

$$\sin\theta = \frac{\text{opp}}{\text{hyp}}$$

$$\cos\theta = \frac{\text{adj}}{\text{hyp}}$$

$$\tan\theta = \frac{\text{opp}}{\text{adj}}$$

$$v = v_0 + at$$

$$x = x_0 + v_0 t + \frac{1}{2} at^2$$

$$x = x_0 + \left(\frac{v_0 + v}{2} \right) t$$

$$v^2 = v_0^2 + 2a(x - x_0)$$

$$x - x_0 = \int_{t_0}^t v dt$$

$$v - v_0 = \int_{t_0}^t a dt$$

$$\sum \vec{F} = m\vec{a}$$

$$F_{\text{friction}} = \mu_k N$$

$$F_{\text{friction}} \leq \mu_s N$$

$$F_{\text{centripetal}} = \frac{mv^2}{r}$$

$$\vec{F}_{\text{spring}} = -k(\vec{x} - \vec{x}_0)$$

$$\text{work} = \int F \cdot ds$$

$$\text{power} = \frac{dw}{dt}$$

$$\vec{A} \cdot \vec{B} = |\vec{A}| |\vec{B}| \cos\theta = A_x B_x + A_y B_y + A_z B_z$$

$$\vec{F} = \frac{Gm_1 m_2 \hat{r}}{r^2}$$

$$G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$$

$$PE_{\text{grav}} = -\frac{GM}{r}$$

$$PE_{\text{spring}} = \frac{1}{2} kx^2$$

circumference of circle = $2\pi r$

area of circle = πr^2

$$\text{quadratic equation} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{d(x^n)}{dx} = nx^{n-1}$$

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