

Calculus 122 - Writing Assignments

Goals: Why are we doing writing assignments in a calculus class? There are a number of reasons why this exercise is important in mathematics. Some of them are:

- *Written communication.* Perhaps one of the most important goals of these assignments is to work on your ability to write well. I've never met anyone who was born a good mathematical writer. Writing mathematics is decidedly different than writing an essay (just as, you may have noticed, reading a math text is different than reading a novel) and it will take some time to get good at it.
- *The opportunity to act on feedback.* You will get lots of feedback on assignments, but there is no chance to revise and resubmit. This is a chance for you and me to make sure you understand my feedback and correct mistakes.
- *Celebrating your progress.* It's important to do this, or the constant presentation of new challenges would have us all feeling like failures all the time.
- *A well polished finished product that you can be proud of.* You will have four typed papers that cover the scope of Calculus 122, and give a sense of some of the depth possible within the subject. I hope this will be a satisfying accomplishment as well as a resource.

Logistics: You are encouraged to consult your class notes, your textbook, and me for assistance. You are also welcome to work with other students on the problems themselves; however, **you should do your writing individually**, and submit only your own written work (with the exception of Assignment #2, which is a group project). You may also use online computational tools (e.g. Wolfram Alpha, Desmos, or similar) when appropriate. Otherwise, avoid internet sources and other textbooks. Make note of whom you have consulted, and any sources you have used. Please ask any questions you may have about this policy.

You will submit one draft per problem. Drafts can be submitted at class time or by email; please don't submit them to the homework folders since those go directly to the graders. All drafts and final submissions must be typed. This is part of presenting a professional solution, but also allows you to edit more easily.

Due dates:

- September 28: Draft of Assignment #1 due
- October 19: Draft of Assignment #2 (group project) due, and presentation day
- October 26: Final drafts of Assignments #1 & 2 due (include the original drafts)
- November 5: Draft of Assignment # 3 due
- November 26: Draft of Assignment #4 due
- December 7: Final drafts of Assignments #3 & 4 due (include the original drafts)

Evaluation: The writing assignments are worth 15% of your final grade. Each problem will be graded on a 10-point scale with the only possible grades being 10, 9, 6, 3, or 0 points. There will be little partial credit because of the opportunity to submit a draft. In order to receive full credit for a problem, your solution must be correct, complete, and well written. The final solutions will be graded according to the following scale:

Points	Description
10	The solution is correct and well written according to the course guidelines.
9	The solution is correct but there is a small mistake that minimally impacts the readers ability to understand.
6	The solution is essentially correct but the solution doesn't meet the course guidelines or there is a problem that moderately impacts the readers ability to understand.
3	Significant progress has been made in developing and writing the solution.
0	Little or no progress has been made in developing a solution.

In addition to the 40 points earned on problems, there are 8 points for timely submission of drafts. You will receive 2 points per problem for submitting a draft.

Guidelines for Solutions: Your solutions need to clearly demonstrate your own understanding and be easily understandable to other Math 122 students. In particular:

- All solutions should be written professionally, as if you were writing a textbook. In particular, this means using full sentences, justifying all work appropriately, and formatting mathematics correctly.
- Your audience for these written problems is a peer in Math 122 who is knowledgeable in the calculus content we have covered, but who is unfamiliar with the specific problem you are solving. Everything you write should be an attempt to persuade such a person that your solution is correct. Some ways to do that are:
 - Before starting a calculation, use a sentence to briefly tell the reader what you are about to do. (For example, “We use the limit definition of the derivative to set up the following limit...”, rather than writing down a limit with no context.)
 - Explicitly state what every function and variable means before you use it. (For example, “The area of a triangle is $\frac{1}{2}bh$ ” is not sufficient, because we don’t know what b and h are. Instead, say “The area of a triangle with base b and height h is $\frac{1}{2}bh$.”)
 - Be specific. Avoid using the pronoun “it”. (For example, don’t write “Since it is positive, it is increasing.” We aren’t sure what “it” means in either case here and there’s a good chance each “it” is referring to something different. Instead, write “since f' is positive, the function f is increasing”.)

- Keep the reader informed by writing explanations throughout your work. Never write a long chain of formulas without explaining key steps.
- At the end of a big calculation, part, or problem, summarize your results. This should include explaining the *meaning* of your work. You do not need to include all algebra steps though. In the case of lots of algebra, you can say, “Simplifying,”.
- Your solution should follow all normal rules for written English. Aim for clarity, and don’t try to sound fancy: write clearly and directly.
- On questions requiring you to sketch a graph, use graphing software (Wolfram Alpha, Desmos, or similar) to create a good quality image. Try to avoid rough pencil sketching, or digitizing by taking a picture of a hand-drawn graph. This does not tend to look good in print.
- You should explain how to do the problem, even if the problem does not explicitly ask you to do so. For example, if the problem says to draw a carefully labeled graph, you should explain how you did so.
- Do not expect to write perfect solutions on your first draft. Work out the problems on a piece of scrap paper and then type and reread for clarity.
- Do not expect to finish your assignment in one night! The problems will be challenging, and then there is the added challenge of writing it up well. Give yourself plenty of time to think, talk with other students, visit the professor, think again, write, and rewrite.

The Problems: Assignments will be posted as we cover the related material. By the time a problem is posted, you will have enough knowledge to begin work on the problem.