

Success in Mathematics

(adapted from Saint Louis University's
Department of Mathematics and Computer Science website)

• Active participation in lecture is essential.

- Attend class every day, pay attention, and take complete notes.
- After lecture, either read through or re-copy your lecture notes, marking any details you don't understand. Instructors *love it* when you come to office hours and say, "I was reading through my lecture notes and I didn't quite understand what you meant by..."
- Ask questions! If you're not shy, ask during lecture — other students with the same question will be grateful. If you are shy, ask after class, during office hours, in quiz section, or in the study center.
- If you absolutely must miss class, get the notes from another student and re-copy them by hand. Go to office hours and ask questions about anything in the notes that doesn't make sense. Catch up with the work as soon as you can.

• Stay on top of the material.

- You learn mathematics by *doing* mathematics. Do the homework. Write up complete and legible solutions to *every* assigned problem.
- Each class builds on the material that came before it. Do the homework from one day's lecture before the next lecture so that you're ready to move on.
- Every student learns at a different pace. Take as much time as it you need to get a thorough understanding of the material. (The general rule of thumb is that, for every course credit, an average student should spend two hours per week on course work outside of class. That is, for a 5-credit course, the average student should be working on math for ten hours a week.)
- Get help as soon as you need it. UW and the Math Department offer many free resources. (Well, they're not actually "free". You pay for them with your tuition.) Visit your instructor in office hours, do your homework in the study center or at CLUE, ask questions about the homework in quiz section, form a study group (other students are a great resource).

• Develop your problem-solving skills.

- Read the entire problem thoroughly. Make sure that you understand *every word* — check your lecture notes and/or the text for definitions of mathematical terms.
- Translate every sentence of the problem into graphs or mathematical language. This could take several forms: a picture, a formula, an equation, etc.
- Identify the quantities that you KNOW (i.e., what's given) and what you WANT to find. Think about the different ways that you can represent these quantities. What do they look like on a graph? How can you represent them using functional notation? Would you find them by solving an equation? Again, use your lecture notes and/or text to remind yourself what you've learned.

- Once you’ve solved the problem successfully, look back and try to describe for yourself the steps you followed in your solution. Did you do anything you didn’t really need to do? Did you notice anything you’d never realized before? This step is particularly important if you couldn’t solve the problem on your own and had to ask for help. Articulate for yourself what you were missing so that you won’t miss it the next time it comes up.
- If the answer to the problem is available to you, use it only to check your work. Working backwards from the answer is rarely a useful skill (it will not help you on an exam, nor in the “real world”, where the answers are typically not available to you).

• You control the help you get.

- Get help as soon as you need it — don’t wait until exam time.
- When you go to office hours or the MSC or work with a private tutor, bring in a list of questions you’ve prepared in advance.
- Try to formulate *specific* questions that will allow your instructor or tutor to zero in on what’s troubling *you*. For example, a remark like, “I don’t get Chapter 5,” is likely to get you a brief review of that chapter that may or may not offer you much information beyond what you already understand. A better question would be, “Can you explain how they get from this step to the next?” Your helper will then know what you already understand and what you don’t.
- Do not become too dependent on outside resources. It is not enough for your tutor to walk you through the homework problems if you do not develop problem-solving skills of your own. When it comes right down to it, it will just be you in there trying to work that exam.

• Exams do not test what you understand — they test what you can do.

- Do not convince yourself that you are prepared for an exam simply because you understand everything that your instructor does in lecture. *You* must practice solving problems on your own *before* you get to the exam. (I compare it to sports. An athlete makes everything he/she does look easy. But if I had to prepare for a big game, I’d practice the sport myself, not just watch an expert play.)
- Start studying for exams early — several days to a week before the exam.
- Begin by making the sheet of notes you’ll be allowed to use on the exam. Go through your lecture notes and the text and write down important definitions, formulas, and concepts. Include all the different ways to think about the same idea (graphical representations, algebraic formulas, and specific applications).
- Re-do the homework, especially problems that gave you a lot of trouble the first time through.
- Study with a group. Explaining to someone else how to solve a problem is a great way to make sure you understand the solution yourself and gives you a chance to fill in the gaps.

- Practice taking tests! Download old exams and attempt them in a test-like situation: give yourself 50 minutes, find a quiet location, and use only your sheet of notes as a reference. Check the answers *after* you've exhausted your time. Get help with any problem you can't solve on your own and note *why* you couldn't solve it.

• Develop a test-taking strategy.

- Pace yourself: if you have 50 minutes to complete 5 problems, don't spend more than about 10 minutes on any one problem unless you've solved the rest already.
- Do the problems in the order that suits *you*. Look through the exam and find the problems that you feel confident doing. Do those first (but keep to your pace).
- Partial credit is important. You should make an honest attempt to solve every problem. Often, simply translating the problem into mathematical notation is enough to earn you a point or two.
- Make it easy for the grader to see your work (and, thus, give you partial credit). Show all your steps and mark your final answer clearly.
- Don't waste time erasing. Put an "X" through the work you think is incorrect and start over. If you must use the back of the page for a fresh solution, let the grader know where to look for it.
- Sometimes a problem has multiple parts that depend on the answer to the first part. If you are running out of time and you've decided to give up on part (a) of a problem, make a reasonable guess as to an answer to part (a) and use your guess to attempt the remaining parts. (Be sure to note that this is what you're doing.) Many graders will give you full credit for doing the remaining parts of the problem correctly even if you get the wrong answers.
- Have confidence! The exam will not cover anything you don't have the tools to solve. Even if a problem *seems* unfamiliar, if you have a thorough understanding of the material, you should eventually be able to find the connections between a new problem and the big ideas of the course.