$$S=d/t$$

$$V_{av} = \Delta x/\Delta t$$

$$V_{AC} = V_{AB} + V_{BC}$$

$$A = \Delta v/\Delta t$$

$$V_f = V_i + at$$

$$\Delta x = V_i t + (1/2)at^2$$

$$V_f^2 = V_i^2 + 2a\Delta x$$

$$V_x = V\cos\theta$$

$$V_y = V\sin\theta$$

$$\Delta x = V_x t$$

$$\Delta y = V_y t + (1/2)gt^2$$

$$\Delta y = (\tan\theta)\Delta x + (g\Delta x^2)/(2V^2\cos^2\theta)$$

$$\Delta x = -(V^2\sin 2\theta)/g \quad \text{lands at same level}$$

$$\theta = \text{arc length/radius (in radians)}$$

$$\omega_f = \omega_i + \alpha t$$

$$\Delta\theta = \omega_i t + (1/2)\alpha t^2$$

$$\omega_f^2 = \omega_i^2 + 2\alpha\Delta\theta$$

$$\Delta\theta r = d$$

$$\omega r = v_t$$

$$\alpha r = a_t$$

$$\omega = \Delta\theta/\Delta t$$

$$\alpha = \Delta\omega/\Delta t$$

1 radian = (arc length of r)/r

$T = (1/2)mv^2$

$\Delta U = -mgh$

$H = mc\Delta T$

$1\ J = 1\ kg.m^2/sec^2$

$H = mh_f$ or mh_v

$\Sigma F = ma$

$W = mg$

$\Delta U_{sp} = (1/2)k\Delta x^2$

Eff = out/in = (total energy – ΔE)/(total energy)

$F\Delta t = m\Delta v$

$\Delta p = \Delta mv$

$F\Delta t = \Delta p$

$\Delta p = 0$ (cons of momentum)

$V_{1f}/V_{1i} = (m_1-m_2)/(m_1+m_2)$

$V_{2f}/V_{1i} = 2m_1/(m_1+m_2)$

$\Sigma F = ma$, $\Sigma F = 0$

$\Sigma F_x=0$, $\Sigma F_y=0$

$F_f = \mu N$

$A_c = v_t^2/r$

$$F_c = mv_t^2/r$$

$$\Sigma F_r = mv_t^2/r, \Sigma F_\theta = 0$$

$$V^2 = \mu gr$$

$$V^2 = rg\tan\theta$$

$$\Sigma T = 0$$

$$T = Fd_\perp = F_\perp d$$

$$\sum T = I\alpha$$

$$T_{rot} = (1/2)I\omega^2$$

$$L = mvr = I\omega$$

$$\Delta L = 0$$

$$\acute{\omega} = 2\pi\nu$$

$$\acute{\omega} = 2\pi/T$$

$$T = 1/\nu$$

$$\nu = 1/T$$

$$x(t) = X_{max}\cos(\acute{\omega}t + \Phi)$$

$$v(t) = \acute{\omega}X_{max}\sin(\acute{\omega}t + \Phi)$$

$$a(t) = \acute{\omega}^2 X_{max} \cos(\acute{\omega} t + \Phi)$$

$$v_{max} = \acute{\omega} X_{max}$$

$$a = \acute{\omega}^2 X_{max}$$

$$T^2 = 4\pi^2 L/g$$

$$W = Fd_{\parallel} = Fd\cos\theta$$

$$W = \Delta T = \Delta E$$

$$T_i = T_f + \Delta U + \Delta W - W$$

$$F = -Gm_1 m_2 / r^2$$

$$g_1 = F_{12}/m_2 = -Gm_1/r^2$$

$$\Delta U_{r\infty} = -Gm_1 m_2 / r$$

$$\Delta U_{AB} = \Delta U_{A\infty} + \Delta U_{\infty B} = \Delta U_{A\infty} - \Delta U_{B\infty}$$