0. **(0 points)** /opt/webwork/webwork2/conf/snippets/ASimpleCombinedHeaderFile.pg

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Assignment PHY141_WW8 due 11/04/2022 at 11:59pm EDT

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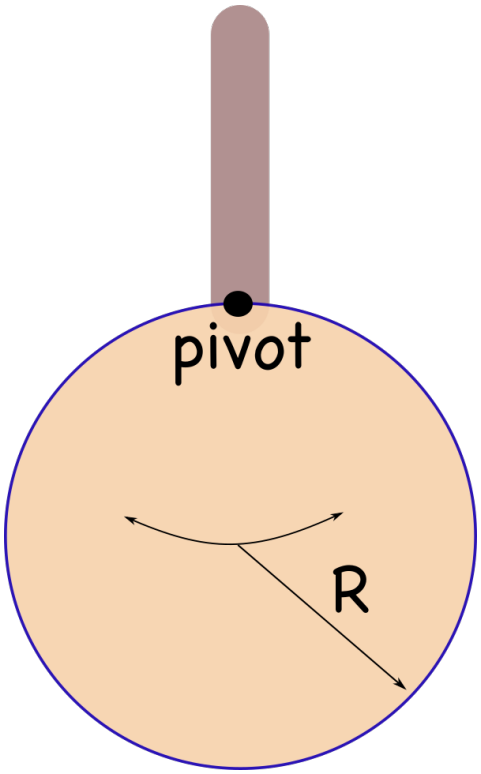
1. **(1 point)** setPHY141_WW8/inertia_disk.pg

On the parallel axis theorem



A thin and uniform disk of radius R and mass M is held with a pivot on its edge.
Use the parallel axis theorem to find the disk's moment of inertia about the pivot point.
The moment of inertia about the pivot point is $I =$ ___ MR^2
(Enter a number accurate to 1 decimal place.)

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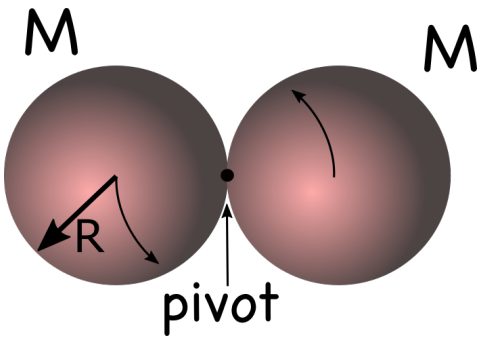
2. **(1 point)** setPHY141_WW8/2sphere.pg

On the moment of inertia



Do two spheres are touching and glued together. Each sphere has mass M and radius R.
At the position where they touch there is a pivot. The two of them form a solid body that can rotate about this pivot point. The axis that they rotate about is perpendicular to the point of view. The direction of rotation is shown with the curved arrows.
What is the moment of inertia about the pivot point?
Enter $I =$ ___ MR^2

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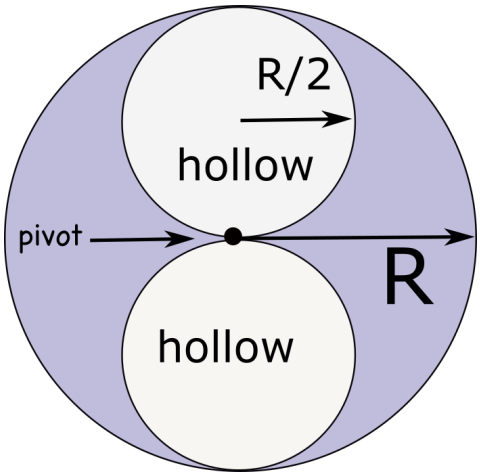
3. **(2 points)** setPHY141_WW8/holes.pg

On superposition and moment of inertia



A disk is mounted with a pivot in its center. The disk has radius R, density ρ and thickness h.
There are two holes in the disk, each with radius $R/2$.
The disk rotates about an axis that is perpendicular to the disk.
What is the moment of inertia about the pivot?
Enter a value for I: ___ $\rho R^4 h$
A number like $\frac{3\pi}{2}$ can be entered like 3 pi /2.

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4. **(1 point)** setPHY141_WW8/moon.pg

On the spin period

The Moon orbits about the Earth with an orbital period of 1 month.
We always see the same side of the Moon. The Moon is tidally locked with the Earth.
What is the spin rotation period P of the Moon?
Enter a value for P: ___ months.

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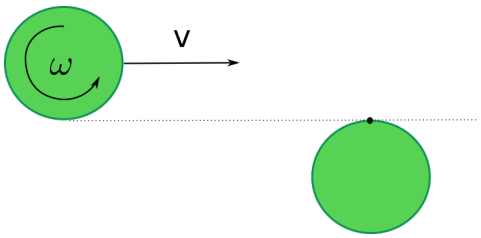
5. **(2 points)** setPHY141_WW8/twodisks.pg

On conservation of angular momentum



Two uniform density disks on a frictionless plane collide and stick together.
The radius of each disk is R. The mass of each disk is M.
The disk on the left is initially rotating counter clockwise with an angular rotation rate of ω.
The disk on the right is initial at rest, but the one on the left is moving with a velocity $V = R\omega$.
The two disks have a grazing contact and stick together.

What is the moment of inertia I of the connected disks about the center of mass of the system?
$I =$ ___ MR^2
What is the total spin angular momentum L of the connected disks after the collision?
$|L_{tot}| =$ ___ $MR^2\omega$
(Ignore the sign)
What is the angular rotation rate of the connected disks after the collision?
$|\omega_{after}| =$ ___ ω

Hint: compute the total angular momentum about the point of contact.
For the connected disks, what is the direction of rotation?

- A. counter-clockwise
- B. clockwise