$$W = \bar{F} \cdot \Delta \bar{r}$$

$$W = \int_{x_i}^{x_F} F(x)\, dx$$

$$W_{net} = \Delta K \qquad K = \tfrac{1}{2} m v^2$$

$$W' = \Delta K + \Delta U_g + \Delta U_{sp}$$

$$U_g = mgz \qquad U_{sp} = \tfrac{1}{2} k x^2$$

$$I = \int_{t_i}^{t_f} F(t)\, dt = \Delta p$$

$$m_1 v_{1i} + m_2 v_{2i} = m_1 v_{1f} + m_2 v_{2f}$$

$$v_{1f} = \left( \frac{m_1 - m_2}{m_1 + m_2} \right) v_{1i} + \left( \frac{2 m_2}{m_1 + m_2} \right)$$

$$v_{2f} = \left( \frac{2 m_1}{m_1 + m_2} \right) v_{1i} + \left( \frac{m_2 - m_1}{m_1 + m_2} \right) v_{2i}$$

$$x_{CM} = \frac{\sum m_i x_i}{M} \qquad p = M v_{CM}$$

$$M x_{CM} = M_I x_{I_{CM}} + M_{II} x_{II_{CM}}$$

$$\Delta t = \gamma \Delta t_p$$

$$L = \frac{1}{\gamma} L_p \qquad \gamma = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$p = \gamma m v$$

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

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

$$\omega^2 = \omega_i^2 + 2\alpha(\theta - \theta_i)$$

$$\theta = \theta_i + \tfrac{1}{2}(\omega_i + \omega) t$$

$$I = \sum_i m_i r_i^2$$

$$K = \tfrac{1}{2} I \omega^2$$

$$L = I \omega$$

$$\tau = r F \sin\theta = r_\perp F$$

$$\tau = \bar{r} \times \bar{F}$$

$$\tau = I \alpha$$

$$x = A \sin(kx - \omega t)$$

$$k = \frac{2\pi}{\lambda} \qquad \omega = \frac{2\pi}{T} = 2\pi f$$

$$v = \lambda f$$

$$v = \sqrt{\frac{T}{\mu}}$$