

Relationships for Mechanics

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}} \quad (1)$$

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}} \quad (2)$$

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}} \quad (3)$$

$$\text{avg speed} = \frac{d}{\Delta t} \quad (4)$$

$$\bar{\mathbf{v}} = \frac{\Delta \mathbf{x}}{\Delta t} \quad (5)$$

$$\bar{\mathbf{a}} = \frac{\Delta \mathbf{v}}{\Delta t} \quad (6)$$

$$\Delta x = v_0 \Delta t + \frac{1}{2} a \Delta t^2 \quad (7)$$

$$v_{avg} = \frac{v_1 + v_2}{2} \quad (8)$$

$$v_f^2 = 2a\Delta x + v_0^2 \quad (9)$$

$$\mathbf{a} = \frac{\mathbf{F}_{net}}{m} \quad (10)$$

$$F_{grav} = mg \quad (11)$$

$$0 \leq F_f \leq \mu_s F_{surface} \quad (12)$$

$$F_f = \mu_k F_{surface} \quad (13)$$