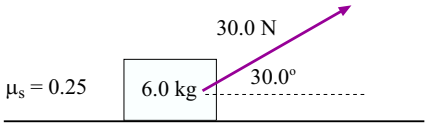
Name_____

Phys 2010 (NSCC), Fall 2007
Problem Set #5

1. A 6.0 kg mass slides on a horizontal *rough* surface which has a coefficient of kinetic friction of 0.25. A force of 30.0 N (directed horizontally) is applied to the mass.

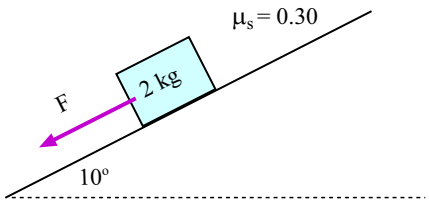
What is the acceleration of the mass?

2. Suppose in problem 1 the applied force had been directed at 30.0° above the horizontal. What would we then get for the acceleration of the mass? (The normal force is not the same as before; find that first.)



3. A 2.0 kg mass rests on a rough slope which tilted at 10° from the horizontal. The coefficient of static friction is 0.30, which is too large for the block to start sliding just from the gravity force.

What force would we have to exert on the mass to get the mass to start sliding *down* the slope?



4. A 2.0−kg mass slides down a *rough* inclined plane which is sloped at 40° above the horizontal. A student measures its acceleration down the slope and finds it to be 4.60 $\frac{\text{m}}{\text{s}^2}$.

What is the coefficient of kinetic friction for the block and this surface?

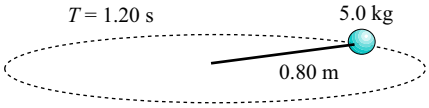
5. A hockey pucks slides across a large patch of flat ice. It starts with a speed of 40.0 $\frac{\text{m}}{\text{s}}$ and slides a distance of 150.0 m before coming to rest.

What is the coefficient of kinetic friction for the puck and the ice?

6. The earth takes one year to travel once around the sun; it moves in a circular path of radius 1.50×10^{11} m.

Find the speed of the earth's motion around the sun. Express the answer in $\frac{\text{m}}{\text{s}}$.

7. An athlete swings a 5.00 kg ball horizontally on the end of a rope. The ball moves in a circle of radius 0.800 m such that it makes one revolution every 1.20 s. Find the speed of the ball.



8. In Problem 7, find the centripetal acceleration of the ball and the tension in the rope.