

# Success in Calculus

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Students committed to learning will find many possible paths to success. No path is error free, but the path best for you may not look like the same path as another student. For this reason, students should continuously assess their academic progress in courses and adjust their academic strategies accordingly.

While there is no magic formula, the following suggestions may improve your ability to succeed in calculus and increase your retention of knowledge.

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1. **Attend class:** This is like stating the obvious, but there is a lot of content in calculus classes that may be presented to you for the first (and possibly only) time. If you skip, you will never know what you missed.
2. **Read ahead of lectures:** If you are frantically taking copious notes during class (or are lost) you likely are not reading enough before class. You can control your reading pace but you cannot control your instructor's lecturing. Hence, make your "first contact" with new course material be under your control by reading before class. You will find that reading ahead allows you to focus on new details in class that you might otherwise have missed.
3. **Divide your reading into smaller sections. Read one section, then read it again. And again:** Reading calculus is like no other reading you will do—calculus textbooks are all details and no fluff. You can help yourself by reading aloud to ensure you do not skip critical details.
4. **Use extra study opportunities to learn with peers:** Problem solving in groups is a key consequence of long-term retention of knowledge. Be actively involved in class, Supplemental Instruction, the math help room, recitation, or other study group opportunities.
5. **As soon as you struggle, determine why:** Calculus concepts are progressively cumulative; hence, you must resolve your struggles with one concept before your struggles compound. Besides using group study opportunities to develop your ability level, also connect with your instructor or TA. You don't need to struggle to reach out. Your TA/instructor are great resources for learning the material.
6. **Do all homework:** Calculus homework replicates what may appear on exams/quizzes. Hence, all homework is test preparation.
7. **Embrace repetition in problem solving:** If your instructor expects you to solve 10 problems, consider this your minimum. You should work out every problem twice

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and do extra problems. This extra effort is the difference between testing your luck and being a good student.

8. **Listen in class during presentation of examples:** Many students want to write down all examples for later reference but are so focused on writing that they fail to hear the instructors' explanations and solution process. Your textbook has examples that you can reference later, so listen carefully during lectures and only take notes of the essential, new information.
9. **Learn the processes:** You can get the right final answer as a fluke, without having any idea how you did. Focus on understanding the solution process as the right answer.
10. **Be logical and critical:** Problem solving is a process of logical steps, but to be a good problem solver requires critical thinking ability. Be conscious of the process it takes to solve the problem.
11. **Study often:** Find the best way for you to study whether it's by yourself or in a study group. After each lecture go through your notes and summarize the material. The minimum amount of time students should devote to chemistry is not the same for everyone. Determine your minimum amount per day and seek to exceed this goal.
12. **Before an exam:**
  - Rewrite key points from your notes into a simplified study sheet (make sure to include each topic and key equation). If helpful write out step by step procedures for different types of problems.
  - Box anything that needs to be memorized or confuses you and make sure to do a couple problems from each topic. While doing those problem, think about ways you could change the problem to make it more difficult or just different and ask yourself if you could solve one those more difficult problems and if not reach out to your professor to ask about it.
  - Make sure to leave time to ask questions (no studying the hard stuff the night before).
  - Study a topic even if you think it is easy and you know it because a lot of times that is what you mess up on, just do not spend as long on it (refresh yourself).
  - Right before the exam test yourself on the important equations and concepts (not problems). When doing practice problems do not just look at old problems, resolve them instead (maybe just write steps and what you would do if trying to save time and can't completely solve) but don't compare to answer until you finish.