Physics 190 Formula Sheet 2

Rotational Inertia:

Thin Hoop

$$I_{cm} = m \, r^2$$

Thick Hoop

$$I_{cm} = \frac{1}{2} m \left(r_1^2 + r_2^2 \right)$$

Disk/Cylinder

$$I_{cm} = \frac{1}{2} m \, r^2$$

Rectangular Plate

$$I_{cm} = (1/12) \, m \, (L^2 + W^2)$$

Rod about its center

$$I_{cm} = \frac{1}{12} m \, L^2$$

Rod about its end

$$I = \frac{1}{3} m \, L^2$$

Solid Sphere

$$I_{cm} = \frac{2}{5} m \, r^2$$

Thin Spherical Shell

$$I_{cm} = \frac{2}{3} m \, r^2$$

Parallel-axis theorem:

$$I = I_{cm} + m \, d^2$$