Kinematics

Linear

$v_f = v_i + at$ $\qquad$ $\Delta x = \frac{1}{2}(v_i + v_f)t$

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

Rotational

$\omega = \omega_i + \alpha t$ $\qquad$ $\theta = \frac{1}{2}(\omega_f - \omega_i)t$

$\omega^2 = \omega_i^2 + 2\alpha\theta$ $\qquad$ $\theta = \omega_i t + \frac{1}{2}\alpha t^2$

Energy

Potential Energy

$U_{gravity} = mgh$ $\qquad$ $U_{spring} = \frac{1}{2}kx^2$

Kinetic Energy

$K = \frac{1}{2}mv^2$ $\qquad$ $K_{rotational} = \frac{1}{2}I\omega^2$

$K_{rolling} = \frac{1}{2}mv^2 + \frac{1}{2}I\omega^2$

Conservation of Energy

$\Delta K + \Delta U = 0$

Projectile Motion

$v_x = v\cos\theta$ $\qquad$ max height $h = \frac{v_{yi}^2}{2g}$

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

$\theta = \tan^{-1}\frac{v_y}{v_x}$ $\qquad$ distance $d = \frac{1}{2}a_x t^2$

Circular Motion

$F = m\frac{v^2}{r} = m\omega^2 r$ $\qquad$ $f = \frac{rev}{sec}$

$\omega = 2\pi f = \frac{v}{r}$ $\qquad$ $1\frac{rev}{sec} = 2\pi\frac{rad}{sec}$

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