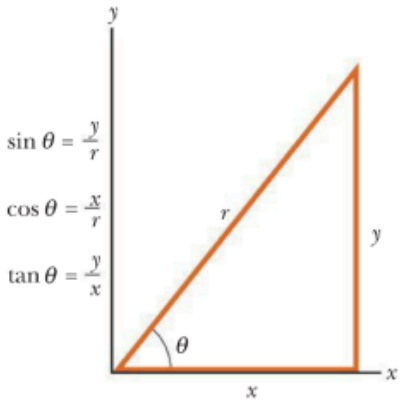
POTENTIALLY USEFUL INFORMATION (**SOME EQUATIONS ARE ONLY VALID IN SPECIFIC SITUATIONS**):

Conversions and constants: $g = 9.8\ m/s^2$ $G = 6.67 \times 10^{-11}\ N\ m^2/kg^2$ $\rho_{water} = 1000\ kg/m^3$

$I_o = 10^{-12}\ W/m^2$ 1 m = 3.281 ft 1 mile = 1609 m 1 kg = 2.2 pounds

1 pound = 4.45 N 1 hp = 746 W $1\ atm = 1.013 \times 10^5\ N/m^2$



$\sin\theta = \frac{y}{r}$ $\cos\theta = \frac{x}{r}$ $\tan\theta = \frac{y}{x}$

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

1D or 2D motion:

$$\bar{v} = \frac{\Delta x}{\Delta t} \quad \bar{a} = \frac{\Delta v}{\Delta t} \quad v = \lim_{\Delta t \to 0} \frac{\Delta x}{\Delta t} \quad a = \lim_{\Delta t \to 0} \frac{\Delta v}{\Delta t}$$

$$x = x_o + \bar{v}t = x_o + v_o t + \frac{1}{2}at^2 \qquad v = v_o + at$$

$$v^2 = v_o^{\,2} + 2a(x - x_o)$$

Quadratic formula:

$$ax^2 + bx + c = 0 \rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Area of a circle = πr^2 Volume of a circle = $4\pi r^3/3$

$$\vec{F} = \sum_i \vec{F}_i = m\vec{a} = \frac{\Delta \vec{p}}{\Delta t} \quad F_g = mg \quad F_{sp} = -kx \quad F_s \le \mu_s n \quad F_k = \mu_k n \quad \vec{F}_{AB} = -\vec{F}_{BA}$$

$$W = F_x \Delta x = \Delta KE + \Delta PE \quad KE = \tfrac{1}{2}mv^2 = \frac{p^2}{2m} \quad PE_g = mgy \quad PE_{sp} = \tfrac{1}{2}kx^2 \quad \bar{P} = \frac{W}{\Delta t} = F\bar{v}$$

$$\vec{p} = m\vec{v} \quad \vec{I} = \vec{F}\Delta t = \Delta \vec{p} = m\Delta \vec{v} \quad m_1\vec{v}_{1i} + m_2\vec{v}_{2i} = m_1\vec{v}_{1f} + m_2\vec{v}_{2f} \quad KE_i + PE_i = KE_f + PE_f$$

$$v_f = \frac{m_1 v_{1i} + m_2 v_{2i}}{m_1 + m_2} \quad v_{1i} - v_{2i} = -(v_{1f} - v_{2f}) \quad \omega = 2\pi f = 2\pi \frac{1}{T} = \sqrt{\frac{k}{m}}$$

$$v_f - v_i = v_e ln\left(\frac{M_i}{M_f}\right) \quad a_c = \frac{v^2}{r} = r\omega^2 \quad F = G\frac{m_1 m_2}{r^2} \quad \omega = \omega_i + \alpha t \quad \Delta\theta = \omega_i t + \tfrac{1}{2}\alpha t^2 \quad \omega^2 = \omega_i^{\,2} + 2\alpha\Delta\theta$$

$\Delta x = r\Delta\theta$ $v = r\omega$ $a_{tan} = r\alpha$

$$F_c = ma_c = m\frac{v^2}{r} = mr\omega^2 \quad I = \Sigma\, m\, R^2 \quad I_{disk} = \tfrac{1}{2}\, M\, R^2 \quad L = I\omega$$

$$\tau = rF\sin(\theta) \quad \tau = I\alpha \quad \sum \tau = \frac{L_f - L_i}{\Delta t} = \frac{\Delta L}{\Delta t}$$

$$\rho \equiv \frac{m}{V} \quad P = \frac{F}{A} \quad \frac{F}{A} = Y\frac{\Delta L}{L_0} \quad \frac{F}{A} = S\frac{\Delta x}{h} \quad \Delta P = -B\frac{\Delta V}{V}$$

$$P = P_0 + \rho g h \qquad \frac{F_1}{A_1} = \frac{F_2}{A_2} \qquad A_1 V_1 = A_2 V_2$$

$$B = \rho_{fluid} \cdot V_{fluid} \cdot g \qquad \frac{1}{2} m v_{avg}^2 = \frac{3}{2} k_B T$$

$$P_1 + \frac{1}{2}\rho v_1^2 + \rho g y_1 = const. \qquad P = \frac{N}{V} k_B T$$

$$T[^\circ C] = T[K] - 273.15 \qquad T[^\circ C] = \frac{5}{9}(T[^\circ F] - 32)$$

$$\Delta L = \alpha L_0 \Delta T \qquad \Delta A = \gamma A_0 \Delta T \qquad \Delta V = \beta V_0 \Delta T$$

$$Q = mc\Delta T \qquad Q = mL \qquad a = -\frac{k}{m}x \qquad T = 2\pi\sqrt{\frac{m}{k}}$$

$$v = \pm\sqrt{\frac{k}{m}(A^2 - x^2)} \qquad T = 2\pi\sqrt{\frac{L}{g}} \qquad v_w = (331\ \text{m/s})\sqrt{\frac{T}{273\ \text{K}}}$$

$$x = A\cos(2\pi f t) \quad v = -A\omega\sin(2\pi f t) \quad a = -A\omega^2\cos(2\pi f t)$$

$$v = \frac{\Delta x}{\Delta t} = \frac{\lambda}{T} = \lambda f \qquad v = \sqrt{\frac{F}{\mu}} \text{ where } \mu = \frac{m}{L}$$