

Unsolicited Advice from Dr. Kelly Delp

(from the course homepage of MATH1920 in Spring 2023 at Cornell University)

Learning math can be both challenging and rewarding. For most of us, depending on previous experience, our math classes in college (as opposed to high school) require us to "level-up" both our problem solving skills, and our depth of understanding of the concepts in the class. Here are some suggestions and things to keep in mind.

- **Learning is often a bit uncomfortable.** You will be often be confused when learning math. You might not know how or where to start when attempting to answer a question. This is COMPLETELY normal. This is how math works. We don't understand, we have an insight, and in hindsight the answer is obvious. It is easy to be hard on ourselves for taking time to have the insight. We should all try to be patient with ourselves and the learning process.
- **Bring a pencil and paper (or tablet, whatever you prefer to write with) to all lectures and recitations.** We'll give you things to think about during class time, but you'll usually need to write things down.
- **Read the text before lecture.** Spend about 20 minutes before each lecture getting to know the main players (definitions, theorems) in the upcoming lecture. We will give some suggested computational exercises. Try to do a few of these before class.

On Seeking Help

There are many opportunities to get your mathematics questions answered on campus. In addition to office hours, there are the Engineering [AEWs](#) and the [MSC](#). Spending time discussing math with our peers, or near peers (someone with a few more mathematical experience points), is a great way to learn mathematics.

However, one should use these resources thoughtfully. It is important to develop your problem solving skills, and mathematical reading and reasoning skills. If one relies too much on tutors when doing one's homework, then these skills may be underdeveloped, which may lead to difficulties come test time. Here are some techniques I recommend when working with peers and tutors.

- Do not ask a tutor or peer for help on a question before you have given it an honest attempt. An "honest attempt" includes reading the relevant text material, going over class notes, and trying it at least twice on two separate occasions.
- See if you can get your questions answered without the tutor writing down anything for you. Following verbal arguments can be more challenging, but if you are the one who ultimately writes everything down, it's more likely to represent your understanding, and not the tutor's. Note, if you are attending office hours online, this will require you to have some way to share your work. Tablets are of course good for this, but also finding a board somewhere on campus to write on and pointing your camera at it also works.
- When working with a tutor or TA, working on scratch paper, not your final draft, is really essential. To figure out an answer to a question, we often need to scribble calculations and ideas, which may or may not be correct. Editing and revising calculations and solutions is often a necessary step. If you are at the stage in your homework where you are working to understand the question, or figuring out the answer, then you are almost certainly not ready to be working on your "turn in" draft. Working on your final draft alone, revisiting the material again not in the presence of TAs, instructors, peers, or tutors, will help solidify your understanding.

- These suggestions are time consuming. Give yourself time to mull over questions. Actively working in more (but shorter) time periods can be an effective way to problem solve. Sometimes we get ideas when we least expect them.