Table of Fundamental Indefinite Integrals

The following table lists the "fundamental" indefinite integrals. This table is essentially the "inversion" of the *Table of Fundamental Differentials* with only minor generalizations specific to integration. These fundamental indefinite integrals (that is, antiderivatives of the respective integrands) are important to know as they often appear when applying the properties of integrals and the advanced techniques of integral calculus to transform and integrate more complicated integrand expressions.

n and a are *Real* constants; C is the arbitrary *Real* constant of integration. Where a is derived from a^2, select the positive root, i.e., $a = \sqrt{a^2}$.

$$\int dx = x + C$$

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

$$\int x^n\,dx = \frac{x^{n+1}}{n+1} + C \qquad (n \neq -1)$$

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

$$\int x^{-1}\,dx = \int \frac{dx}{x} = \ln|x| + C$$

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

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

$$\int \sec^2 ax\,dx = \frac{1}{a}\,\tan ax + C$$

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

$$\int \csc^2 ax\,dx = -\frac{1}{a}\,\cot ax + C$$

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

$$= \frac{1}{a}\,\cos^{-1}\left|\frac{a}{x}\right| + C$$

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

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