Constant Acceleration

$d = d_0 + v_0 t + \frac{1}{2}at^2$
$v = v_0 + at$
$v^2 = v_0^2 + 2a(\delta x)$

Projectile Motion

$v_x(t) = v_{x0} = v_0 \cos\theta_0$
$x(t) = x_0 + v_0 \cos(\theta_i)t$
$v_y(t) = v_0 \sin\theta_i - gt$
$y(t) = y_0 + v_0 \sin(\theta_i)t + \frac{1}{2}at^2$
$v = v_{0y} - gt$
$v^2 = v_y^2 - 2ad$

Vectors with angles

$A_x = A\cos\theta$
$A_y = A\sin\theta$
$\tan\theta = \frac{A_y}{A_x}$
$\theta = \arctan\frac{A_y}{A_x}$

Angular Velocity

$s = r\theta$
$v = r\omega$
$v = \frac{2\pi r}{T}$
$\omega = \frac{v}{r}$
$\omega = \frac{d\theta}{dt} = \frac{2\pi}{T}$
$T = \frac{2\pi r}{v}$

Kinematics of Constant Angular Acc.

$R =$ radius
$\alpha =$ acceleration $(\frac{rad}{s^2})$
$\omega =$ velocity $(\frac{rad}{s})$
$s = s_0 + v_0 t + \frac{1}{2}at^2$
$\theta = \theta_0 + \omega_0 t + \frac{1}{2}\alpha t^2 \equiv \delta\theta = \omega_0 t + \frac{1}{2}\alpha t^2$
$v_f^2 = v_0^2 + 2a(s - s_0)$
$\omega_f^2 = \omega_0^2 + 2\alpha(\delta\theta)$
$\omega_f = \omega_0 + \alpha t$
$v_f = R\omega$
$\delta s = R\delta\theta$
$a_c = \frac{v_f^2}{R}$ (centripetal)
$a_r = \omega^2 R$
$a_t = R\alpha$ (tangential)
$v_{ang} = \frac{R}{T}$
$a_{ang} = \frac{v_{ang}}{T}$
$a_{total} = \sqrt{a_t^2 + a_c^2}$

Friction

$a = \frac{f_{net}}{m}$
$\mu mg = ma$
$a = \mu g$
$\overrightarrow{F_{net}} = \sum \overrightarrow{F_x} - \overrightarrow{F_k}$
$\sum F_x = ma = T - f_k$
$\sum F_y = n - mg = 0$
$\sum F_x = F_{(s|k)} - mg\sin\theta$
$F_k = \mu_k mg$

Newton's Laws

$F = ma$
$\sum F = T - mg = ma$
$\sum F = ma + mg$
$\sum F = \frac{T - F_k}{m}$
$\sum F_{m_a + m_b} = (m_a + m_b)a$
$\sum F_x = T_1 \sin\theta_1 + T_2 \sin\theta_2$
$\sum F_y = T_1 \cos\theta_1 + T_2 \cos\theta_2$

Misc. Equations

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$