$$I \quad = \quad \sum M_i {R_i}^2$$

$$I_{\text{central}} = \frac{1}{12} m L^2$$

$$\begin{aligned} I_{\text{shifted}} &= I_{\text{central}} + m x^2 \\ &= \frac{1}{12} m L^2 + m x^2 \end{aligned}$$

$$\begin{aligned} I_{2-\text{rod}} &= I_{\text{central}} + I_{\text{shifted}} \\ &= (\frac{1}{12} m L^2) + (\frac{1}{12} m L^2 + M x^2) \end{aligned}$$

$$\text{surface density} \quad \sigma = \frac{M}{A} = \frac{M}{L^2}$$

$$dM = \sigma * (\text{ area }) = \sigma * (L * dx)$$

$$dI = (\frac{1}{12}\, dM\, L^2) + (dM\, x^2)$$

$$dI = (\frac{1}{12}(\sigma L dx) L^2) + ((\sigma L dx) x^2)$$

$$dI = (\frac{1}{12}\sigma L^3 dx) + (\sigma L x^2 dx)$$

$$I \quad = \quad \int dm\, R^2$$

$$W = \int \vec{F} \cdot d\vec{x} \qquad\qquad W = \int \vec{\tau} \cdot d\vec{\theta}$$

$$W = \frac{1}{2} m v_f^2 - \frac{1}{2} m v_i^2 \qquad W = \frac{1}{2} I \omega_f^2 - \frac{1}{2} I \omega_i^2$$

$$P = \vec{F} \cdot \vec{v} \qquad\qquad P = \vec{\tau} \cdot \vec{\omega}$$