

List of Derivatives and Integrals of Elementary Functions

$$\frac{dx^n}{dx} = nx^{n-1}.$$

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

$$\frac{da^x}{dx} = \ln(a)a^x.$$

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\int \ln(x) dx = x \ln(x) - x + C.$$

$$\int (\ln(x))^n dx = x (\ln(x))^n - n \int (\ln(x))^{n-1} dx, \quad n \in \mathbb{N}.$$

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

$$\int \sin(x) dx = -\cos(x) + C.$$

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

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

$$\int \cos(x) \, dx = \sin(x) + C.$$

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

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

$$\int \tan(x) \, dx = -\ln |\cos(x)| + C = \ln |\sec(x)| + C.$$

$$\int \tan^2(x) \, dx = \tan(x) - x + C.$$

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

$$\int \cot(x) \, dx = \ln |\sin(x)| + C.$$

$$\int \cot^2(x) \, dx = -\cot(x) - x + C.$$

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

$$\int \sec(x) \, dx = \ln |\sec(x) + \tan(x)| + C.$$

$$\int \sec^2(x) \, dx = \tan(x) + C.$$

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

$$\int \csc(x) \, dx = -\ln |\csc(x) + \cot(x)| + C.$$

$$\int \csc^2(x) \, dx = -\cot(x) + C.$$

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

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

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

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

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

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

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