

**Equations of Motion**  
**MID TERM EQUATIONS**

$$\Delta x = v_i t + \frac{1}{2} a t^2$$

$$v_f^2 = v_i^2 + 2a\Delta x$$

$$v_f = v_i + at$$

**SOH CAH TOA**

$$R = \frac{(v_i^2)}{g} \sin 2\theta$$

$$v = \Delta x / \Delta t$$

$$a = \Delta v / \Delta t$$

$$0 = ax^2 + bx + c$$

$$F_{x \text{ or } y} = mg \sin \theta$$

$$F_{\text{net}} = mg - T$$

$$F_{\text{net}} = T - mg$$

$$T = mg - ma$$

$$T = ma - mg$$

$$T_p = 2\pi\sqrt{(r^3/Gm)}$$

$$v = \sqrt{Gm/r}$$

$$F_f = \mu F_N$$

$$F = (Gm_1m_2)/r^2$$

$$\rho = 3g/(4\pi rG)$$

$$k = T^2 / R^3$$

$$F = ma$$

$$F_c = ma_c$$

$$F_c = mv^2/r$$

$$a_c = 4\pi^2 r / T^2$$

$$a_c = \omega^2 r$$

$$a_c = g(r_e/r)$$

$$a_c = v^2/r$$

$$\omega = 2\pi f$$

$$g = Gm/r^2$$

$$\omega = v/r$$

$$C = 2\pi r$$

$$\Theta = s/r$$

$$T = 1/f$$

$$1 \text{ day} = 86400 \text{ sec}$$

$$\frac{R_1^3}{T_1^2} = \frac{R_2^3}{T_2^2}$$

$$\tan \Theta = v^2/rg$$

$$T_p^2 = (4\pi^2 r^3 / Gm)$$

$$1 \text{ rad} = 57.3^\circ$$

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

$$M_S = 2 \times 10^{30} \text{ kg}$$

$$M_e = 5.98 \times 10^{24} \text{ kg}$$

$$R_{e \rightarrow s} = 1.5 \times 10^{11} \text{ m}$$

$$1 \text{ mile} = 1609 \text{ m}$$

$$g = 9.81 \text{ m/s}^2$$