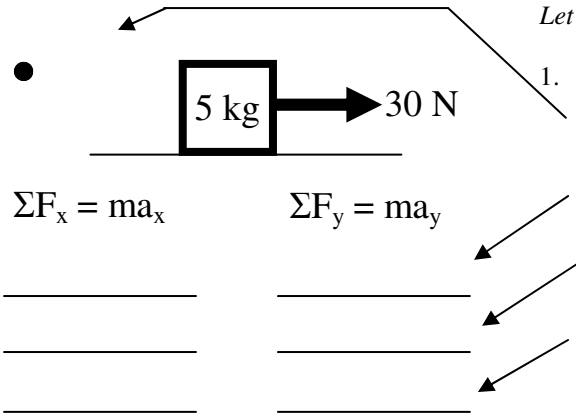
Due Fri., Oct 21

2011 PreAP Forces 4



Let me talk you thru how you NEED to do each of these problems.

1. * A 5 kg mass is acted on by a 30 N force. There is no friction on the ground.

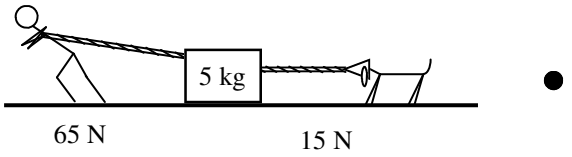
   Step 1: Using a dot as the object, draw all of the forces acting on the object (known as a "Force Diagram").

   Step 2: Write $\Sigma F = ma$ for the both the x and y-directions:

   Step 3: Put in what numbers you know.
   (Hints: Since the object is not jumping up or crashing thru the ground, what is the a_y?)

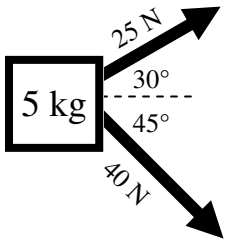
   Step 4: Calculate unknowns. (Find the normal force in the y-direction and the acceleration in the x-direction.)

   This is how you solve ALL force problems.



2. Slim Jim is pulling on an 5 kg box and his dog Bim tries to "help". Calculate the acceleration of the object (*pretend Jim is pulling parallel to the floor*). Show all of the above steps!

Looking DOWN on the object.

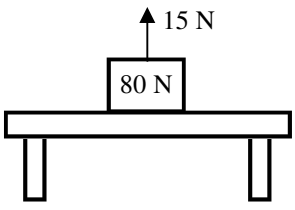


3. Now two forces pull on the 5 kg mass, but at angles.
   A. Which force is bigger (greater magnitude)?
   B. So, which force will the resultant be closer to?
   C. Which components will add together: xs or ys?
   D. Which components will subtract from each other: x or y's?
   E. * Calculate the net force on the object, using what you learned about vectors last chapter (give magnitude and direction).

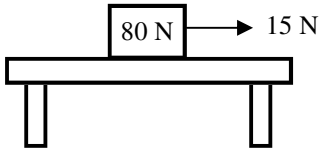
   Since ΣF = ma, the acceleration will be in the direction of the net force.

   F. Calculate the acceleration of the object (*magnitude and direction, of course).*

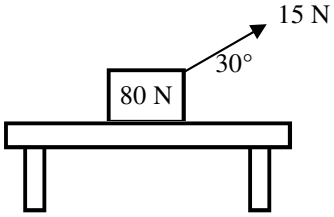
4. Using the LONG METHOD ABOVE (ΣF = ma), calculate the normal force acting on each of the objects below. Also, notice that I gave you the weight of the object, not the mass.



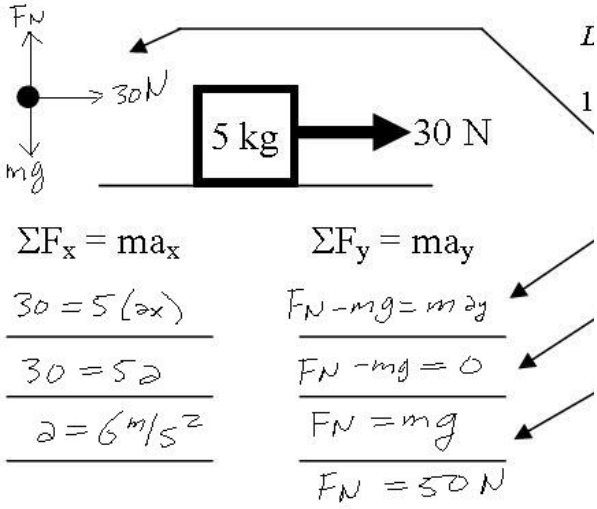
A.



B.



C. * answer on back.



3E) 52.4 N at −17.5°
4C) 72.5 N