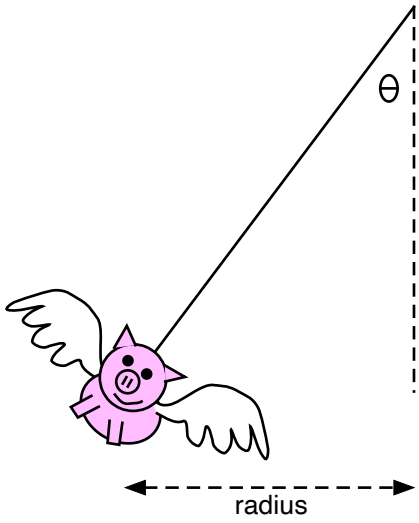
 NAME: _____

Lab 6-3: **Flying Pig**

Purpose: To determine the speed of a pig flying around in circles using two different sets of measurements, and then hopefully be impressed with your accuracy and physics knowledge.



Materials: 1 flying pig 1 stopwatch 1 meter stick

Procedure:

1. Set up the flying pig and get it going around nicely in a circle.
2. You need to figure out how to measure 3 things:
   a. The radius of the circle that the pig is flying in.
   b. The period of the pig's motion. (i.e. the time it takes the pig to go around the circle once.)
   c. The angle that the string makes from either the vertical (shown) or horizontal. (It may be a lot easier to use trig to calculate the angle.)
3. Record your results in the data table and then do the calculations.

Data: **Do your best to measure distances to the center of the pig.**

Radius: _____ Period: _____ Angle: _____ (Length of String: _____)

If you used trig to determine the angle, show your calculation here:

Calculations:

You have to calculate the speed of the pig using two different methods and sets of measurements. Hopefully you get similar answers.

Easy Direct Way:

1. Based on the radius and period of the pig's motion, calculate its speed. Show the equations you are using and your calculations.

Round-About Method using Newton's Laws:

2. Derive an expression for the speed of the pig based on the radius of the circle and the angle from the vertical that the string made. (So make pretend you don't know the time.) In order to do this, you will have to draw a correct free-body diagram, apply Newton's Second Law, and then do some algebra to find an equation that will give you the speed based on the angle and the radius.

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3. Use your freshly-minted equation to calculate the speed of the pig.

4. How close were your numbers? ☐ ☐ ☐

5. Why did you not need the mass of the pig?

6. You calculated the speed of the pig two different ways. Which set of measurements/calculations do you think was more accurate? Explain.