

MATH 1316 Homework Notes

One of the wonderful things about our textbook is that students are able to do quite a lot of homework relatively easily because there are so many examples and the directions for the homework problems tell you which examples to follow. However, it is often a shock to students that the tests don't have examples for you to follow as you solve the test problems! So please **practice doing many problems without looking at similar examples as you are working them**. When you are doing the homework, follow examples when you need to in order to understand how to do the problem. Make the appropriate notation on the homework cover sheet for that problem. (An example cover sheet is provided.) After you have done a problem by looking at an example, then do another similar problem or two and make sure you are now able to do them without looking at examples. If you don't feel fully confident about that topic, make a note on your cover sheet to ask a question in class and go back and work another similar problem or two later.

Students often ask for a review before each test. I have found that is too late to do much good. You need to think about how to prepare for the test every day as you are doing the work in the course. Your homework cover sheet should be a useful guide as you study for the test. Follow my guidelines for preparing it and write extra notes on it as needed to remember which topics need extra work.

It is particularly important to do some practice tests to find out what you need to study more before the actual test. Students can often improve their test grade by 20-30 points by using this method of studying. Because of this, I am including the Chapter Tests as part of your homework.

Most students in trig classes are preparing for calculus. The material most often used in calculus is in Chapters 4 (graphing,) 5 (algebra with trig functions,) and 6 (trig equations.) I have found that students master these topics more easily if each is introduced several weeks early so that they can get well-acquainted with the simple ideas of each topic before working on the more advanced ideas of the topics. I introduce these topics through supplements to four of the sections in the first three chapters.

Prerequisite Review: (Review of Algebra)

We will not cover this material in class because students who don't already know it need to move to an algebra class instead of staying in this class. Get tutoring if you need it so that you can confidently work ALL of these problems. But if you need help on more than about 20% of them, you should not stay in this class. It is crucial for you to **do these in the first two days of the semester** so that if you need to move back to an algebra class, you will be able to do so immediately instead of wasting this semester. If you miss just a few, you may stay in the class, but get help outside of class to learn to work all of these problems.

Prerequisite Review sheet: 1-25.

Chapter 1, Section 1: (Main idea: Angles)

This should be review material. Do as much homework as you need to learn it. I expect that some of you will not do all of it and will list some as "easy, so I didn't do it." That's OK.

The basic ideas and terminology about angles are important. We'll use all these words enough for you to learn them as we go along, except the phrase "coterminal angles." Students have some trouble remembering that. So make a note of what it means and how to do those problems!

It's a lot easier to compute with decimal degrees than with degrees-minutes-seconds (called DMS on some calculators.) But you do need to learn conversions both directions.

1.1: # 1,2,3,4,13,17,19,23,25,31,33,37,45,49,53,59,63, 73, 77, 79

Chapter 1, Section 2: (Main idea: Triangles)

This should be review material. Do as much homework as you need to learn it. I expect that some of you will not do all of it and will list some as “easy, so I didn’t do it.” That’s OK.

There are many specialized words in this section. You should already know most of them. You shouldn’t need to memorize a lot here – just see if you remember the ideas. Make a note of any idea here that is entirely new to you; probably you’ll need to make an effort to memorize the name of it.

An important skill in trigonometry is sketching figures to illustrate word problems. In this section, as in all sections with word problems, you must sketch the picture **FROM THE WORDS**. Don’t just rely on the picture that is given in the illustration. You sketch the picture from the words and then check to be sure that it agrees with the figure in the book. Ask in class if you can’t figure it out.

1.2: # 1,3,5,11,13,15,17,21,23,25,27,37,39,41,45,51,57,61,67,69,71

Chapter 1, Section 3: (Main idea: Definitions of Trig Ratios)

I expect that this is new material for almost all students. Do the homework slowly and carefully.

You must memorize these definitions of trig functions. Make flash cards or whatever you need. You can work on memorizing for another week or two, so it shouldn’t be too hard.

You should do most problems without a calculator. (See Example 3.) There are so many relationships to learn that you will probably not notice if you are using a calculator too much. Notice that, in the problem set, you are expected to do problems 1-46 without a calculator. If it isn’t clear to you whether you should use a calculator or not on a type of problem, please ask.

When you use your calculator to find trig functions of angles, you must be sure to get the calculator into the correct mode. In chapters 1 and 2, that’s degree mode. Ask in class if you don’t know how.

For one of the quiz problems today, I will ask you to do a bit more calculator work to make a table of function values for one of the trig functions and then make a graph of that trig function. When graphs are introduced in this book in Chapter 4, they go **VERY FAST**. You’ll understand the material here better and do much better later if you get used to the basic trig graphs starting now. After you have done that part by hand, I will give you a handout to assist you in becoming familiar with the graphs of the six trig functions.

1.3: # 1, 3, 5, 7, 9, 13, 14, 15, 17-24, 33, 35, 37, 39, 41, 47, 49, 50, 62

Chapter 1, Section 4: (Main idea: Interrelationships)

This section is about **INTERRELATIONSHIPS**. Don’t memorize formulas and identities from here. Focus on how to derive them from the definitions. Think about how all these ideas relate to each other. **The problems in this section are very important. Problems throughout the rest of the course look quite a lot like these.**

Use the graphs as an alternative way to help you remember the signs of the trig functions (p. 28) and the ranges of the trig functions (p. 28.) It is important to learn to think of these facts both algebraically and geometrically so that you develop a better understanding of the interrelationships. This will also help you remember them more easily.

You should do most problems without a calculator. If it is not clear to you whether you are expected to use a calculator on a certain type of problem, please ask. If you use a calculator too much, you will not learn all you need to learn and get stuck later in the course.

This is a very important type of problem in trig: use the value of one trig ratio to find possible values for all of x , y , and r , and, from those and knowing something about whether the values are positive

or negative, find all the other trig ratios of the angle. Example 4 and problems 55-71 use this. Notice that Example 5 is an alternative way to solve these problems. It is important to learn both methods. You'll need to use these techniques for quite important problems in later chapters (such as 5.1, 5.5, 6.1, and 6.4.)

1.4: # 1, 2, 4, 5, 6, 9, 11, 14, 15, 16, 22, 25, 29, 31, 35, 38, 39, 41, 47, 49, 51, 53, 55, 56, 57, 61, 63, 65, 66, 71, 72, 74, 77, 82

Chapter 1, Section 4. **SUPPLEMENT Basic Trig Graphs**

In our textbook, trig graphs are introduced much later and immediately we do some fairly complicated things with them. I believe you will be able to understand the material in Chapters 1-3 more easily if you refer to the basic trig graphs frequently. You can produce any of these graphs simply by point-plotting, as you have produced many graphs in several algebra courses. Do as much point-plotting as you need to feel comfortable understanding these graphs. The supplement shows you the graphs of the six trig functions.

Supplement: Sketch and label the following functions on the interval $-180^{\circ} \leq x \leq 360^{\circ}$. Do this without point-plotting. Just use your knowledge of the basic shapes.

1. $y = \sin(x)$
2. $y = \cos(x)$
3. $y = \tan(x)$

Chapter 1 Test:

Read the Chapter 1 Summary.

Review your homework cover sheet. For each type of problem that you had questions about when you first worked the problems, find another similar problem in the exercises and work it now (usually an adjacent odd-numbered problem.) If you got it right, great! If you didn't get it right, get help. Then work a few more of that type until you are confident that you will remember how to do these during the practice test and the regular test.

On this practice test, use the first page of the class formula sheet, with all the formulas given. On Tests 2-4 in this class, you will be expected to have memorized many of the formulas. But you will be able to use the formula sheet for Test 1.

It is CRUCIAL that you take this like a test – in one sitting of about one hour, with no interruptions, without notes and without looking up examples or answers until after you finish. Then look up the answers and GRADE IT and put the grade on your homework cover sheet. That gives you an indication about what additional work you need to do in this chapter.

Use the Review Exercises as much as you can to do additional work. If you can't find a similar problem in the Review Exercises, go back to that section in the chapter to find one. If you still can't find one, ask for help. As you are working those similar problems, if you need to go back to read examples again, do so, but make a note that you need to work several problems like each of those when you HAVEN'T just read an example. By the time of the test, you must be able to remember how to do the problem without the prompting of an example.

Include this extra work right after the chapter test when you turn in your homework. Label each problem with section number and problem number. On the cover sheet, just indicate that extra work is included. You do not have to list the particular problems on the cover sheet. Obviously I will not be grading these, since they will differ for different students. However, it is important to include them so that your collected homework presents a complete picture of your work.

Chapter 1 Test: 1-12

Extra work: As required by your studying (last paragraph above.)