

Math 122B Study Tips

The key to achieving greatness in calculus is **focused, deliberate practice**. This means spending as much time as possible working on problems by yourself *without* the aid of your book, friends, the internet or tutors. The only way to succeed is to struggle!

This is *not* to say you shouldn't take advantage of your numerous resources when necessary! In fact, learning *how* to appropriately use your resources is crucial. I recommend the following process for exam studying:

1. Make yourself a practice exam if your instructor hasn't provided one. Do this by choosing *representative problems* from the sections covered (make sure they're similar to homework or class problems!)
2. Put yourself in an exam setting by turning off music, internet, phone, friends, etc, and setting a timer for 50 minutes. Make sure you won't be distracted during this hour.
3. Take your exam as if it mattered - don't stop to look things up, just do what you can. Mark problems you had a difficult time with - these will form the basis of further study.
4. Afterwards, take a break, check your Facespace or whathaveyou, stretch, then grade your own exam if possible using the answers in the book or answers provided by your instructor. Or, better yet, swap with a friend and grade each others' (if you're social like that).
5. Identify trouble areas and focus further efforts there:
 - If it's algebra you're having a hard time with, you just need more practice. Do as many problems as possible from the relevant sections - odd numbered questions are especially good because the answers are in the back. You will never get better at algebra by *only* watching someone else do it or reading about it in a book! (Watching and reading can get you started, but you must practice). Algebra is like fine art: you can learn a lot by looking at a Rembrandt or Picasso, but unless you start painting...
 - If it's concept comprehension that is the issue, read the book, watch videos on YouTube, or talk to your instructor. Personally, I like to get as many perspectives as possible on more abstract concepts - that way I can choose my favorite way of thinking about it.

On the next page, I list some mathematics study resources.

- Books. Head to the science and engineering library and find some books on calculus. This is a great way to find more problems to do or a different way to think about things. Anything with the name ‘Calculus’ or ‘Single Variable Calculus’ should be appropriate for 122B, for instance Stewart, Strang, Apostol, Spivak (more advanced). Also Google ‘MIT calculus textbook’ to access an online version of Strang’s book.
- YouTube. Recommended search terms: MIT 18.01, Khan Academy, UCLA Math 31A. You can also search for more specific items like ‘differentiability’, ‘chain rule’, etc.
- Wolfram Alpha. Be careful not to form bad habits with this incredible tool! Wolfram Alpha can do calculus, but can you?
- math.stackexchange.com. Stack exchange is an online community of question and answer websites, with topics ranging from religion to biology to computer science and programming to wine and beer and cooking. Yes, you can ask math questions on math.stackexchange.com, but **you must show your own attempt and thoughts on the question**. Questions that are clearly directly copied from a book will be immediately down-voted and flagged for deletion by the community. You should also search for previously asked questions on the same topic - for instance ‘Is dy/dx not a ratio?’ is one of my favorite questions. math.stackexchange.com is much better suited for *conceptual* questions as opposed to algebraic ones. If you plan on asking a question, make sure you read through math.stackexchange.com/help as well as meta.math.stackexchange.com/questions/5020/ (to learn how to type math equations)