Equations and Constants

$$\left\{\begin{array}{l} x = r\cos\theta \\ y = r\sin\theta \end{array}\right\}; \qquad \left\{\begin{array}{l} r = \sqrt{x^2+y^2} \\ \theta = \tan^{-1}\left(\frac{y}{x}\right) \end{array}\right\};$$

$$\left\{\begin{array}{c} v_x = v_{0x} + a_y t \\ \Delta x = \frac{1}{2}(v_{0x}+v_x)t \\ \Delta x = v_{0x}t + \frac{1}{2}a_x t^2 \\ v_x^2 = v_{0x}^2 + 2a_x\Delta x \end{array}\right\}; \qquad \left\{\begin{array}{c} v_y = v_{0y} + a_x t \\ \Delta y = \frac{1}{2}(v_{0y}+v_y)t \\ \Delta y = v_{0y}t + \frac{1}{2}a_y t^2 \\ v_y^2 = v_{0y}^2 + 2a_y\Delta y \end{array}\right\};$$

$$\left\{\begin{array}{l} \Delta x = x_f - x_i \\ speed_{ave} = \frac{d}{\Delta t} \end{array}\right\}; \qquad \left\{\begin{array}{l} v_{ave} = \frac{\Delta x}{\Delta t} \\ a_{ave} = \frac{\Delta v}{\Delta t} \end{array}\right\}; \qquad \left\{\begin{array}{l} v = \lim_{\Delta t\to 0}\frac{\Delta x}{\Delta t} \\ a = \lim_{\Delta t\to 0}\frac{\Delta v}{\Delta t} \end{array}\right\};$$

$$\left\{\begin{array}{l} a_c = \frac{v^2}{r} \\ T = \frac{2\pi r}{v} \end{array}\right\}; \qquad x = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A};$$

$$g = 9.80 \text{ m/s}^2$$

$$\left\{\begin{array}{c} 60 \text{ s} = 1 \text{ min} \\ 60 \text{ min} = 1 \text{ hr} \end{array}\right\}; \qquad \left\{\begin{array}{c} 1 \text{ cm}^3 = 1 \text{ mL} \\ 2.54 \text{ cm} = 1 \text{ inch} \\ 12 \text{ inches} = 1 \text{ ft} \\ 3 \text{ ft} = 1 \text{ yrd} \end{array}\right\}$$