

Keys to Success in Math 130



This is a challenging class, but you will be successful if you have the right preparation, put in the work, and seek help consistently.

- **Background knowledge:** You should be able to carry out basic algebra (including graphing and solving equations and inequalities with polynomial, rational, trig, exponential, and logarithmic functions) without serious difficulty. Also, you should feel comfortable with very basic geometry (essentially just facts about rectangles, triangles, circles, and lines). For a summary of most facts you'll need, see the "Prerequisites for Math 130" document on the Syllabus page in Canvas.

Some rust on topics you understood well in the past is OK, but if you never really learned them, taking Math 100 and then Math 130 is the way to go.

We will cover at least Ch. 1-4 of the text. *If you did well with this material (differential calculus) in a previous class and received a score above 25 on the math placement exam, you should probably take Math 131.* Please talk to me right away if that is the case.

- **Mindset:** Math is rigorous, but it can also be a lot of fun. You need to be curious about mathematics and be willing to think through the material we discuss. Beyond memorizing facts or procedures, seek an intuitive understanding of the concepts. Ask yourself: can I explain the main idea to someone else in a clear, concise way?

Calculus can't be mastered all at once, so unless you are ready for Math 131 (see "Background knowledge"), there is plenty to work on in Math 130. Even if you've seen some calculus before, focus on getting a deeper understanding and acing the harder problems.

- **Taking advantage of class time:** See the syllabus for tips on getting the most out of class discussions.
- **Homework:** See the syllabus for guidelines on your written work. *Spending time wrestling with problems is the single most important thing you can do for this class.*
- **Studying:**
 - Read the assigned material before class and complete the written reading assignment (see the syllabus). Know what you do and don't understand so you can focus on the problem areas and ask questions. *Learn definitions by heart.*

- Practice the art of reading math. Look first for a big-picture understanding and then dig into the details. Work to understand at multiple levels: summary/main idea, visually, and doing the calculations. *Break each section into a few specific concepts and make it your goal to master them.* The reading assignment should help you with these skills.
 - Don't rush over worked examples in the text. Reworking them on your own is a great way to check your understanding.
 - *Study your notes after class and then try to solve the example problems on your own.*
 - When you study a new concept, explain it to yourself in terms you understand and make connections with things you have already learned. Think hard about the material over an extended period of time (i.e., not just before exams).
- **Time management:** Keep up with reading, homework, and studying your class notes. *You'll need to spend a lot of time working outside of class (at least an hour for each hour in class).* Give each concept and problem a good shot, but don't agonize too long if you are stuck after thinking hard about it. That's the time to get help (and *everyone* needs help in math, even mathematicians!):
 - **Getting help:**
 - Come *regularly* to my office hours and the Math Intern's help sessions; both Sam and I are excited to talk with you! *These are probably the most important sources of help for our class.*
 - Use a variety of sources to find explanations that “click”. Use them as supplements to understand the text and class notes better. Some helpful video and web resources for calculus are
 - * <https://www.khanacademy.org/math/calculus-home>,
 - * <https://www.youtube.com/user/professorleonard57>,
 - * Paul's Online Math Notes <http://tutorial.math.lamar.edu/>, and
 - * Harvey Mudd math tutorials <https://www.math.hmc.edu/calculus/tutorials/>.
- Some good books are
- * *The Calculus Lifesaver* by Adrian Banner,
 - * *The Humongous Book of Calculus Problems* by W. Michael Kelley.
- Take advantage of the Center for Teaching and Learning for help with sharpening your general study skills.
- **Technology:** The right software can speed up your understanding, help you make guesses, and allow you to check your work. There are many good options, but two free systems that I really like are Desmos (www.desmos.com) and GeoGebra (www.geogebra.org); you can use them on a desktop or phone.

We will use software to explore examples in class and lab. I encourage you to do the same. Be careful, though, to work non-technology-dependent problems by yourself *first* before consulting computer graphs or computations. Remember that you will only have a non-graphing calculator for quizzes and exams, so you can't afford to become dependent on outside programs.

- **Strategize:** Take a few minutes to think about your strategy for the course: e.g., how much time per day/week, how to use the time (studying the book and other materials, working on homework assignments, etc.), your plan for getting help, preparation for exams, and so on. Beyond this, pick a few big-picture goals that you want to focus on this semester. (For instance, you may want to strengthen your skills at translating “word problems” into concrete steps and calculations.) Make these goals specific to your personal needs and style, and think about how you will accomplish them.

It won't be easy, but by doing these things you'll be sure to learn a lot and do well in the class!