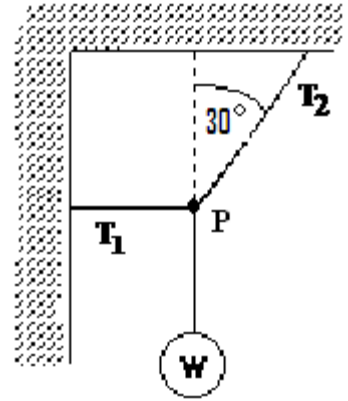


UNIT IV: Worksheet 3

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

1. The cable at left (T_1) exerts a 30 N force. Draw a force diagram for this situation (hint: draw the diagram for the forces acting at point P.)

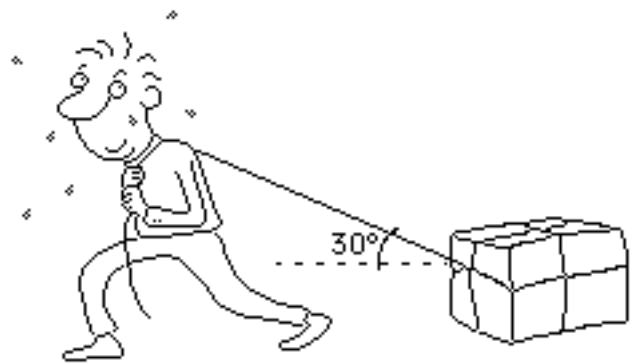
- a. Write the equation for the sum of the forces in the x-direction.
What is the value of T_2 ?



- b. Write the equation for the sum of the forces in the y-direction.
What is the force of gravity acting on the ball?

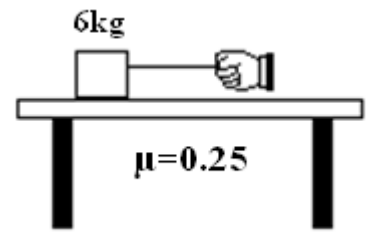
2. A man pulls a 50 kg box *at constant speed* across the floor. He applies a 200 N force at an angle of 30° .

- 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?

3. A 6kg block is pulled across a table at a *constant speed*. The coefficient of friction (μ) between the block and the table is 0.25.



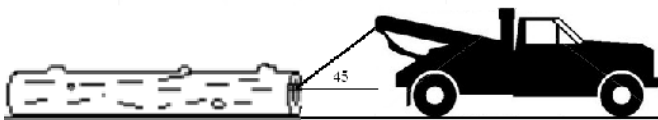
- Draw a force diagram for the block below the drawing. Make sure to clearly label and identify all of the forces.
- Write out the equations for the sum of the forces acting in the x and y directions.

$$\sum F_x =$$

$$\sum F_y =$$

- Calculate the force of friction between the block and the table. How does this compare to the pulling force? Explain.

4. A tow truck pulls a 1000 kg fallen log out of the street at a constant speed. The towing cable makes an angle of 45° to the horizontal and has a tension of 3600N, as shown in the diagram.



- Draw a force diagram for the forces acting on the log. \rightarrow
- Calculate the coefficient of friction (μ) between the ground and the log.