\tan(x) + \frac{n-2}{n-1}\int \sec^{n-2}(x)\,\mathrm{d}x\,, \quad n \in \mathbb{N}_{>2}.$$

$$\int \csc(x)\,\mathrm{d}x = -\ln|\csc(x) + \cot(x)| + C.$$

$$\int \csc^2(x)\,\mathrm{d}x = -\cot(x) + C.$$

$$\int \csc^n(x)\,\mathrm{d}x = -\frac{1}{n-1}\csc^{n-2}(x)\cot(x) + \frac{n-2}{n-1}\int \csc^{n-2}(x)\,\mathrm{d}x\,, \quad n \in \mathbb{N}_{>2}.$$

$$\int \arcsin(x)\,\mathrm{d}x = x\arcsin(x) + \sqrt{1-x^2} + C.$$

$$\int \arccos(x)\,\mathrm{d}x = x\arccos(x) - \sqrt{1-x^2} + C.$$

$$\int \arctan(x)\,\mathrm{d}x = x\arctan(x) - \frac{1}{2}\ln\left(1+x^2\right) + C.$$

$$\int \operatorname{arccot}(x)\,\mathrm{d}x = x\operatorname{arccot}(x) + \frac{1}{2}\ln\left(1+x^2\right) + C.$$

$$\int \operatorname{arcsec}(x)\,\mathrm{d}x = x\operatorname{arcsec}(x) - \ln\left|x + \sqrt{x^2-1}\right| + C, \quad |x| \geq 1.$$

$$\int \operatorname{arccsc}(x)\,\mathrm{d}x = x\operatorname{arccsc}(x) + \ln\left|x + \sqrt{x^2-1}\right| + C, \quad |x| \geq 1.$$