Formulas and Constants

$$g = 9.80\ m/s^2$$

$$\mathbf{A} + \mathbf{B} = \mathbf{C} \quad \Longrightarrow \quad A_x + B_x = C_x \ , \ A_y + B_y = C_y$$

$$C_x = C\ cos(\theta) \ , \ C_y = C\ sin(\theta) \ , \ C = \sqrt{C_x^2 + C_y^2} \ , \ \theta = arctan\left(\frac{C_y}{C_x}\right)$$

$$\bar{v} = \frac{\Delta x}{\Delta t}$$

$$\bar{v} = \frac{v + v_0}{2}$$

$$v = v_0 + at \ , \ \Delta x = v_0 t + \frac{1}{2}at^2 \ , \ v^2 = v_0^2 + 2a\Delta x$$

$$\vec{v} = \vec{v}_x + \vec{v}_y \ , \ v_x = v\ cos(\theta) \ , \ v_y = v\ sin(\theta) \ , \ v = \sqrt{v_x^2 + v_y^2}$$

<u>Projectile Motion</u>

$$x = v_{0x}t \ , \ y = v_{0y}t - \frac{1}{2}gt^2 \ , \ v_x = v_{0x} \ , \ v_y = v_{0y} - gt$$

$$v_{0x} = v\ cos(\theta) \ , \ v_{0y} = v\ sin(\theta)$$

$$T = \frac{v_{0y}}{g} \ , \ H = \frac{v_{0y}^2}{2g} = \frac{v_0^2 sin^2(\theta)}{2g} \ , \ R = \frac{v_0^2}{g} sin(2\theta) \ , \ R_{max} = \frac{v_0^2}{g}$$