

## Communicating Mathematics through Homework and Exams

Effective communication is essential to mathematics. As a student, much of your communication will be in the form of homework and exams. In the end, whether you are studying calculus or advanced topics in representation theory, it won't matter what you know if you cannot share your ideas with others (specifically your graders). You may also find that taking the time to write out your ideas clearly will help you to better gauge your own understanding. Therefore, it is important that you put your work in an easy to read, easy to navigate format. After all, how you present your work should enhance the ideas you are trying to communicate (to your grader and to yourself), not impede them. With that in mind, the following are some guidelines for submitting work in your math classes.

### Mechanical Issues

- In the upper right-hand corner you should write
  - your name,
  - the class and section number,
  - the homework set number, and
  - the due date.
- Homework with multiple pages should be stapled in the upper left-hand corner.
- Clearly label/number problems on the left side of the page. There should also be a visible separation between problems.
- Start each solution with the original problem statement (or at least a summary thereof, with all key ideas). This will help you to process the question, as well as provide a convenient tool for studying in the future.
- Put problems in the order they are assigned.
- Leave most of the top margin and the entire left margin blank so that graders may use this space for scoring and comments, and so that you can write notes and corrections when studying later.
- Avoid scratch work on assignments. Instead, first work out the solutions to problems on scratch paper, and then write or type them up neatly.
- Indicate your final answers to computational problems clearly, such as by boxing them or placing them in displayed equations.
- For hand-written assignments:
  - Your handwriting should be legible.  
(Don't want to work on your handwriting? See the section on learning  $\LaTeX$ !)
  - Use one side of each sheet of paper. Using both can smudge or obscure writing.
  - Long solutions ( $\geq$  half a page) should have their own sheet(s) of paper.

## Common Mathematical Transition Words

also	as	because	certainly
consequently	conversely	for example	furthermore
given	hence	in fact	in particular
it follows that	likewise	moreover	similarly
since	that is	therefore	thus

If possible, avoid *clearly*, *obviously*, etc. Either it's "clear", in which you can just state it, or it's not. Graders often see these words as red flags—these connectives often indicate that important parts of the problem are being glossed over without understanding.

## Stylistic Issues

- Explain your steps using complete sentences and connective words.
- Make sure that your steps are logical, explicit, and proceed toward the desired conclusion. Pro tip: reading your solution aloud to yourself can help you determine whether it makes sense and flows well.
- Balance words and mathematical symbols. Use mathematical symbols for mathematical objects and precise mathematical relations (e.g., points, sets, numbers, functions, operators). Use words to connect these symbols logically and to relate them conceptually.
- Punctuate your text with whitespace and paragraph breaks. From time to time, center complicated or important formulas and equations on their own line with space around them, especially if they contain fractions or other vertical constructions. (This is called *display setting* the expression.)
- In proofs, make sure you understand what conditions you are assuming and what conclusions you must show. In particular, revisit the appropriate definitions and important theorems. Often this process alone will make the steps of the proof apparent.

For more on stylistic suggestions, see *Guidelines for Good Mathematical Writing*, F. Su, MAA Focus, August/September 2015, pp. 20–22.

If you are interested in learning to type up your solutions, LaTeX (pronounced "lah-tek" or "lay-tek") is an easy-to-learn programming language designed specifically for math and technical writing. There are many resources online to help you out, including [LaTeX-project.org](http://LaTeX-project.org), [TeXample.net](http://TeXample.net), and [TeX.StackExchange.com](http://TeX.StackExchange.com). The "Not So Short Introduction to L<sup>A</sup>T<sub>E</sub>X" is a good quick-reference, and is easily found through an online search.