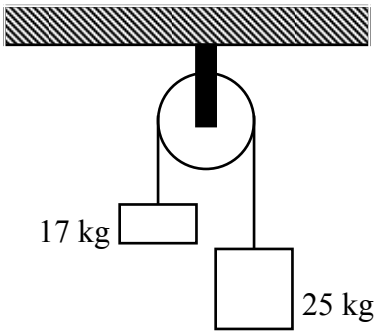
PHYSICS 12 DYNAMIC EQUILIBRIUM WORKSHEET 2

1.



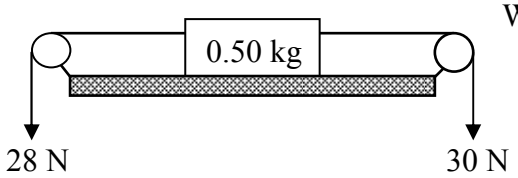
In this diagram, a cord of negligible mass connects the two masses as shown. There is negligible friction.

a) At what rate will the masses accelerate?

b) What is the tension in the cord while the masses are accelerating?

c) If the pulley exerts a 9.6 N friction force, what is the acceleration now?

2.



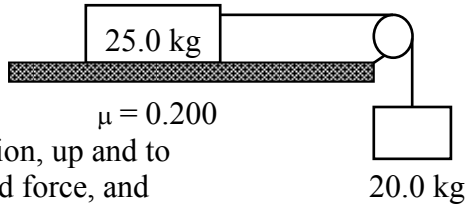
Will the 0.50 kg block be in static equilibrium if:

a) the coefficient of friction between block and table is 0.60?

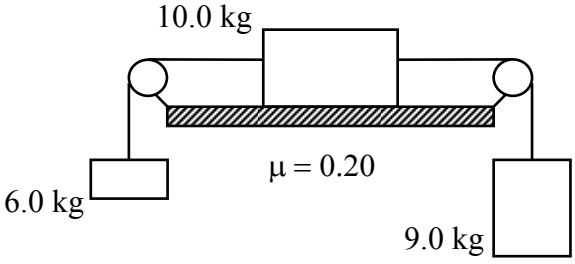
b) the table is frictionless, but each pulley can exert a friction force of 0.5 N?

3. a) Find the acceleration of the system to the right as well as the tension in the string.

b) The 25.0 kg mass is now pulled to the *left*, giving the connected system an acceleration, up and to the left, of 1.50 m/s^2. How large is this applied force, and what is the *new* tension in the cord?



4. Three blocks with masses 6.0 kg, 9.0 kg and 10.0 kg are connected as shown below:



Calculate the following:

a) the acceleration of the system.

b) the tensions in each of the cords connecting the masses.

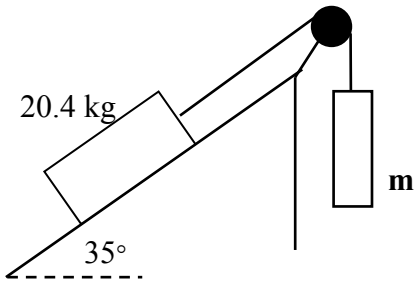
5. Examine the diagram to the right.

a) In the absence of friction, what mass **m** is needed to keep the system in static equilibrium?

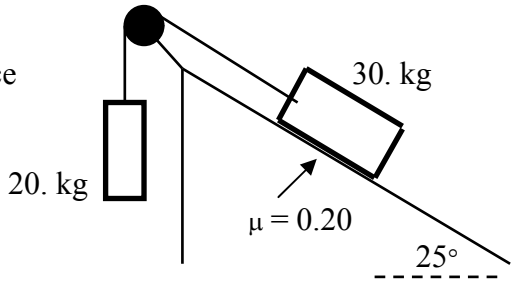
b) Now assume there *is* friction. If the hanging mass **m** is increases to 30.0 kg, causing an acceleration of 1.63 m/s^2,

i) what is the magnitude and direction of the friction force on the 20.4 kg block?

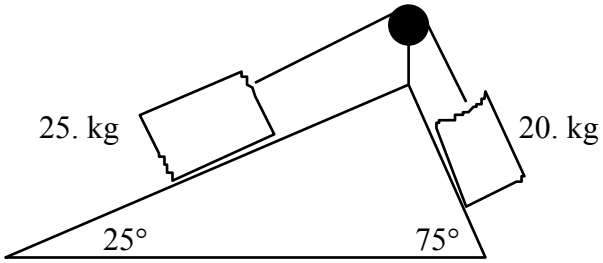
ii) what is the coefficient of friction between block and inclined surface?



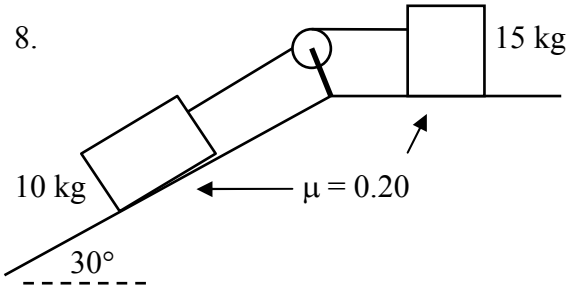
6. Examine the system to the left. Determine the acceleration of the system and the distance the 20.0 kg block will fall in 2.0 s starting from rest.



7. Determine the acceleration of the system and the direction of the 20. kg mass. There is negligible friction in the system.



8.



Find the acceleration in the system and the tension in the cord.

1. a) 1.9 m/s^2 b) 2.0 x 10^2 N c) 1.6 m/s^2 2. a) F_f = 2.9 N, ∴ yes b) F_f = 1.0 N, ∴ no 3. a) 3.27 m/s^2, 131 N b) F_{App} = 313 N, T = 226 N 4. a) 0.39 m/s^2 b) left: 61 N, right: 85 N 5. a) 11.7 kg b) i) 96.8 N downslope ii) 0.59 6. 0.37 m/s^2, 0.74 m 7. 1.9 m/s^2, downward 8. 0.10 m/s^2, 31 N