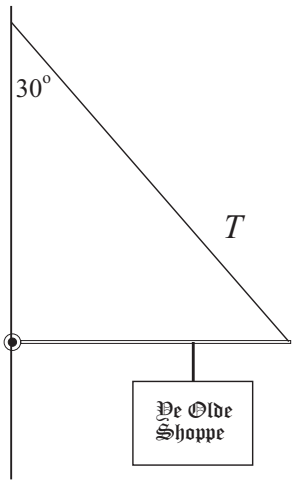
Name_____

Phys 2010 (NSCC), Fall 2005
Problem Set #11

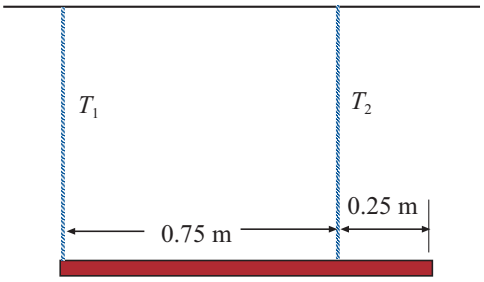
1. A 500-N sign is suspended from a horizontal 6.00-meter long uniform 100-N rod as indicated at the right. The sign is attached to the rod at a point which is 4.0 m from the wall; The left end of the rod is pivoted and the right end is supported by a thin cable making a 30.0° angle with the vertical.

Find the tension T in the cable.



2. A uniform rod 1.00 m in length and of weight 80 N is supported by two wires as shown at the right.

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

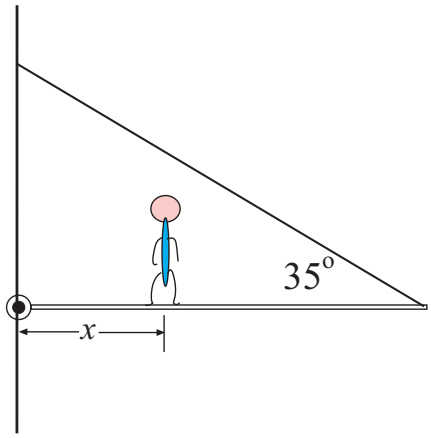


3. The rod from Problem 2 is now supported (horizontally) by *three* ropes, as shown to the right.

Find the tensions in all the ropes.

4. 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

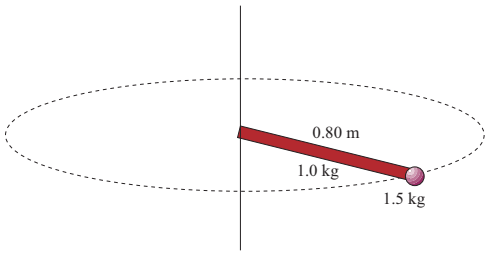
A man of weight 700 N goes walking out on the beam. How away from the wall can he get before the cable breaks?



5. A solid cylinder of mass 9.0 kg, when rotated about its axis of symmetry, has a moment of inertia of $3.70 \times 10^{-2}\,\mathrm{kg \cdot m^2}$. What is the radius of the cylinder?

6. 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.



7. If the wheel in Problem 5 is set in rotation, find the torque that will produce an angular acceleration of $2.5\,\frac{\text{rad}}{\text{s}^2}$

8. A 150-kg merry-go-round in the shape of a uniform, solid horizontal disk of radius 1.50 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 0.500 rev/s in 2.00 s?