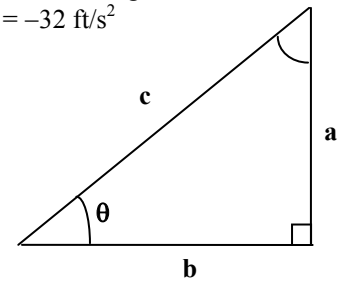
Conversions and Constants:
1 in = 2.54 cm
1 mi = 1.61 km
1 lb = 4.45 N
1 rev = 2π rad = 360°
$G = 6.673 \times 10^{-11}\ N \cdot m^2/kg^2$
$g = -9.8\ m/s^2 = -32\ ft/s^2$

KIN 335 - Biomechanics
Helpful Equations



$$c^2 = a^2 + b^2$$

$$\sin\theta = \frac{a}{c}$$

$$\cos\theta = \frac{b}{c}$$

$$\tan\theta = \frac{a}{b}$$

$$\sum F = ma$$

$$Weight = -mg$$

$$F_{attraction} = G\frac{m_1 m_2}{l^2}$$

$$\overline{v} = \frac{\Delta d}{\Delta t} = \frac{d_f - d_i}{\Delta t}$$

$$\overline{\omega} = \frac{\Delta\theta}{\Delta t} = \frac{\theta_f - \theta_i}{\Delta t}$$

$$\overline{a} = \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{\Delta t}$$

$$\overline{\alpha} = \frac{\Delta\omega}{\Delta t} = \frac{\omega_f - \omega_i}{\Delta t}$$

$$d = \theta r$$

$$v_T = \omega r$$

$$a_R = \frac{v_T^2}{r} = \omega^2 r$$

$$a_T = \frac{\Delta v_T}{\Delta t} = \frac{v_{T_f} - v_{T_i}}{\Delta t}$$

$$v_f = v_i + at$$

$$d = v_i t + \frac{1}{2}at^2$$

$$v_f^2 = v_i^2 + 2ad$$

$$d_H = v_H t_{TOTAL}$$

$$Pressure = \frac{Force}{Area}$$

$$F_{\lim} = \mu_s R_n$$

$$Work = Fd$$

$$Work = \Delta Energy = \Delta KE + \Delta PE + \Delta SE$$

$$KE = \frac{1}{2}mv^2$$

$$PE = -mgh$$

$$SE = \frac{1}{2}kx^2$$

$$Power = \frac{Work}{t} = \frac{Fd}{t} = Fv$$

$$Momentum = mv$$

$$\sum Ft = \Delta mv = m(v_f - v_i)$$

$$-e = \frac{(v_1 - v_2)}{(u_1 - u_2)} = \sqrt{\frac{h_{bounce}}{h_{drop}}}$$

$$Moment = Fd_{\perp}$$

$$I = \sum mr^2$$

$$I_A = I_{CG} + md^2$$

$$H = I\omega$$

$$H_S = I_S\omega_{S/G_S} + m_S r^2 \omega_{G_S/G}$$

$$H = \sum_{S=1}^{S=N} H_S$$

$$X_{cm} = \frac{\sum_{i=1}^{n} m_i x_i}{\sum_{i=1}^{n} m_i} = \frac{\sum_{i=1}^{n} m_i x_i}{M_B}$$

$$Y_{cm} = \frac{\sum_{i=1}^{n} m_i y_i}{\sum_{i=1}^{n} m_i} = \frac{\sum_{i=1}^{n} m_i y_i}{M_B}$$