

How to Study Mathematics

(Excerpted and edited from an article written by Paul Dawkins)

Most people who do poorly in a math class fall into three main categories.

1. Students who do not have good study habits and/or don't really understand how to study for a math class. This is the largest and most common type of student who has trouble in math.
2. Students who spend hours each day studying and still don't do well. Most of the people in this category suffer from inefficient study habits. Hopefully, with a change in study habits, this student can study more efficiently and not waste time.
3. Students who simply aren't spending enough time studying. The vast majority of the students in this category unfortunately, don't realize that they are in this category. Many don't realize how much time you need to spend on studying in order to be successful in a math class. Many simply aren't willing to make the time to study as there are other things in their lives that are more important to them. While that is a decision that you will have to make, realize that eventually you will have to take the time if you want to pass your math course.

Important Things to Understand

Math is Not a Spectator Sport

You cannot learn mathematics by just going to class and watching the instructor lecture and work problems. In order to learn mathematics you must be actively involved in the learning process. You' have to attend class and pay attention while in class. You need to take a good set of notes. You must work homework problems, even if the instructor doesn't assign any. You need to study on a regular schedule, not just the night before exams. In other words you need to be involved in the learning process.

The reality is that most people really need to work to pass a math class, and in general they need to work harder at math classes than they do with their other classes. If all that you're willing to do is spend a couple of hours studying before each exam, then you will find that passing most math classes will be very difficult.

If you aren't willing to be actively involved in the process of learning mathematics, both inside and outside of the class room, then you will have trouble passing any math class.

Work to Understand the Principles

You can pass a history class by simply memorizing a set of dates, names and events. You will find, however, that in order to pass a math class you will need to do more than just memorize a set of formulas. While there is certainly a fair amount of memorization of formulas in a math class you need to do more. You need to understand how to USE the formulas and that is often far different from just memorizing them.

Some formulas have restrictions on them that you need to know in order to correctly use them. For instance, in order to use the quadratic formula you must have the quadratic in standard form first. You need to remember this or you will often get the wrong answer!

Other formulas are very general and require you to identify the parts in the problem that correspond to parts in the formula. If you don't understand how the formula works and the principle behind it, it can often be very difficult to use the formula. For example, in a calculus

course it's not terribly difficult to memorize the formula for integration by parts for integrals. However, if you don't understand how to use the formula and identify the appropriate parts of the integral, then you will find the memorized formula worthless.

Mathematics is Cumulative

You must always remember that mathematics courses are cumulative. Almost everything you do in a math class will depend on subjects that you've previously learned. This goes beyond just knowing the previous sections in your current class to needing to remember material from previous classes.

General Tips for Studying

Listen During Class: In order to get something out of the class you need to listen while in class. Often this can be difficult to do but it is very important. Sometimes important ideas will not be written down on the board, but instead just spoken by the instructor. Watch for things the instructor emphasizes, even if just in words. This often means the instructor thinks it's important. The more important that an instructor thinks a topic is, the more likely that it will show up on the exam!

Take Good Notes: Try to write down everything that instructor puts on board. It may seem easy when watching the instructor, but it often is not so easy when it comes time for you to do it. A good set of notes will help remind you how to do these problems. For some instructors writing down everything may be difficult. In these cases you should try to write down as much as possible. Note as well that this seems to contradict the previous tip. It is often hard to both listen and take a good set of notes.

Ask Questions: If you don't understand something, then ask a question. Chances are you are not the only one who doesn't understand.

Listen When Others Ask Questions: When other students ask questions make sure you listen to both the question and the answer. It may be that the student asking the question thought of something that you didn't think of.

Review Notes After Class: After each class you should review your notes. Note the topics that you found confusing and formulate questions that you can ask your instructor or to help you understand the topic.

Get Into A Study Group: It is often helpful to study in groups. People often look at things differently so someone else may see how to solve a problem that can't do or understand a topic that you find confusing.

Budget Adequate Time For Studying/Homework: It often takes more time studying mathematics to learn the subject than you may require in other classes. Homework will often take more time than you had originally thought it would. Keep this in mind as you budget time.

Do Homework After Each Class: At the end of each class budget some time to look over the homework from that days lecture and attempt to do it Doing this will allow you time to really work at understanding the concepts covered that day. Do not wait until the last minute to do the homework as this often results in an incomplete homework set and/or an incomplete understanding of the concept.

Do Homework Without Notes and Book: After the first few homework problems, put your notes and book up and try to do the remaining problems without referring to your notes and/or book. In most cases you will not have these during your exams so get used to doing problems without them.

Do More Homework: Do not limit yourself to just the homework that your instructor assigns. The more problems that you work the better off you'll be.

Practice, Practice, Practice: Practice as much as possible. The only way to really learn how to do problems is work lots of them. The more you work, the better prepared you will be when it comes to taking an exam.

Seek Help If You Need It: If you are having trouble with your math class you have many options open to you and you should take advantage of them. You can go to your instructor's office hours to get some help.

Have the Proper Attitude: Always do the best that you can. Do not do try to do just enough to get by. Doing this can lead to major problems if you aren't careful. If you are trying to do just enough to get by then all it takes is one bad exam and you are now failing the course. You should always do the best that you can and strive for the best grade that you can possible get.