# POSITION AS FUNCTION OF TIME

(L-42)

This is a run-and-shoot lab in the sense that your grade will be generated *during* lab. It is also going to be an interesting lab. You will need to calculate all the parameters needed to determine where a bob on a spring is 3 seconds after the clock is started.

## PROCEDURE--DATA

**Part A:** (the worksheet)

**a.)** During class, we came up with an expression that allowed you to determine *where* a bob was at any point in time. That relationship was:

$$y(t) = A\sin(\omega t + \phi).$$

You are going to determine all the parameters you need to be able to use that expression to determine where the bob will a time t = 3 seconds as it oscillate in the vertical.

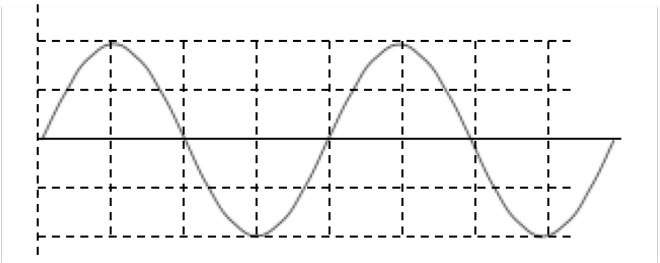
**b.)** Pick a spring. You want to weight the spring with a bob that is large enough so the spring and bob oscillates *very slowly*. Record that mass.

**c.)** Determine your spring's spring constant. (You know how to do this—use what you know!) Showing the relationship used.

**d.)** Determine the spring's angular frequency. Showing the relationship used.

**e.)** We want the oscillation to span as large an amplitude as possible, so choose an amplitude for your spring and record it.

**f.)** I will tell each group where I want their bob to be when the clock starts. That means you will have to determine the appropriate phase shift on the spot. Do that calculation below. (I've provided a sine wave to the right for your convenience.)



**BEFORE MAKING YOUR RUN, YOU NEED TO SHOW ME THE INFORMATION REQUESTED IN THE SECTIONS BELOW.**

**g.)** With all of the information accumulated above, write out the "y(t) = " expression (the only unknown variable in the relationship should be time). Show this to me before you make your run.

**h.)** Evaluate the expression generated in *Part g* to determine the bob's *y-coordinate* as it exists at t = 3 seconds. Show me this information before your run.

**i.)** When you are ready, GET ME so you can make your run.