Translational	Rotational
Work $= F \cdot d \cdot \cos \angle^{F}_{d}$	work $= \tau \cdot \Delta\theta \cdot \cos \angle^{\tau}_{\Delta\theta}$
Power $= \frac{\text{work}}{t} = F \cdot v \cdot \cos \angle^{F}_{v}$	Power $= \tau \cdot \omega \cdot \cos \angle^{\tau}_{\omega}$
$K_{translational} = \frac{1}{2} m v^2$	$K_{rotational} = \frac{1}{2} I \omega^2$
Linear Momentum $p = m \cdot v$	Angular Momentum $L = I\omega$
p is constant or conserved if $F_{net} = 0$	L is constant or conserved if $\tau_{net} = 0$
Impulse $= F_{ave} \cdot \Delta t$	Angular Impulse $= \tau_{ave} \cdot \Delta t$

I: rotational intertia or moment of inertia

Translational Motion		Rotational motion
$K_{trans.} = \frac{1}{2} m v^2$	$=$ equal!	$K_{rot.} = \frac{1}{2} I \omega^2$

The point mass should have the same amount of energy regardless whether we treat it as having rotational or translational energy.

$$\cancel{\tfrac{1}{2}} m v^2 = \cancel{\tfrac{1}{2}} I \omega^2$$
$$m v^2 = I \omega^2$$
$$m (r\omega)^2 = I \omega^2$$
$$m r^2 \cancel{\omega^2} = I \cancel{\omega^2}$$
$$m r^2 = I$$

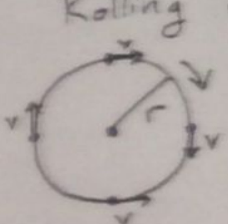
Inertia for pt. mass

$$\boxed{I = m r^2}$$

depends on the location of the mass and how much mass it has.

'r' is the distance between the mass and the axis.

Rolling without slipping:



rotate about fixed axis
dist. $= r \cdot \Delta\theta$
spd $= r\omega$
$a_T = r\alpha$

translational motion of center axis
dist. $= r \cdot \Delta\theta$
vel. $v = r\omega$
$a = r\alpha$