

Overview:

One important aspect of mathematical sophistication is understanding that reality can be modeled in many different ways and we choose which way to model based on what types of questions we want to answer. We choose a model that makes it easy to see and manipulate the relevant quantities for answering our questions. These two different types of graphing are good illustrations of models that are different from those you have used to in previous courses.

Because these sections are about graphs, it is interesting to learn to use graphing technology to produce these graphs. I hope that you will do that. It is fun and, with it, gives you a much better feeling for what lots of these graphs look like than you could ever get if you just did all your graphing by hand. So please do use your graphing technology. But, on the test, I will give problems that do not use graphing technology.

Chapter 8, Section 5: Polar Coordinates

Until this point, you have only seen the rectangular coordinate system. In it, lines are represented in a simple, straightforward manner, but other things are harder to represent. In the polar coordinate system it is simple to represent circles and circular-type functions and more difficult to represent lines.

Look at Example 3 to see how simple the equation of the circle looks and how complicated the equation of a line looks. Then notice a rather simple equation for an interesting shape in Example 5. Look at p. 366 for a number of shapes that have simple equations in the polar coordinate system. This is an example of how one type of graph makes lines simple and another makes circular objects simple.

You should memorize and learn to use the relationship between rectangular and polar coordinates to convert equations from one form to the other. Then plot a few points in a polar coordinate system. Next, choose a polar equation and make a table and plot points as in Exercise 5.

8.5: # 3, 5, 7, 9, 13, 19, 21, 23, 25, 37, 39, 41, 45, 47, 49, 53, 59, 63, 67, 73, 75

Chapter 8, Section 6: Parametric Equations

Here we learn about another type of graph where there are three variables (x , y , and t) and a two-dimensional graph to illustrate the relationship. Actually, we use a two dimensional graph and a bit of additional information to indicate how the point is moving along the graph.

1. Read Example 1 carefully to see how to do these by hand.
2. Look at Examples 2 and 3 to see how we can convert parametric equations to a rectangular equation.
3. Look at p. 374 and Example 6 to learn to model the path of an object thrown forward using parametric equations. Understand, memorize, and use the parametric equations in the model. Separately modeling the vertical and horizontal movement makes it easier for most people to understand what is happening, so this is a situation where parametric equations are particularly useful.

8.6: # 2, 3, 5, 9, 11, 13, 15, 19, 23, 25, 27, 31, 33, 35, 39, 41, 45

Chapter 8 Test:

Do problems 8-14. Follow the guidelines for the earlier chapter tests.

Test 4 Review.

Materials allowed for the test: calculator, graph paper, ruler, blank paper, full pages of formulas with blanks for those that must be memorized, 1 page of Ch. 7 notes in your own handwriting. You are required to turn in the notes with the test and you will not get them back. Test 4 will be about half from Chapters 7 & 8.5 & 8.6 and about half from Chapters 4, 5, and 6. Review all of those Chapter Tests while preparing for Test 4.