Friction homework

1. A block weighing 300. N is being moved *at constant speed* over a horizontal surface by a force of 50.0 N applied parallel to the surface.
    a. Draw a free body diagram for the block.

    b. What is the coefficient of kinetic friction? *(0.167)*

    c. What would be the acceleration of the block if μ_k= 0.00? *(1.63 m/s²)*

2. A 100. N force is applied horizontally to a 50.0 kg crate resting on a level floor. The coefficient of kinetic friction is 0.150.
    a. Draw a free body diagram to represent this situation.

    b. What is the acceleration of the crate? *(0.530 m/s²)*

3. A 100. N force is applied horizontally to a 50.0 kg crate resting on a level floor. The coefficient of static friction is 0.250. Is the 100. N force sufficient to cause the crate to accelerate? Draw a free body diagram and then explain why or why not.

4. A minimum horizontal pull F is required to get a block of mass m to just start moving from rest on a horizontal surface.
    a. How large is the normal force acting on the block?

    b. How large is the friction force acting on the block just before it starts to move?

    c. What is the coefficient of static friction between the block and the horizontal surface?

    d. Calculate the value of μ_s if it takes a 13 N pull to get a 2.2 kg block to start moving from rest. *(0.60)*

5. Carlos and Miranda are in the lab, determining the coefficients of friction between blocks of various materials and the floor. Each block has a hook on its side. Miranda attaches the spring scale to each block of mass m and pulls each block at constant speed across the floor while Carlos record the spring scale reading F.
    a. How will Carlos and Miranda calculate their values for μ_k?

    b. Complete the table for results that they measured in the lab:

Material pulled along the floor	Mass of the block (kg)	Spring scale reading F (N)	Value of μ_k
Brick	2.20	1.3	
Pine	0.56	2.2	
Steel	1.20	5.5	