Communicating Mathematics through Homework and Exams

Effective communication is essential to mathematics. Regardless of how brilliant the mathematicians, their ideas are inconsequential if they are not able to share them with their communities. As a student, much of your communication will be in the form of homework and exams. In the end, whether you are studying basic algebra or advanced topics in crazy-mathiness, 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, so that we may provide you with meaningful and worthwhile feedback, and so you may be able to prove your level of understanding, 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 us and to yourself), not impede them. With that in mind, the following are some suggestions for submitting work in your math classes.

Mechanical Issues

- Your handwriting should be legible.
- Avoid scratch work on assignments: instead, first work out the solutions to problems on scratch paper, and then write them up neatly.
- Use one side of each sheet of paper. Using both can smudge pencil and obscure ink.
- Homework with multiple pages should be stapled in the upper left-hand corner.
- In the upper right-hand corner you should write
  - Your Name
  - Your Class and Section Number
  - The Homework Set Number
  - The Due Date of the Homework
- Problems should be clearly labeled and numbered on the left side of the page. There should also be a visible separation between problems.
- Each solution should begin 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.
- You should leave most of the top margin and the entire left margin blank so that graders may use this space for scoring and comments.
- To ensure that each problem is graded, problems should be written in the order they are assigned.
- Box your final answers to computational problems.

Stylistic Issues

- Explain your steps using complete sentences and connective words.
- Make sure that your steps are in fact logical and proceed toward the desired conclusion. Often 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.

Common Mathematical Transition Words (not to be overused, of course)

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

Be careful with *clearly*, *obviously*, and *surely*, as graders often interpret these connectives to mean that important parts of the problem are being glossed over and that they should therefore read over the surrounding text more diligently.

If you are interested in exploring these topics further, Nicholas Higham's *Handbook of Writing for the Mathematical Sciences* and Steven Krantz's *A Primer of Mathematical Writing* both present more detailed discussions of good mathematical style.