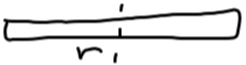




## Moment's Of Inertia:

Rod   $I = \frac{1}{3} mr^2$


  $I = \frac{1}{12} mr^2$

Ring   $I = mr^2$

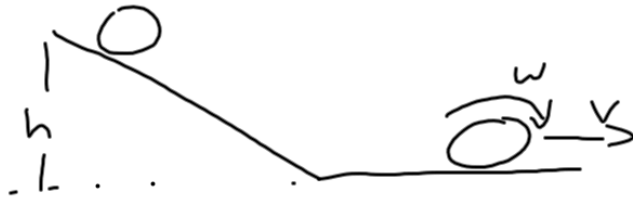
Disk   $I = \frac{1}{2} mr^2$

Point mass   $I = mr^2$

Solid Sphen   $I = \frac{2}{5} mr^2$

Hollow Sphen   $I = \frac{2}{3} mr^2$

## Web Assign Problem 1



$$E_{Total i} = U_g$$

$$E_{Total f} = K_{Trans} + K_{ROT}$$

$$v = r\omega$$

$$\omega = \frac{v}{r}$$

$$mgh = \frac{1}{2} mv^2 + \frac{1}{2} I \omega^2$$

$$mgh = \frac{1}{2} mv^2 + \frac{1}{2} \left( \frac{2}{5} mr^2 \right) \omega^2$$

$$gh = \frac{1}{2} v^2 + \frac{1}{5} r^2 \left( \frac{v}{r} \right)^2$$

## Other Rotational Energy Set ups

Before                      After

$E_o = U_{gb} = mgh$

$E_f = K_{bL} + K_{rotT}$

$mgh = \frac{1}{2} m_b v_{fb}^2 + \frac{1}{2} I_T \omega_T^2$

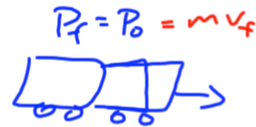
$v = \omega r$

## Angular Momentum:

### Angular Momentum

Linear

$\vec{p} = m \vec{v}$   
 Collisions! inelastic



$I = \Delta p = F \cdot \Delta t$

$v_f < v_o$

Angular

$L = I \omega$

$\Delta L = \tau \cdot \Delta t$

must have an outside force in order to change momentum

Disk on Disk



ω ↓ because m ↑

L is conserved