1. Calculate the tension in the cable supporting the beam. The beam has a mass of 58.0 kg and the weight on the end has a mass of 35.0 kg. The cable is attached at the end of the beam where the weight is and makes a 30.0° angle with the beam.
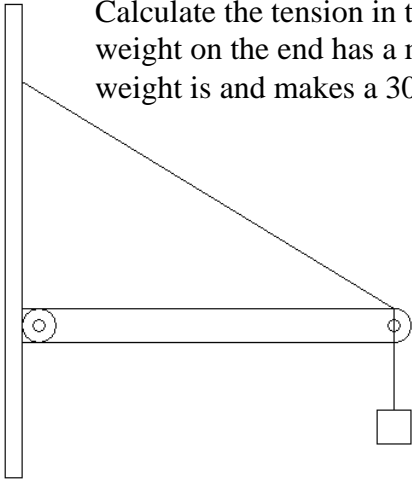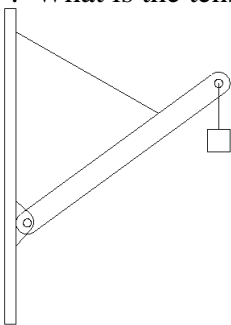

Tension: _____

2. A lamp with a mass of 5.45 kg and a round base 25.0 cm in diameter is discovered to slide when pushed at a point below 40 cm above the floor and tip when pushed above this point. What is the coefficient of friction between the floor and the lamp?

40 cm

μ: _____
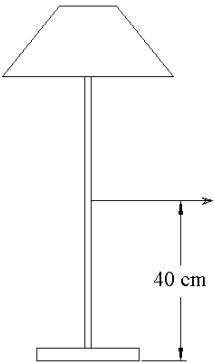
3. The beam has a mass of 85.0 kg and the box has a mass of 45.0 kg. The cable is attached ¾ of the way up the beam and makes an angle of 66.0° with the beam. The angle between the wall and the beam is 54.0°. What is the tension in the cable?

tension: _____

4. A 250 g (gram) meter stick is supported at the 35 cm mark and a 400 g mass balances it when hung at the 10 cm mark. Where is the center of mass of the meter stick? **The meter stick is not uniform and its center of mass is not in the middle.**

Center of mass: _____

5. A ***uniform*** meter stick with a mass of 230 g is supported horizontally by two strings, one at the 0 cm mark and the other at the 90 cm mark. The strings are both vertical. What is the tension (in Newtons) in each string?

0 cm: _____

90 cm: _____

6. Three boys are trying to balance on a seesaw which consists of a uniform board 3.6 m long and supported at the middle. A 50.0 kg boy sits at one end and a 35.0 kg boy is at the other. The third boy whose mass is 25.0 kg wishes to balance the seesaw. Where should he place himself on the seesaw?

From the support: _____

7. A 200 kg box is supported by two ropes. Each rope is massless. One is horizontal and attached to a wall and the other makes a 30° angle with the ceiling. What torque does the weight of the box produce around the point where the rope is attached to the ceiling? What is the tension in each rope?
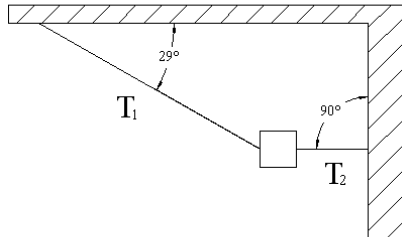
Torque: _____

T_1: _____

T_2: _____

8. A worker is standing on a horizontal, uniform board with a weight of 205 N and a length of 3.00 m. The worker, whose weight is 675 N is standing 1.00 m from one end of the board. What vertically upward forces must be exerted at the ends of the board in order to support it and the worker?

Near the worker: _____

The other end: _____

9. A bowling ball of mass 7.3 kg and radius 9.0 cm rolls without slipping down a lane at 3.3 m/s. Its rotational inertia is 0.024 kg-m2. Calculate it total kinetic energy.

K: _____

10. A 75 kg adult sits at one end of a 9.0 m long board. His 25 kg child sits on the other end. (a) Where should the pivot be placed so that the board is balanced, ignoring the board's mass? (b) Find the pivot point if the board is uniform and has a mass of 15 kg.

Pivot: (a)   _____

Pivot (b):   _____