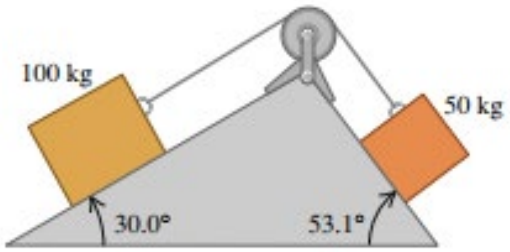
Physics 211 Problem Set 6 Due Friday, 10/11/19
Last Name:_____ First Name _____
Workshop time or section:_____TA name or Room #_____

Please submit your homework on this sheet. If you need more space than is available, please attach additional sheets of paper.



Two blocks connected by a massless not-stretchable cord, passing over a massless frictionless pulley, slide to the left on inclined planes as shown above. Coefficient of kinetic friction is 0.05. (a) What is the acceleration of the blocks? Assume $g=10\ m/s^2$. (b) Find tension in the cord.
Follow the steps outlined in the Friday workshop. The lecture notes outlining the recommended procedure are posted on the course website.

1. Sketch the system and identify parts that you will need to consider when applying Newton's laws.

2. Draw all forces on each block (i.e. draw free body diagrams). Are the magnitudes of tension forces on each block different or equal?

3. Set up x-y coordinate system for the first block with the x-axis in direction of its motion. Set up a different coordinate system for the second block with the x-axis in direction of its motion. Indicate the coordinate axes in the figure above (sketch the axis and label them by x_1,y_1 and x_2,y_2 respectively. What are the y-components of the acceleration of each block in their reference systems?

4. Write Newton's 2nd law in x_1,y_1 directions for block 1, and in x_2,y_2 directions for block 2. Write down also relations of frictional forces to the normal forces and determine weight forces from the given masses.

5. Are accelerations of block 1 and block 2 related to each other? Write the relation if there is any.

6. Count how many equations you wrote in 4 and 5. Count also the relation between tension forces on each object if you labeled them as two distinct quantities.

List all unknowns and count them. Does number of equations equal number of unknowns?

7. (a) eliminate all unknowns except for the magnitude of acceleration of the blocks. This should give you an answer to the first part of the problem.

(b) Use the value of the acceleration obtained in the previous step to find tension in the string. Use one of the equations that you wrote in step 4.