

I've talked to some people who had hoped to get a higher score on Exam 2. Because a few themes have come up multiple times, I thought I'd write this document to give advice to others, who haven't talked to me or the other instructors in person.

I talked in class (and on the Exam 2 Review) about how the test would be harder than the first midterm. That's not because we were aiming to make it harder, or write a bunch of surprising questions – if you look over the exam, you'll see most of them came from lecture and/or writing problems and quizzes. But the material is simply more difficult than the problems in Chapter 1. The same will be true on Exam 3. So if your score on the second midterm was lower than you hoped, what can you do to raise your scores on Exam 3 and the final?

- **Come to Class.** This is straightforward advice, but worth saying. Some students have told me they got into a habit in previous math courses of skipping the lectures and only going to the discussion sections with the TA's, or only going to discussion sections on quiz days. That doesn't work well in Math 3283W. The TA's and I actually interact with each other and coordinate what's happening in lectures and discussion. They cover examples I don't have time for in lecture. They give specific help on the homework problems which end up on quizzes and exams. They're also coordinating oral presentations which are often relevant for those same problems and concepts.

As I've said in class, the material on exams is there because we think it's important. If it's important, we'll spend lots of time on it in class. You may have had a disconnect between class and exams in previous courses, but that shouldn't be the case in Math 3283W.

- **Don't Rely on Lecture Notes.** Building off the last point: I post lecture notes from class so you can have a reference and double-check your notes, but they don't contain every word said in lecture. If you miss one class you can probably figure out what happened by using those notes (and perhaps supplementing from a friend's notes from class), but that's not a substitute for regular attendance. There is mounting evidence that there is a real benefit to taking notes by hand. See this study, for example:

<http://www.psychologicalscience.org/news/releases/take-notes-by-hand-for-better-long-term-comprehension.html#.WEJqkqIrJZg>

If you're already actively engaged in class every day, then it's worth looking at how you're studying for exams. There's relevant advice on the study guides, but it's worth repeating and expanding on it here:

- **Spend 80% of your time doing problems.** You should definitely read through the book, remind yourself of definitions and theorems, take notes, make flashcards, and/or any other strategies that help you learn. But the vast majority of your time should be spent working on problems. You'll find you learn the theorems and definitions that you need if you use them over and over. *Just as importantly*, you'll gain confidence to handle anything that shows up on the exam. You can't possibly do every problem involving sequences in the textbook before the next exam, but you can do enough of them to feel confident that you can deal with any sequence problem that shows up on the test.
- **Don't just read our solutions. Or Stack Exchange's.** You have lots of resources available for you to check your work. It doesn't help as much if you read the solutions before you've tried

the problems. It can be frustrating to struggle with a math problem, but struggling for 30 minutes and figuring out how to do it is much more useful than struggling for 5 minutes and then heading online. Developing open ended problem solving skills is one of the goals of this (or any other) math course. It takes practice – and unfortunately, there’s not really any shortcut to putting in that effort.

- **Talk to us for help.** Struggling with a problem can be worthwhile, but not to the point of frustration and wanting to give up. If you’ve tried a few things – even just writing out definitions of what you’re given, and what you want to prove – and are truly stuck, email us and/or come to office hours. We’re all pretty good at giving you enough hints to get you unstuck, while still not giving the whole problem away. (So you still get the benefit of solving the problem.)
- **Start studying early.** It’s hard to get help if you start studying for an exam at 10pm the night before. Start studying a week early, so that the Monday before an exam you can start coming to office hours with specific questions.
- **Don’t assume this advice is for everybody else.** It’s easy to read this advice and think, “That sounds like good advice for most students, but my learning process is different.” Sure, there are exceptions to every rule, but we tend to overestimate how common they are. I’ve taught a few thousand students in math courses, and have yet to run across anybody for whom I’d significantly change the advice I’ve given here.

We’re all here to help; don’t hesitate to come talk to any of us in person for advice about studying or questions about the course!