Name: _____

Date: _____

MCHS Honors Physics 2014-2015

Friction 2

1. Two bank robbers push a 77 kg safe across a floor at a constant velocity. The coefficient of kinetic friction between the floor and the safe is 0.81.
    a. Draw a free-body diagram of the safe.
    b. Write a net force equation for the x- and y- directions.
    c. Find the magnitude and direction of the kinetic friction force acting on the safe.
    d. What is the magnitude of their pushing force acting on the safe?

2. A large piece of vinyl fence lays on a dirt surface (down due to high winds). Jodi is trying to pull it horizontally with a rope. She pulls with increasing force until it just starts to move. If her pulling force at this point is 125 N and the mass of the fence piece is 34 kg:
    a. Draw a free-body diagram of the vinyl.
    b. Write a net force equation for the x- and y- directions.
    c. Find the magnitude of the static friction force acting on the vinyl.
    d. What is the coefficient of static friction between the fence and the dirt surface?

3. This is a continuation of the last problem. Now Jodi is successfully dragging the fence piece along the ground at constant velocity. If her pulling force is now 101 N, and the fence still has a mass of 34 kg:
    a. Draw a free-body diagram of the vinyl.
    b. Write a net force equation for the x- and y- directions.
    c. Find the magnitude of the kinetic friction force acting on the vinyl.
    d. What is the coefficient of kinetic friction between the fence and the dirt surface?

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4. What is the force required to barely start a reluctant pig moving that is lying on its side in some mud? The mass of the pig is 131 kg and the coefficient of static friction for the pig/mud system 0.29. The coefficient of kinetic friction for the pig/mud system is 0.18.

   Once the pig is moving, what force will be required to keep it moving at constant speed?

5. A 7.5 kg sled slides to the left across level ground. When we come into this problem, any pushing forces have stopped and the sled is slowing due to friction. The coefficient of kinetic friction between the snow and the sled is 0.12.

   What is the magnitude and direction of the acceleration vector?