

### Rotational Motion

$$\tau_{\text{net}} = I\alpha \quad \tau = rF \sin\theta \quad \tau = rF$$

#### Linear to Rotational Conversions

$$x = r\theta \quad v = r\omega \quad a = r\alpha$$

#### Rotational Kinematics

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

#### Rotational Momentum

$$L = I\omega \quad K = \frac{1}{2}I\omega^2 \quad \Delta L = \tau\Delta t$$

### Momentum

$$\text{When Momentum is Conserved:} \quad \sum p_i = \sum p_f$$

$$p = mv \quad \Delta p = F\Delta t \text{ or } J = F\Delta t$$

$$\text{Elastic Collision (KE conserved, p conserved)} \quad m_1v_1 + m_2v_2 = m_1v_3 + m_2v_4$$

### Momentum

$$\text{When Momentum is Conserved:} \quad \sum p_i = \sum p_f$$

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