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

$$\sin 2\theta = 2\sin\theta\cos\theta \qquad \cos 2\theta = \cos^2\theta - \sin^2\theta = 1 - 2\sin^2\theta = 2\cos^2\theta - 1$$

$$\begin{aligned}
\sin A\cos B &= \frac{1}{2}[\sin(A+B) + \sin(A-B)] &&= \frac{1}{2}\sin(A+B) + \frac{1}{2}\sin(A-B)\\
\cos A\cos B &= \frac{1}{2}[\cos(A+B) + \cos(A-B)] &&= \frac{1}{2}\cos(A+B) + \frac{1}{2}\cos(A-B)\\
\sin A\sin B &= \frac{1}{2}[\cos(A-B) - \cos(A+B)] &&= \frac{1}{2}\cos(A-B) - \frac{1}{2}\cos(A+B)
\end{aligned}$$

$$\sin(-\theta) = -\sin\theta \qquad \cos(-\theta) = \cos\theta$$

$$\int \sec\theta\; dx = \ln|\sec\theta + \tan\theta| \qquad \int \csc\theta\; dx = \ln|\csc\theta - \cot\theta|$$

$$f(x) = \sum_{n=0}^{\infty} \frac{f^{(n)}(a)}{n!}(x-a)^n$$

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n \qquad R = 1 \qquad\qquad e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} \qquad R = \infty$$

$$\sin x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!} \qquad R = \infty \qquad\qquad \cos x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!} \qquad R = \infty$$

$$\tan^{-1} x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)} \qquad R = 1 \qquad\qquad \ln(1+x) = \sum_{n=0}^{\infty} (-1)^{n-1} \frac{x^n}{n} \qquad R = 1$$

$$(1+x)^k = \sum_{n=0}^{\infty} \frac{k(k-1)(k-2)\cdots(k-n-1)}{n!} x^n = 1 + kx + \frac{k(k-1)}{2!}x^2 + \frac{k(k-1)(k-2)}{3!}x^3 + \cdots \qquad R = 1$$

$$\text{If } \sum_{n=m}^{\infty} ar^n \text{ converges, then } \sum_{n=m}^{\infty} ar^n = \frac{ar^m}{1-r}$$

$$\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n = \left(\frac{n+1}{n}\right)^n = e$$

$$\lim_{n\to 0}(1+n)^{1/n} = e$$

$$\frac{1}{2}\Delta x\left[f(x_0)+2f(x_1)+2f(x_2)+2f(x_3)+\cdots+2f(x_{n-1})+f(x_n)\right]$$

$$\frac{1}{3}\Delta x\left[f(x_0)+4f(x_1)+2f(x_2)+4f(x_3)+\cdots+2f(x_{n-2})+4f(x_{n-1})+f(x_n)\right]$$

$$\int_\alpha^\beta y(t)x'(t)\,dt$$

$$x = r\cos\theta$$
$$y = r\sin\theta$$

$$r^2 = x^2+y^2$$

$$\tan\theta = \frac{y}{x}$$

$$\frac{dy}{dx} = \frac{r\cos\theta + r'\sin\theta}{-r\sin\theta + r'\cos\theta}$$

$$\int_\alpha^\beta \frac{1}{2}[r(\theta)]^2\,d\theta$$

$$\int_\alpha^\beta \frac{1}{2}\left([r_o(\theta)]^2 - [r_i(\theta)]^2\right)\,d\theta$$

$$\frac{d}{dx}\left[\sin^{-1}x\right] = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}\left[\cos^{-1}x\right] = \frac{-1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}\left[\sec^{-1}x\right] = \frac{1}{x\sqrt{x^2-1}}$$

$$\frac{d}{dx}\left[\csc^{-1}x\right] = \frac{-1}{x\sqrt{x^2-1}}$$

$$\frac{d}{dx}\left[\tan^{-1}x\right] = \frac{1}{1+x^2}$$

$$\frac{d}{dx}\left[\cot^{-1}x\right] = \frac{-1}{1+x^2}$$

$$\frac{d}{dx}\left[a^x\right] = \ln a\cdot a^x$$

$$\frac{d}{dx}\left[\log_a x\right] = \frac{1}{x\ln a}$$

$$\int a^x\,dx = \frac{a^x}{\ln a}$$

$$\left(f^{-1}\right)'(a) = \frac{1}{f'(f^{-1}(a))}$$