ISP209 Spring 2002 **Homework 7** Name: _____
Due: Thurs., Feb. 28, 2:40 pm, in Rm 118PA. ID:_____

To receive credit for a problem you must show the work necessary to obtain your answer.

1. To get a 100 kg mass on the ground to begin to move requires a horizontal force of 700 N.

   a) What is the coeficient of friction between the mass and the ground?

   μ = _____

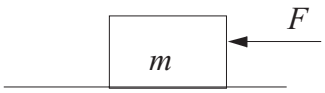
   b) If a 50 kg mass is glued on top of the 100 kg mass, what horizontal force must be applied to make the masses begin to move?

   F = _____

   c) If someone pushes down on top of the 50 + 100 kg mass with a 500 N force, what horizontal force must now be applied to make the masses begin to move?

   F = _____

2. The wind applies a horizontal force **F** = 100 N to the left, on a mass m = 100 kg sitting on the ground. The coeficient of friction between the mass and the ground is 0.3.



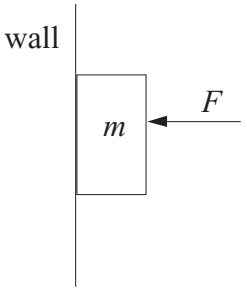
   a) What magnitude and direction of horizontal force must be applied to the mass to make it begin to move to the left?

   F = _____; direction = _____

   a) What magnitude and direction of horizontal force must be applied to the mass to make it begin to move to the right?

   F = _____; direction = _____

3. A block with mass m is pressed against a wall with a purely horizontal force, F , and does not begin to fall. Between the mass and the wall the coefficient of friction is μ . As the force F is decreased , at what value of F will the mass begin to fall?



   F= _____.

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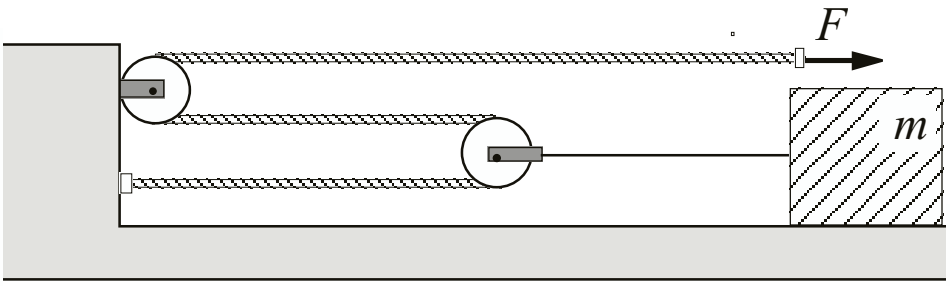

A massless rope runs through a pair of massless pulleys with a wire from one pulley to a mass, m, as shown in the figure above. A stationary person applies a force, $\mathbf{F} = +F$, to the end of the rope but due to frictional forces acting on the mass it does not move, i.e., the forces acting on the mass are balanced.

4. Draw and label the rope tension forces acting on pulleys, and on the person pulling the rope.

5. What is the magnitude of the tension in the rope?

a) F b) $2F$ c) $F/2$ d) $3F$ e) $3F/2$

6. Draw the tension forces acting on the objects at the ends of the wire. What is the magnitude of the force the wire applies to the mass ?.

a) F b) $2F$ c) $F/2$ d) $3F$ e) $3F/2$

7. ? Draw the frictional force vector, $\mathbf{F}_f$, the ground applies to the mass. What is the frictional force vector, $\mathbf{F}_f$.

a) $\mathbf{F}_f = 0$ b) $\mathbf{F}_f = +F$ c) $\mathbf{F}_f = -F$ d) $\mathbf{F}_f = -2F$ e) $\mathbf{F}_f = +2F$

8. Draw the frictional force vector, $\mathbf{F}'_f$, the mass applies to the ground. What is the frictional force vector, $\mathbf{F}'_f$?

a) $\mathbf{F}'_f = 0$ b) $\mathbf{F}'_f = +F$ c) $\mathbf{F}'_f = -F$ d) $\mathbf{F}'_f = -2F$ e) $\mathbf{F}'_f = +2F$

9. What is the net force vector, $\mathbf{F}_{net}$ (sum of force vectors) acting on the ground (or on pulleys attached to the ground?

a) $\mathbf{F}_{net} = +F$ b) $\mathbf{F}_{net} = -F$ c) $\mathbf{F}_{net} = -2F$ d) $\mathbf{F}_{net} = +2F$ e) $\mathbf{F}_{net} = +3F$

10. To balance the forces acting on the ground what force vector is not shown on the figure? Who or what applies this force to the ground ? _____

a) $\mathbf{F}_p = +F$ b) $\mathbf{F}_p = -F$ c) $\mathbf{F}_p = -2F$ d) $\mathbf{F}_p = +2F$ e) $\mathbf{F}_p = +3F$