

$$\vec{v} = \vec{v}_0 + \vec{a}t$$

$$\vec{w} = \vec{w}_0 + \vec{a}t$$

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

$$\bar{x} - \bar{x}_0 = \vec{v}_0 t + \frac{1}{2} \vec{a} t^2$$

$$\mathbf{q} - \mathbf{q}_0 = \mathbf{w}_0 t + \frac{1}{2} \mathbf{a} t^2$$

$$\bar{F} \Delta t = \Delta \vec{p} = \vec{J}$$

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

$$\mathbf{w}^2 = \mathbf{w}_0^2 + 2\mathbf{a}(\mathbf{q} - \mathbf{q}_0)$$

$$f_{friction} = \mu N$$

$$s = \mathbf{q}r$$

$$\frac{v_t}{r} = \mathbf{w} = 2\mathbf{p}f$$

$$a_t = R\mathbf{a}$$

$$\vec{p} = m\vec{v}$$

$$Work = \vec{f} \cdot \vec{s} = \Delta E$$

$$a_r = \mathbf{w}^2 r = \frac{v^2}{r}$$

$$\cos \mathbf{q} = \frac{\text{adjacent}}{\text{hyp}}$$

$$\vec{A} \cdot \vec{B} = AB \cos \mathbf{q}$$

$$\cos \mathbf{q} = \frac{\vec{A} \cdot \vec{B}}{|\vec{A}| |\vec{B}|}$$

$$\sin \mathbf{q} = \frac{\text{opposite}}{\text{hyp}}$$

$$\vec{A} \times \vec{B} = AB \sin \mathbf{q}$$

$$I = I_{cm} + MR^2$$

$$\tan \mathbf{q} = \frac{\text{opposite}}{\text{adjacent}}$$

$$f = \frac{1}{T} = \frac{1}{2\mathbf{p}} \sqrt{\frac{k}{m}}$$

$$R = \frac{v_0^2 \sin 2\mathbf{q}}{g}$$

$$r_c = \frac{1}{M} \int r dm$$

$$v_{1f} = \frac{m_1 - m_2}{m_1 + m_2} v_{1i}$$

$$v_{2f} = \frac{2m_1}{m_1 + m_2} v_{1i}$$

$$KE_{lin} = \frac{1}{2} mv^2$$

$$PE_{grav} = mgh$$

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

$$KE_{rot} = \frac{1}{2} I\mathbf{w}^2$$

$$\vec{F} = -k\vec{x}$$

$$\vec{F}_G = G \frac{m_1 m_2}{r^2} \hat{r}$$

$$I = \int r^2 dm$$

$$dm = \rho dV$$

$$dm = \sigma dA$$

$$dm = \lambda d\ell$$

$$P = P_a + \rho gh$$

$$\vec{L} = \vec{r} \times \vec{p}$$

$$\frac{d\vec{L}}{dt} = \vec{\Gamma} = \vec{r} \times \vec{F}$$

$$B.F. = w_{fluid} = m_f g = \mathbf{r}_f v g$$

$$B = (10) \log \frac{I}{I_0}$$

$$PA = F \quad P_1 + \frac{1}{2} \rho v_1^2 + \rho g y_1 = P_2 + \frac{1}{2} \rho v_2^2 + \rho g y_2$$

$$\Gamma = I\mathbf{a}$$

$$U_g = G \frac{mM}{r}$$