Formula Sheet

Integrals

$$\int x^n\,dx = \frac{x^{n+1}}{n+1} + C, \text{ for } n \neq -1$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Trigonometric Formulas

$$\sin(2x) = 2\sin(x)\cos(x)$$

$$\cos(2x) = \cos^2(x) - \sin^2(x)$$

$$\sin^2(x) = \frac{1-\cos(2x)}{2}$$

$$\cos^2(x) = \frac{1+\cos(2x)}{2}$$

$$\sec^2(x) - 1 = \tan^2(x)$$

$$\sin(x)\cos(y) = \tfrac{1}{2}\left(\sin(x-y) + \sin(x+y)\right)$$

$$\sin(x)\sin(y) = \tfrac{1}{2}\left(\cos(x-y) - \cos(x+y)\right)$$

$$\cos(x)\cos(y) = \tfrac{1}{2}\left(\cos(x-y) + \cos(x+y)\right)$$

Maclaurin Series and their Radius of Convergence

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n, \text{ with a radius of convergence } R = 1.$$

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!}, \text{ with a radius of convergence } R = \infty.$$

$$\sin(x) = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!}, \text{ with a radius of convergence } R = \infty.$$

$$\cos(x) = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!}, \text{ with a radius of convergence } R = \infty.$$

$$\tan^{-1}(x) = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{2n+1}, \text{ with a radius of convergence } R = 1.$$

$$\ln(1+x) = \sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^n}{n}, \text{ with a radius of convergence } R = 1.$$

$$(1+x)^k = \sum_{n=0}^{\infty} \binom{k}{n} x^n, \text{ with a radius of convergence } R = 1.$$