## Kinematic Equations

$$v_f = v_i + at$$

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

$$\Delta x = \tfrac{1}{2}(v_i + v_f)t$$

$$\Delta x = v_i t + \tfrac{1}{2}at^2$$

## Projectile Motion

$$v_x = v\cos\theta$$

$$v_y = v\sin\theta$$

$$\theta = \tan^{-1}\frac{v_y}{v_x}$$

$$\text{max height } h = \frac{v_{yi}^2}{2g}$$

$$\text{max range } r = \frac{v_{xi}^2\sin(2\theta)}{g}$$

$$\text{distance } d = \tfrac{1}{2}a_x t^2$$

## Circular Motion

$$F = m\frac{v^2}{r} = m\omega^2 r$$

$$\omega = 2\pi f$$

$$f = \frac{rev}{sec}$$

$$1\frac{rev}{sec} = 2\pi\frac{rad}{sec}$$

$$\alpha = \frac{v^2}{r}$$

$$\alpha = \frac{a}{r}$$

$$\omega = \frac{v}{r}$$

## Rotational Kinematics

$$\omega = \omega_i + \alpha t$$

$$\omega^2 = \omega_i^2 + 2\alpha\theta$$

$$\theta = \tfrac{1}{2}(\omega_f - \omega_i)t$$

$$\theta = \omega_i t + \tfrac{1}{2}\alpha t^2$$