

HOW TO WRITE MATHEMATICAL ARGUMENTS

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Writing a complete mathematical argument is a skill that takes time to develop. Developing this skill is one of the main goals of undergraduate mathematics courses. We give some advice on this writing process below.

Let's say you have sketched some calculations, and you have a pretty good idea of how to prove a mathematical statement for your homework. At this point, I would do the following:

My Homework Writing Process

- (1) Write a rough draft with pencil and paper.
- (2) Read through the rough draft and correct mistakes.
- (3) Write a final draft with typesetting software.
- (4) Read through the final draft and correct mistakes.

Steps (2) and (4) are probably the most important. While you are proofreading your work, you should check that every new statement is clearly justified. *All* details should be included. Here is a good rule that should clarify the previous sentence.

The Proofreading Rule

Imagine that you have a math major friend that is *not* taking the class. This person should be able to read and understand your work, *without asking you for any additional justifications*. At most, this person would need to be told a few definitions and theorems that have been covered in class. This person should only need a short time to figure out an implication that you have presented.

While reading your homework, the grader will always ask: has the student shown that they understand an implication? If you do not give evidence in your writing that you understand an implication, you may not get full credit.

Step (3) is also a very important step of the writing process. The process of writing your final draft will help you catch mistakes. And if you use typesetting software, the grader will be in a *very* good mood while grading your work. Moreover, learning typesetting will benefit you in your future mathematical endeavors.

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Date: February 12, 2013.