TABLE 8.1
Moments of Inertia for Various Rigid Objects of Uniform Composition

Hoop or thin cylindrical shell
\[ I = MR^2 \]

Solid sphere
\[ I = \frac{2}{5} MR^2 \]

Solid cylinder or disk
\[ I = \frac{1}{2} MR^2 \]

Thin spherical shell
\[ I = \frac{2}{3} MR^2 \]

Long thin rod with rotation axis through center
\[ I = \frac{1}{12} ML^2 \]

Long thin rod with rotation axis through end
\[ I = \frac{1}{3} ML^2 \]

Table 8-1, p.241
MOMENTS OF INERTIA

RING MASS M

SAME AS

HOLLOW CYLINDER MASS M

ALL MASS AT R

\[ I = \sum m_i r_i^2 = MR^2 \]

DISK (DISC) MASS M

SOLID CYLINDER MASS M

SAME AS

ALL MASS AT LESS THAN R.
SO "AVERAGE" \( r^2 \) IS LESS THAN R
SO \( I < MR^2 \)
IN FACT \( I = \frac{1}{2} MR^2 \) (CALCULUS!)

SOLID SPHERE MASS M.

"AVERAGE" \( r^2 \) IS LESS THAN FOR SOLID CYLINDER:

SIDE VIEW: