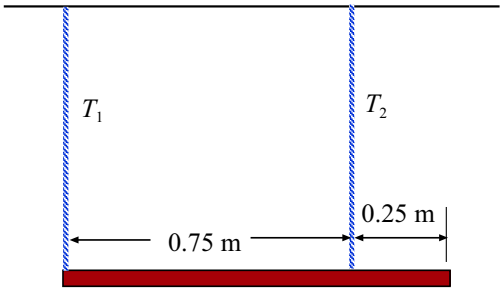
Name_____

Phys 2010 (NSCC), Fall 2007
Problem Set #11

1. A uniform rod 1.00 m in length and of weight 180 N is supported by two wires as shown at the right.

What is the tension in each of the cables supporting the rod?

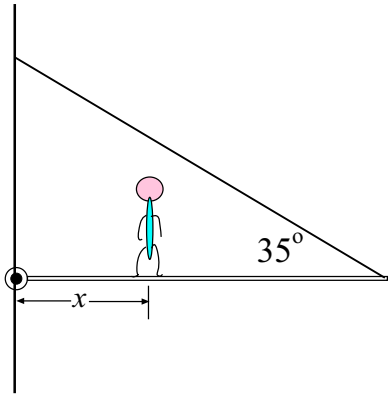


2. The rod from Problem 2 is now supported (horizontally) by *three* ropes, as shown to the right.

Find the tensions in all the ropes.

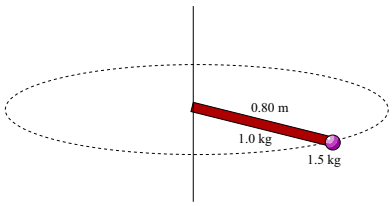
3. A uniform beam of weight 500 N, 6.00 m in length is supported by a cable at the far end as shown at the right. The cable will break if its tension exceeds 1300 N

A man of weight 700 N goes walking out on the beam. How away from the wall can he get before the cable breaks?



4. A uniform solid sphere of mass 4.0 kg, when rotated about an axis through its center, has a moment of inertia of $9.70 \times 10^{-3}\,\mathrm{kg} \cdot \mathrm{m}^2$. What is the radius of the sphere?

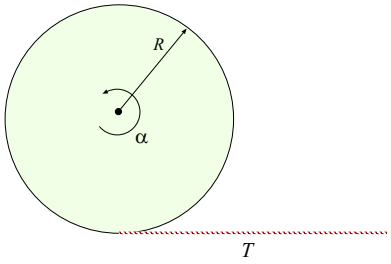
5. A uniform rod of mass 1.0 kg and length 0.80 m is turned about an axis through one of its ends and perpendicular to the rod. A *small* 1.5 kg is attached to the very end of the rod, as shown.



Find the moment of inertia of this system about the given axis.

6. If the sphere in Problem 4 is set in rotation, find the torque that will produce an angular acceleration of 3.00 $\frac{\text{rad}}{\text{s}^2}$

7. A 200-kg merry-go-round in the shape of a uniform, solid horizontal disk of radius 1.60 m is set in motion by wrapping a rope about the rim of the disk and pulling on the rope. What constant force must be exerted on the rope to bring the merry-go-round from rest to an angular speed of 0.600 rev/s in 2.00 s?



8. A horizontal 800-N merry-go-round of radius 1.50 m (which we'll treat as a uniform circular disk) is started from rest by a constant horizontal force of 50.0 N applied tangentially to the merry-go-round. Find the kinetic energy of the merry-go-round after 3.00 s.