

ON STUDYING AND LEARNING MATHEMATICS

Past students have found that some ways are far more effective than others in studying and learning mathematics. Here are some suggestions and pointers that may help you in budgeting the time you can devote to mathematics, preparing for examinations, and learning and understanding the material in a way that promotes long-range retention:

1. Do all reading assignments actively. Keep a pencil and scratch paper at hand. Mark up the pages of the book. Write in any questions you may have. Verify examples given by writing out the details yourself.
2. Plan to do all reading assignments several times. In mathematics courses, reading assignments are seldom more than a few pages long. They often contain, however, subtle ideas which require repeated study before they are mastered. You should read the appropriate section of the text before the class in which it will be discussed, read it again before beginning the homework assignment, and read it a third time after you have completed the homework.
3. Follow the advice in (1) above when reviewing your lecture notes. You should try to go over your lecture notes as soon as possible after the class session has ended. Definitely review the notes before attempting the homework.
4. Do all homework sets on time. Don't let yourself fall behind. If you have difficulty with a problem, especially one that is more theoretical, do the following:
 - (a) Write out the relevant definitions and results. It may now be a small step to complete the problem.
 - (b) Ask whether you can think of a simpler but related problem, and tackle that one first. Is there a special case of the general result? Do you know how to solve the problem in this special case? This approach usually provides insight for attacking the original problem.
5. Do not spend hours sitting still, thinking, reading, studying and reviewing problem solutions! While these approaches may be helpful for other courses and some time should be spent on these activities in mathematics courses, there are more productive paths to learning in mathematics. Spend your time writing out solutions to new problems, deriving relationships, writing down clear definitions, and outlining the steps of a proof. These activities provide a better way to prepare for an examination.
6. Pay a great deal of attention to definitions. Write them out yourself and think about them. Write out examples that do and do not satisfy the definitions. Ask yourself how the definition says something different from its intended meaning if the order of the words is shifted.
7. Begin reviewing for examinations a week early. Use small chunks of time. Tackle those topics you have found difficult; with hindsight they are often easier. Do NOT plan on spending a whole day of study just before an exam. This is almost always an inefficient way to budget your time.
8. Review solutions for homework problems as soon as you get them, and write up (for your own enlightenment) those problems which caused you difficulty.
9. Write down questions that arise as you go along. Bring them with you to class, to review sessions, and to your instructor's office hours.