

HOW TO STUDY MATHEMATICS

Adapted from study guides given to freshmen at Ohio State University

INTRODUCTION

Why aren't you getting better grades in mathematics? Do you feel that you have put in all the time on it that can be expected of you and that you are still not getting results? If you are unwilling to work hard, this material is not intended for you. But if you have been trying and your grades still don't show your ability, or if you have been getting good grades but still feel that the mathematics does not mean very much to you, it is very likely that you do not know how to study effectively. This material aims to help you to study mathematics effectively.

Some of you, may feel that you have successful study methods of your own different from the ones described here. In that case, you need not feel you must change your methods, although you might profit from comparing your methods with these.

On the other hand, some of you may feel that the suggestions on the following pages are over-ambitious - that they would require more time and effort than you are prepared to give. You will probably be right. We cannot expect to do everything to perfection, but we can do the best we are able. Out of the suggestions offered, you can pick the ones that may help you most, and as you find your work improving, you may be able to try further suggestions. So scoff if you wish at these ambitious suggestions, but then give some of them a try, a fair try, and watch the results.

HOMEWORK

There is a common misconception that homework is primarily something to eventually hand in to the teacher. Actually, the homework is first and foremost a means of learning fundamental ideas and processes in mathematics, and of developing habits of neatness and accuracy. What is passed in to the teacher is only a by-product of that learning process. The following four-step routine is a suggestion for making your homestudy effective:

1. Get oriented. Take a few minutes to think back, look over your notes, and look over the book to see clearly what ideas you have been working on.
2. Line up the ideas. Think about the ideas, laws, and methods in the day's assignment or lesson. Don't forget to familiarize yourself with any new words in your mathematics vocabulary. Try to remind yourself of any warnings about errors to avoid that the teacher might have mentioned. Go through any examples given to be sure you really understand the concepts being illustrated.
3. Do the assignment. Think about the ideas the exercises are illustrating. You should be increasing your understanding as well as getting the answers. The following pointers will help you do a better job:
 - a. Get the assignment accurately off the blackboard. Have a definite place in your notebook where you write down the assignment or lesson. If you do not understand the assignment, don't hesitate to ask.
 - b. Follow the directions.
 - c. Work neatly and accurately.
 - d. Show your complete work, not just the answer. This will help you and your teacher when you are checking through for errors.

- e. Always check back to be sure you have done all simple arithmetic correctly.
 - f. Do the work promptly before you have forgotten all the instructions.
 - g. If you get stuck, don't just give up! Look back at the book and your notes for ideas related to the problem. If your work on a problem seems to be completely confused, it sometimes helps to discard your paper entirely and start afresh. If you still can't clear your thinking, ask the teacher about the problems as soon as possible.
4. Help someone else, if you can. There is no better way to learn a topic than by trying to teach it! Also, it is often helpful to call upon a classmate when you do not understand a problem. Often, they are able to explain the concept to you as well (if not better than) the teacher.

HOW TO MAKE YOUR ERRORS HELP YOU LEARN

What do you do when an answer is wrong in your homework, or on a test? Do you throw it away and forget it-and then make the same mistake the next time? If you are wise, you will make those errors teach you something. Here's what you can do:

1. Analyze the error to see if you can find what you did wrong.
2. If it is a careless error and you really knew how to do the work correctly, make a note of it, and if you find that you keep making careless errors frequently, start working more carefully.
3. If you can't find where your error is, ask the teacher or a classmate to help you.
4. Keep a page in your notebook entitled, "Warning: Errors to Avoid." On the same page write a description of the corrected way to do that kind of exercise, being sure to emphasize the important idea behind it.

CLASSWORK: HOW TO MAKE THE MOST OF YOUR TIME IN CLASS

1. Get ready. In the minute or two before the class gets started, think over what you have been working on recently.
2. Have all necessary equipment: book, pencils or pens, notebook, homework assignment.
3. Take down the assignment promptly and accurately.
4. Concentrate. This takes an effort if you are the kind whose mind tends to wander.
5. Ask questions when you do not understand.
6. Listen to the questions and answers of others in the class. When another pupil is answering a question, think how you would answer the question.
7. Take part in the class discussion.
8. Do not write at the wrong time. When you are taking notes, be sure you do not miss anything that is said while you are doing so. When taking notes, there are two conflicting things you must try to do. One is to make your notes complete and accurate enough to be valuable to you later. The other is to make your notes brief enough so that you can continue to listen to what is being said in class.

HOW TO USE THE TEXTBOOK

1. Use the index and glossary at the back of the book, especially when you have forgotten the meaning of a word.
2. When your book gives an example to illustrate an idea, analyze the example carefully for the ideas behind it instead of just trying to make your exercises look like the example.
3. If you can't do an exercise, reread the explanatory material in the book and/or go

- over your class notes.
4. Make the most of the study helps at the end of each chapter.

HOW TO REVIEW FOR TESTS

1. Start reviewing far enough in advance so you have time to do a careful unhurried job, and still are able to go to bed early the night before the exam.
2. Be sure to go through your notes and the examples that are there. If they don't make sense to you, you haven't taken enough notes!
3. If there are some formulas for which you are responsible, make a list of them and then practice saying them, or writing them.
4. Use the review materials at the end of each chapter. If you are having trouble on a problem, go back to that section in the book and rework some problems there.
5. If you were the teacher, what questions would you ask on the test? Prepare yourself for those questions.
6. Since it is said that "practice makes perfect", one of the better ways of studying for a test is to do some problems that were previously assigned to you. Go over your homework to be sure you understand the procedure you used in each section.
7. Get a good night's rest the night before the exam!
8. **DON'T WORRY!**

HOW TO TAKE TESTS

1. When you take a test, have the right attitude - take pride in doing the best job you can. Don't try to "get by" with doing as little as possible. Have confidence in your own ability.
 2. Be serious and concerned enough about the test to do your best, but don't worry to the point of anxiety. Fear alone can make a person do poorly on a test, regardless of his ability and knowledge.
 3. Have all necessary equipment.
 4. **FOLLOW DIRECTIONS.** Read carefully and listen carefully for any special instructions, such as where answers are to be written, any changes or corrections, etc.
 5. Look over the whole test quickly at the start and, unless you are required to do the questions in the order given, do the ones you are sure of first.
 6. If you are unable to answer a question, leave it and go on to another, coming back to the hard one later. Often, with a fresh start, you will suddenly see much better what to do.
 7. Be careful to show clearly what you are doing. Remember that the teacher is not a mind-reader, and your grade may depend on whether or not the teacher can see from your work that you understand what you are doing.
 8. Work neatly. It makes a good impression on the teacher!
 9. Check back as you go along for accuracy. Careless errors can make a great deal of difference in your score.
 10. With the right attitude and careful preparation for a test you probably will do well on the exam.
 11. Remember: The one or two hours of the test are but brief moments in your life span so **DON'T PANIC!**
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