Integrals

Basic antiderivatives

Powers

$$\int a\,dx = ax + C$$

$$\int x^n\,dx = \frac{x^{n+1}}{n+1} + C$$

Exponentials

$$\int e^x\,dx = e^x + C.$$

$$a^x\,dx = \frac{a^x}{\ln(a)} + C$$

Logarithms

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

Trigonometrics

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

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

$$\int \frac{1}{\cos(x)^2}\,dx = \tan(x) + C$$

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

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

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

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

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

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

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

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

Rationals e irrationals

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

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

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

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

Integration rules

Sum

$$\int u + v\,dx = \int u\,dx + \int v\,dx$$

Difference

$$\int u - v\,dx = \int u\,dx - \int v\,dx$$

Product by a constant

$$\int af(x)\,dx = a\int f(x)\,dx$$

Parts

$$\int u\,dv = uv - \int v\,du$$

Substitution

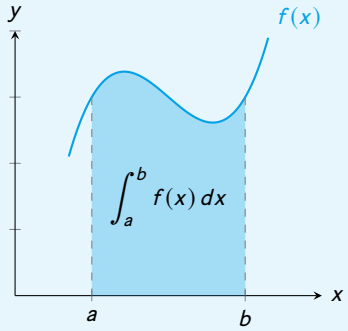
$$\int f(u)u'\,dx = \int f(u)\,du$$

Definite integrals

Barrow's rule

$$\int_a^b f(x)\,dx = F(b) - F(a)$$

where $F(x) = \int f(x)\,dx$



Properties

$$\int_a^a f(x)\,dx = 0$$

$$\int_a^b f(x)\,dx = -\int_b^a f(x)\,dx$$

$$\int_a^b f(x)\,dx = \int_a^c f(x)\,dx + \int_c^b f(x)\,dx$$

where $a < c < b$.