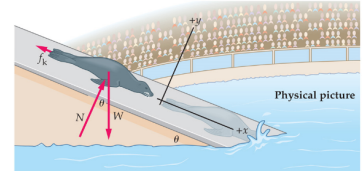


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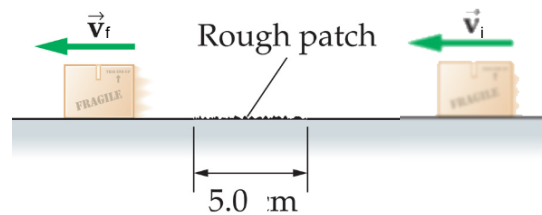
PERIOD _____

AP Physics 1 Semester Review Sample Free Response Problems

1. A trained sea lion slides from rest with constant acceleration down a 3.0 m long ramp into a pool of water. The ramp is inclined at an angle of 23° above the horizontal and the coefficient of kinetic friction between the sea lion and the ramp is 0.26.



- a) Draw a free body diagram for the sea lion as it slides down the ramp.
 - b) What is the magnitude of the acceleration of the sea lion as it slides down the ramp?
 - c) How much time will it take for the sea lion to splash into the pool?
 - d) How fast will the sea lion be traveling when it enters the pool?
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 16.6 m/s up a ramp inclined at 27.0° with the horizontal. The coefficient of kinetic friction between the block and the ramp is 0.32.
 - 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.