

# HOW TO DO BETTER IN MATH AND MATH-RELATED COURSES

## Tips for Notetaking

1. In class, problems are put on the blackboard to show the reasoning processes that you are expected to learn and perform; your notes on those processes will help you to work the exercises that the professor assigns.
2. Take notes even when you're lost: they'll give you something to go over later and make sense of. They also give you something to show the instructor, to say, "This is what I wrote down, but it doesn't make sense to me. What do I need to know?"
3. What should you include in notes?
  - Any material written on the board, especially examples as they are worked.
  - New terms, symbols, definitions, and techniques. They may not be in the book.
  - All material verbally highlighted by the instructor: repeated information; summarized information; information indicated by key words and phrases, such as "Don't do this." "This is a mistake everyone makes." "It's tempting to do this...."
  - Option: Do the problems on one side of your notebook; on the other side, write the information indicated above.

## Reviewing Notes and Reading the Text

1. Review your notes right after class to see if you understand the information and procedures that were explained. Add information to make the notes clearer and more complete.
2. Read the text and review your notes **before** working the assigned problems.
3. Don't expect to read mathematics as fast as you'd read a novel or a letter. It can take 1-2 hours to read two pages of math, because you'll need to think about each line. Your teacher will expect you to spend 2-3 hours on work outside of class for each hour in class.
4. Read with pencil and paper at hand, working through all examples. Don't go on until you understand how to get from one step to the next.
5. If you can't figure it out, mark the trouble spot and get help.
6. Make flashcards for areas of difficulty. Put the basic definition on one side and the steps or formula for solving a particular problem on another. Specialized terminology, symbol systems, and graphics can also be learned this way.
7. Talk your way through the examples to paraphrase their concepts and procedures.
8. Go back and rework each problem without looking at the solution; then check the answer.
9. Compare examples to see what's the same and what's different in the procedures used. This is especially important because similar processes are easily confused.
10. Focus on directions and possible variations in problems.
11. Close your eyes to visualize relationships, charts, diagrams, pictures, equations, etc.

## Working the Assigned Problems

1. Work some problems every day. Math is like competing in a sport, playing a musical instrument, or learning a foreign language. Daily practice is vital to success.
2. Write each step up carefully to get in the habit of clearly showing what you've done. The goal is not only to get the correct answer, but to communicate the process involved.
3. First, try problems for which answers are available.
4. If you don't get the correct answer, review your notes or the material in your text.
5. If you have difficulty, contact a study buddy or tutor or the instructor. Don't hesitate to do this — waiting until the course is half over is too late.
6. After you have basic understanding, work the assigned problems.
7. Focus on similarities and differences: ask how the problems are similar to or different from those in a previous section or chapter. Be able to categorize problems into various types.
8. If you're working a specific example or problem for a long time and realize that no new ideas are coming, leave it for a while and do something else. Sometimes the problem just needs to stew for a while. Fresh ideas may come when you return to the problem. However, do return to the problem! Procrastination does not help.
9. If a problem has you stumped, sometimes rewording it or writing it in an equivalent but different way will help you to recognize it as one that you know how to do.
10. Depending on the type of problem, drawing a picture may help.

## General Study Questions

1. What are the different kinds of problems and how can they be recognized? Is it the format of the problem or the directions which will indicate the specific technique to be used?
2. How are these different problems related? Or are they?
3. In what different ways can the directions can be worded and still mean the same thing?
4. What other versions are possible for this type of problem: how can it be restated?
5. What changes in the wording of the directions indicate different procedures?
6. Is there only one method to work this type of problem or are several techniques applicable? If there are several, how do you choose which to use? Or does it matter?
7. How could you check your answer other than re-working the problem the same way? Does the answer you got really answer the question that the problem asked?

## Before the Test

1. Don't study up to the minute of the exam, or all night. The time before the test should be spent in organizing and consolidating information and practicing doing the problems.
2. Be rested and refreshed.
3. Practice taking a twenty-minute test in ten minutes. Do this several times--once a week or every other week. This will provide pressure of limited time which is usually not present when you're doing homework, but is present during the test.
4. Outline or take condensed notes on your notes from class and on the relevant sections of the textbook. Include sample problems from the class lectures or the homework assignments or the text.
5. Working under pressure is a learned skill, and that's part of what tests require of you. You need to learn to concentrate fully and, at the same time to hurry. It requires lots of self-discipline and is challenging to learn, but it CAN be learned. Practice helps!

## Taking Quizzes and Exams

1. As you read the questions, jot notes on the test so that you can refer to them later.
2. Remember that the ratio of problems correct to problems attempted needs to be high. In other words, it is better to attempt and complete successfully 10 problems in a 20-problem test than it is to attempt all the problems and get fewer than half correct.
3. Do first the problems that are easy and quickly solved and which you know how to do.
4. Next, do the problems you know that take the most time.
5. Then attempt the problems for which you have some idea of a solution.
6. Reserve the rest of your time for checking answers and attempting the rest of the problems. Most students should check an answer as they finish a problem; however, slow, methodical students should probably not do this.

*Revised Summer 2010*