

Integration formulas

$$\int \frac{dx}{a^2 + x^2} = \frac{1}{a} \tan^{-1} \frac{x}{a} + C$$

$$\int \frac{dx}{a^2 - x^2} = \frac{1}{2a} \ln \left| \frac{x+a}{x-a} \right| + C$$

$$\int \frac{dx}{\sqrt{a^2 + x^2}} = \ln |x + \sqrt{a^2 + x^2}| + C$$

$$\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1} \frac{x}{a} + C$$

$$\int \sqrt{a^2 - x^2} dx = \frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1} \frac{x}{a} + C$$

$$\int \frac{dx}{\sqrt{x^2 - a^2}} = \ln |x + \sqrt{x^2 - a^2}| + C$$

$$\int \sin ax dx = -\frac{1}{a} \cos ax + C$$

$$\int \cos ax dx = \frac{1}{a} \sin ax + C$$

$$\int \sin^2 ax dx = \frac{x}{2} - \frac{\sin 2ax}{4a} + C$$

$$\int \cos^2 ax dx = \frac{x}{2} + \frac{\sin 2ax}{4a} + C$$

$$\int \tan ax dx = -\frac{1}{a} \ln |\cos ax| + C$$

$$\int \cot ax dx = \frac{1}{a} \ln |\sin ax| + C$$

$$\int \sec ax dx = \frac{1}{a} \ln |\sec ax + \tan ax| + C$$

$$\int \csc ax dx = -\frac{1}{a} \ln |\csc ax + \cot ax| + C$$

$$\int e^{ax} dx = \frac{1}{a} e^{ax} + C$$

$$\int b^{ax} dx = \frac{1}{a} \frac{b^{ax}}{\ln b} + C, \quad b > 0, b \neq 1$$

$$\int x e^{ax} dx = \frac{e^{ax}}{a^2} (ax - 1) + C$$

$$\int \ln ax dx = x \ln ax - x + C$$