Chapter 4, Section 1: (Main idea: Basic Trig Graphs)

We have already studied the basic graphs of sine and cosine. Look carefully at the material on the first three pages of this section and see that you have already learned it. If any of that doesn't look familiar, please ask.

In addition to learning the basic graphs, now you must learn about stretching and shrinking – both vertically and horizontally. That is discussed in the remainder of this section. In your previous algebra course, you studied transforming graphs. Please review that in Appendix D of our text if you have forgotten some of it. The first two pages of Appendix D are relevant to stretching and shrinking which are covered in this section of the trig course.

When you sketch graphs to solve problems in this section, be sure to divide the period into four parts and label the five end points of one period. That is described in Examples 2-5 in this section.

Obviously it would be convenient to use graphing technology for some of these problems. You should learn to do that. Consider Example 6 and the discussion of the solution. Notice that it is possible to find the amplitude and period algebraically, without the graph. Be able to find the amplitude and period both algebraically and graphically.

Problem 39. Can you see why you shouldn't even think about graphing this by hand? Much too time-consuming! If you have not yet started using graphing technology in this course, now is the time. You will have some quizzes which require it.

4.1: # 1,9,11,13,15,17,20,21,23,25,27,33,39,43 - 47,50,51,53

Chapter 4, Section 2: (Main idea: Trig Graphs – Translations)

Before beginning this section, review the last three pages of Appendix D about translations of graphs in algebra. The challenge in applying this to trig graphs is that, after a horizontal shift, it is most convenient to think of one period starting at some number other than zero, so dividing the period into four parts and finding the five end points is more challenging.

Look carefully at the two different methods described. You can do just one of those methods – choose the one you like best. But, for Example 1, understand how to do both so that you can make a good decision about which you like best.

4.2: # 1 - 11, 13,14,15,17,19,21,23,25,27,29,33,35,37,39,41,43,45,47abcde

Chapter 4, Section 3: (Main idea: Other Trig Graphs)

Here we investigate the other four trig graphs. You learned the basic form of all of these in a supplement in Chapter 1. Look over page 155-156 and the discussion of the graph of the tangent function on p. 159-160 to notice that you already know this. Now recall that the cotangent function is the reciprocal of the tangent function, so use that to draw its graph. Read those parts of p. 159-160.

In this section the new and difficult material is to use the same old ideas of stretching, shrinking, and translation of graphs on the four trig functions of secant, cosecant, tangent, and cotangent. While there are no new ideas here, there is a lot to practice.

Look carefully at the material at the end of p. 164 on graphing by addition of ordinates. It is important to understand how to do that, but usually we graph such functions using graphing technology.

It is important to use graphing technology to do problems 59 and 61. If you haven't started that yet, do so now. You will have quiz problems requiring graphing technology.

4.3: # 2, 1-6, 7, 11, 15, 23, 26, 27, 37, 39, 40, 48,51,53,57, 59, 61

Chapter 4, Section 4: (Main idea: Harmonic Motion)

Harmonic motion is an important application of the cosine function and the sine function. It is important in engineering and in physics.

If you'll think of the verbal description of the process, then the obvious graph it generates, that will help you pick out parameters you need for the equation (model.) First, if the starting position is zero, then we need the sine function and if the starting position is an extreme point, then we need the cosine function. And if the starting point is an extreme point, that tells you the amplitude, which gives you the value for a in the model.

Then notice the relationship between the period and the frequency. Usually one or the other of those is given and from that you can find the value of ω in the model.

In most physical processes, we need to consider that the motion "dies down" after awhile. That leads to the idea of "damped harmonic motion" which is discussed on p. 170. All you'll need to do with damped harmonic motion is graph an example or two using graphing technology, such as problem 21 on the homework.

4.4: # 1, 3, 5, 7, 9, 13, 15, 17, 19, 21

Chapter 4 Test:

Remember that no calculator will be allowed on Test 2. Follow the same instructions as for the other sample tests.

Chapter 4 Test: Do all problems except problem 8.
(If I give a problem like number 8 on the make-up test or on Test 4, I will provide the graph and you will have access to a scientific calculator to do the calculations.)

Test 2 Review.

Materials allowed for the test: graph paper, ruler, blank paper

No formulas, no notes, no calculator are allowed on Test 2.