

CONCEPT: PARALLEL AXIS THEOREM

- The moment of inertia is a really important quantity to know, because it acts like _____ in rotational equations
 - However, moment of inertia isn't a fixed quantity like mass; it changes depending on the rotation
 - Typically, moments are given on exams or in homework, but only what I'd call "typical" moments of inertia
 - How do we solve a problem with a non-typical moment of inertia?
- For instance, we know how to find the moment of inertia of a disk rotating about its central axis: _____
 - What if this disk weren't rotating about its central axis, but was rotating about its rim?
 - If we aren't given this new moment of inertia, we can find it using the PARALLEL AXIS THEOREM

- The PARALLEL AXIS THEOREM will give us the "non-typical" moments of inertia:

$$I = \underline{\hspace{2cm}}$$

- where d is the distance between the center-of-mass axis and the new axis, which must be PARALLEL

EXAMPLE 1: A disk has a mass M and a radius R . What is its moment of inertia about an axis perpendicular to the surface of the disk, at the rim of the disk? What about a parallel axis half-way to the rim of the disk?

EXAMPLE 2: The moment of inertia of a thin rod of length L and mass M about an axis perpendicular to the rod, at the edge of the rod, is $(1/3)ML^2$. What is the moment of inertia of the rod about a parallel axis halfway from the edge to the center of the rod?