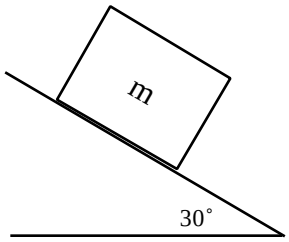
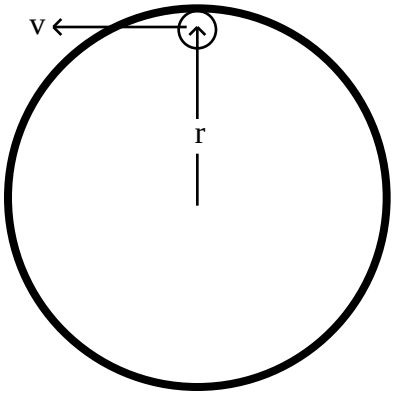
Name:_____

Solve the following problems in the space provided. Use the back of the page if needed. Each problem is worth 20 points. You must show your work in a logical fashion starting with the correctly applied physical principles which are on the last page. Your score will be maximized if your work is easy to follow because partial credit will be awarded.

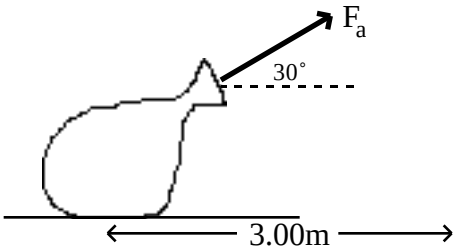
1. A 50.0kg crate skids down a 30.0˚ ramp. The coefficient of friction is 0.450. Find the acceleration of the crate.



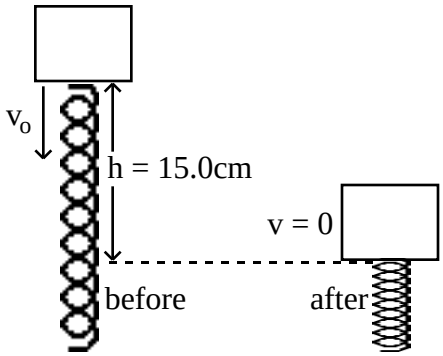
2. In my office is a toy in which a 100g ball rolls around on the inside of a circular track with a radius of 20.0cm as shown at the right. Find the forces that act on the ball at the top of the circle if the speed of the ball at this point is 3.00m/s.



3. A 10.0kg laundry bag is dragged 3.00m across a floor at a constant speed by an applied force of 120N exerted at an angle of 30.0˚ above the horizontal. Find (a)the net work done on the laundry bag, (b)the work done by the applied force on the laundry bag, and (c)the work done by the frictional force on the laundry bag.



4. A 250g block is dropped onto a vertical spring with a spring constant of 5.00N/cm. The block attaches to the spring and drops 15.0cm more before coming to rest. Find the speed of the block just as it hits the spring.



5. Every month Pacific Gas & Electric Company sends me a bill for the energy I "used." As a physicist I find their choice of words to be irritating because I still have to pay the bill! Explain why I object to paying for the energy I "used" and explain what I am really paying for.