Taylor Series

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

$$x^n + y^n = z^n$$

$$\frac{(x-x_0)^2}{a^2} + \frac{(y-y_0)^2}{b^2} + \frac{(z-z_0)^2}{c^2} = 1$$

$$\varepsilon = \frac{\sqrt{a^2+b^2}}{a}$$

$$\int \sec(ax)dx = \frac{1}{a}\ln\left|\tan\left(\frac{ax}{2}+\frac{\pi}{4}\right)\right| + c$$

$$e^{-at}\sin(\Omega t)u(t) \Leftrightarrow \frac{\Omega}{(s+a)^2+\Omega^2}$$

$$-\frac{\hbar^2}{2m}\frac{\partial^2\psi(x,t)}{\partial x^2} + U(x)\psi(x,t) = i\hbar\frac{\partial\psi(x,t)}{\partial t}$$

$$y = \frac{1}{\sqrt{2\pi}}e^{-\frac{z^2}{2}} = .3989e^{-5z^2}$$

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

$$\Gamma\left(a\right) = \int\limits_0^\infty s^{a-1} e^{-s} ds$$

$$\lim_{x \to c} \frac{f\left(x\right)}{g\left(x\right)} = \lim_{x \to c} \frac{f'\left(x\right)}{g'\left(x\right)}$$

Limit of Arctangent X as X Approaches Negative Infinity

$$\lim_{x \to -\infty} \tan^{-1}\left(x\right) = -\frac{\pi}{2}$$

Standing-wave function

$$y(x,t) = A_n \cos(\omega_n t + \delta_n) \sin(k_n x)$$

$$A = \frac{F_0}{\sqrt{m^2 \left(\omega_0^2 - \omega^2\right)^2 + b^2 \omega^2}}$$

Relationship between Energy and Principal Quantum Number

$$E_n = -R_H \left(\frac{1}{n^2}\right) = \frac{-2.178 \times 10^{-18}}{n^2} joule$$

Z-transform time domain multiplication (z domain convolution) property

$$h(n)x(n) \Leftrightarrow \frac{1}{2\pi j} \oint_C H\left(v\right) X\left(z/v\right) v^{-1}\, dv$$