Introduction to Chapters 6 & 7 Worksheet

This is an "in class" worksheet designed to introduce you to some of the core ideas in Chapter 6 and 7 (We will skip most of Ch 6). Please read carefully and give some thought to your answers. Please work in groups but write your own answers on a separate sheet of paper.

1. You will be given a number of scenarios. In each, make a graph of the situation, labeling what the *x* and *y* axis represent (you do not need numbers on theses axis). Also indicate the type of function that will model the situation (logarithmic, polynomial, exponential, linear, quadratic, or a new type).

   a) The cost of hiring a lawyer who takes an up-front retainer (a set fee) and charges per hour of work.
   b) The value of an investment that grows at 8% per year.
   c) The height of a redwood tree as it grows over time.
   d) The height of a ball thrown up into the air in terms of the time since it was thrown.
   e) The size of the student body at WPS if the school started with 13 kids, grew to 250 after 25 years, fell to 150 after 35 years and then ended up at 350 students after 50 years.
   f) The height of the tide at Monterey Bay over the course of a week.
   g) The average temperature in Portola Valley over the course of 5 years.

2. a) Which two examples above needed a new type of function to model them?
   b) What are the characteristics of this type of function?
   c) What are some other situations that would require this type of "cyclical" or "periodic" function?

3. There is a shape that we are familiar with that has the type of properties that we can use to base our new function type upon. It is a circle. The nicest type of circle is a circle with radius 1 that is centered at the origin. It is called the unit circle. This is the circle that we will base our new type of functions upon.

   a) What is the equation of the unit circle?

   As we move around the circle we can keep track of the *x* coordinate and the *y*-coordinate. We will call our starting location the point the farthest to the right at (1, 0). From there, we will move in a counterclockwise fashion.

   b) **As a class**, make a graph that has as its "*x*" value the amount we have turned on the circle and its "*y*" value the value from the *x*-coordinate of the circle at that point.
   c) Working with the other members of your group, make a graph that has as its "*x*" value the amount we have turned on the circle and its "*y*" value from the value of the *y*-coordinate of the circle at that point.
   d) How would you describe these types of curves in a physics class? What would be the "amplitude'? What would be the "period"?

   If you were really thinking, you would have noticed that parts b) and c) bring up the problem of measuring how far around the circle we have gone. There are two ways to do this, using **degrees** or **radians.** This is what we will talk about in section 6-1.