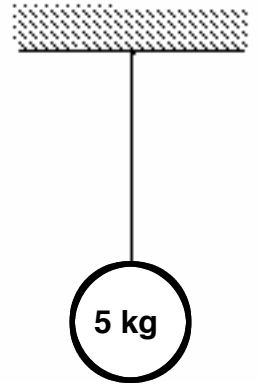
UNIT IV: Worksheet 3 **Name_____ #:____**

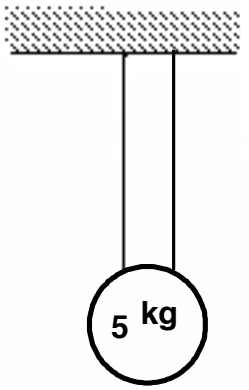
For each of the problems below, carefully draw a force diagram of the system before attempting to solve the problem.

1. Determine the tension ($F_{rope,\ box}$) in each cable in case A and case B.

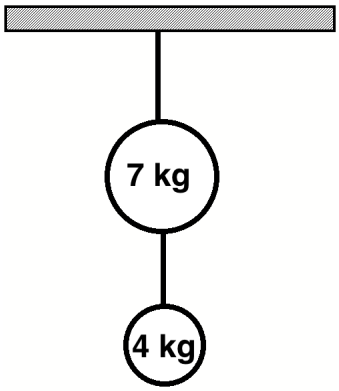
Case A



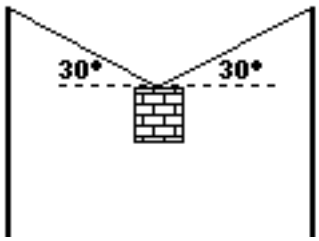
Case B



2. Determine tension in each cable. (Hint: There is more than one way to define the system.)

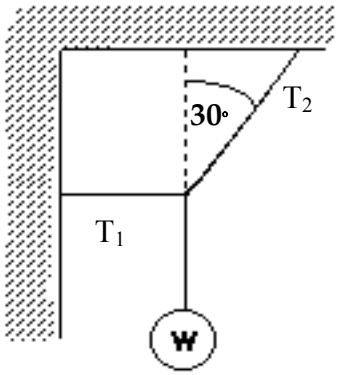


3. The object hung from the cable has a weight of 25 N. Write the equation for the sum of the forces in the y-direction. What is the tension ($F_{rope,\ box}$) in the cable?



Repeat the problem above with a 5° angle. How does the tension compare?

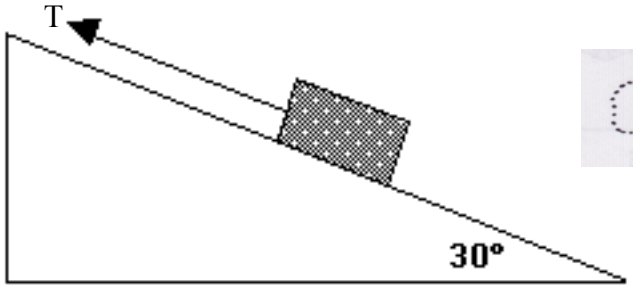
4. The cable at left exerts a -30 N force ($F_{rope\ 1,\ box}$).



a. Write the equation for the sum of the forces in the x-direction. What is the value of T_2 ($F_{rope\ 2,\ box}$)?

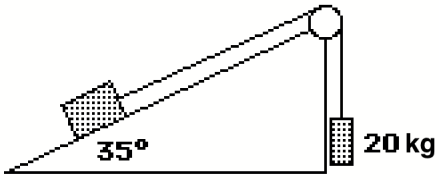
b. Write the equation for the sum of the forces in the y-direction. What is the force of gravity ($F_{earth,\ ball} = m*g$) acting on the ball?

5. The box on the *frictionless* ramp is held at rest by the tension ($F_{rope,\ box}$) force. The mass of the box is 20 kg. What is the value of the tension force?

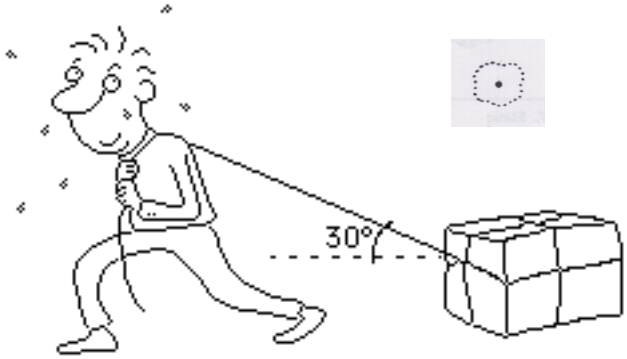


What is the value of the normal force?

6. In the system below the pulley and ramp are *frictionless* and the block is in static equilibrium. What is the **mass** of the block on the ramp?



7. A man pulls a 50 kg box *at constant speed* across the floor. He applies a 200 N force at an angle of 30°.



a. Sum the forces in the x-direction. What is the value of the frictional force opposing the motion?

b. Sum the forces in the y-direction. What is the value of the normal force?

8. A man pushes a 2.0 kg broom *at constant speed* across the floor. The broom handle makes a 50° angle with the floor. He pushes the broom with a 5.0 N force.

a. Sum the forces in the y-direction. What is the value of the normal force?

b. Sum of the forces in the x-direction. What is the value of the frictional force opposing the motion?

c. If the frictional force were suddenly reduced to zero, what would happen to the broom?