FORMULAS

$$\cos^2 A = \frac{1+\cos 2A}{2}, \qquad \sin^2 A = \frac{1-\cos 2A}{2}$$

$$\sin 2A = 2\sin A\cos A, \qquad \cos A\cos B = \frac{1}{2}\left[\cos(A-B)+\cos(A+B)\right]$$

$$\sin A\sin B = \frac{1}{2}\left[\cos(A-B)-\cos(A+B)\right], \qquad \sin A\cos B = \frac{1}{2}\left[\sin(A-B)+\sin(A+B)\right]$$

$$\int \csc x\,dx = \ln|\csc x - \cot x| + c, \qquad \int \tan x\,dx = \ln|\sec x| + c$$

$$\int \sec x\,dx = \ln|\sec x + \tan x| + c, \qquad \int \cot x\,dx = \ln|\sin x| + c$$

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

$$e^x = \sum_{n=0}^{\infty}\frac{x^n}{n!}, \qquad \sin x = \sum_{n=0}^{\infty}(-1)^n\frac{x^{2n+1}}{(2n+1)!}, \qquad \cos x = \sum_{n=0}^{\infty}(-1)^n\frac{x^{2n}}{(2n)!} \quad \text{(for all } x\text{)}$$

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n \quad \text{(for } |x|<1\text{)}$$

$$|R_n(x)| \le \frac{M}{(n+1)!}|x-a|^{n+1}, \quad \text{where} \quad \left|f^{(n+1)}(x)\right| \le M \text{ for } |x-a| \le d$$

$$M_y = \rho\int_a^b x[f(x)-g(x)]dx, \qquad M_x = \rho\int_a^b \frac{1}{2}\left[(f(x))^2-(g(x))^2\right]dx$$

$$\bar{x} = \frac{M_y}{m}, \qquad \bar{y} = \frac{M_x}{m}, \qquad m = \rho A$$

$$ds = \sqrt{1+\left(\frac{dy}{dx}\right)^2}dx, \qquad ds = \sqrt{1+\left(\frac{dx}{dy}\right)^2}dy, \qquad ds = \sqrt{\left(\frac{dx}{dt}\right)^2+\left(\frac{dy}{dt}\right)^2}dt$$

$$L = \int ds, \qquad L = \int_a^b \sqrt{1+\left(\frac{dy}{dx}\right)^2}dx, \qquad L = \int_c^d \sqrt{1+\left(\frac{dx}{dy}\right)^2}dy$$

$$L = \int_\alpha^\beta \sqrt{\left(\frac{dx}{dt}\right)^2+\left(\frac{dy}{dt}\right)^2}dt, \qquad L = \int_a^b \sqrt{r^2+\left(\frac{dr}{d\theta}\right)^2}d\theta$$

$$S = \int 2\pi y\,ds, \qquad S = \int 2\pi x\,ds, \qquad A = \int_a^b \frac{1}{2}\left\{[f(\theta)]^2-[g(\theta)]^2\right\}d\theta$$