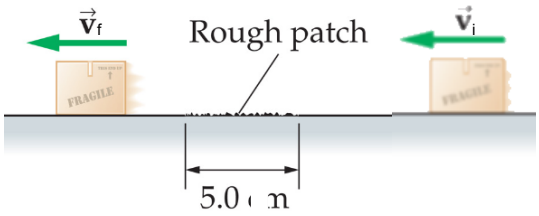
NAME _____ **PERIOD** _____

Physics 1 Semester Review Sample Free Response Problems

1. A 70.0 kg skier is moving down an icy hill that is 25.0 m long. The angle of elevation for the hill is 25° above the horizontal.
   a.) Draw a free-body diagram for the skier as he slides down the hill.
   b.) What is the magnitude of the acceleration of the skier?
   c.) How much time will it take the skier to reach the bottom of the hill?
   d.) How fast is the skier traveling at the bottom of the hill?

2. A box is sliding across a frictionless surface at 10.0 m/s. The box then encounters a rough section on the surface that is 5.0 m long. The coefficient of kinetic friction between the box and the rough patch is 0.40.



   a) Draw a free body diagram for box as it is sliding across the rough patch.
   b) What is the magnitude of the acceleration of the box as it is sliding across the rough patch?
   c) How long does it take the block to pass through the rough patch?
   d) What is the velocity of the block after it has passed through the rough patch?

3. An 8.70 kg block slides with an initial speed of 9.50 m/s up a frictionless ramp inclined at 27.0° with the horizontal.
   a.) Draw a free body diagram for the block as it slides up the ramp.
   b.) What is the magnitude of the acceleration of the block as it is sliding up the ramp?
   c.) How far will the block travel up the ramp before it comes to rest?
   d.) How long will it take the block to come to rest?

4. A rock is thrown from a 50.0-m-high cliff with an initial velocity of 7.0 m/s at an angle of 53.0° above the horizontal. Find each of the following.

   a.) Find the time that the rock was in the air.
   b.) Find the horizontal distance that the rock traveled from the bottom of the cliff.
   c.) Find the rock's velocity when it impacts the ground.