

Handout #2: Homework Expectations

Each week, there will be a written homework assignment to turn in for a grade. The homework problems will mostly be taken from the textbook, with perhaps a few additional ones added in. Assignments will be posted on the web each Wednesday, and are due in class the following Wednesday. These assignments are the heart of the course. Most of them will take some time to think about, so I caution you against putting them off until the evening before they're due. Late homework will not be accepted except in extraordinary circumstances and with advance permission.

I encourage you to work on the homework problems in groups. But when writing up solutions to hand in, *you must write your own solutions in your own words*, unless an assignment is specifically designated as a group writing assignment. If you collaborate on any assignment, you must list the names of any people with whom you collaborated on that assignment.

Mechanics

Here are my expectations regarding the mechanics of writing up homework assignments:

- **Parts:** Most assignments will be divided for grading purposes into several parts. Each part should be handed in as a *separate stapled and labeled packet*.
- **Identification:** Make sure the first page of each homework packet is clearly labeled with your name, your student number, your section (Math 310A or 310B), the date, the assignment number, and the part number (Part I, Part II, etc.).
- **Staple:** Please staple the pages of each part together. (But don't staple different parts together.)
- **In order:** Arrange your solutions in numerical order, just as they appear on the assignment sheet. Problems that are out of order might not get credit.
- **Legible:** Write your answers neatly and legibly, not too small, with as few erasures or crossouts as possible. Be sure to distinguish clearly between similar symbols, such as $l/1$, $s/5$, $t/+$, x/\times , $y/4$, $z/2$, \in/ε , \subset/C , \cup/U , and uppercase/lowercase letters. Unless mathematical ideas spring fully and impeccably realized from your pen, *your first draft is not acceptable*.
- **White space:** Don't be stingy with white space. Leave at least two blank lines between consecutive problems, and leave one-inch margins on all sides of your pages.
- **Identify answers:** If you show work in addition to your final answers, make sure your answers are clearly identifiable.

Short answers vs. proofs

Homework problems will generally be of two types:

- **Short Answers:** Some of the homework problems will just ask for answers, not proofs. For these problems, all you need to do is just write the answers to the problems clearly and completely. (*But note that "short answer" does not mean "cryptic"!*) You don't need to restate the problem, or show your work, or prove your answers correct.

- **Proofs:** For any homework problem that asks you to “prove” or “show” something (both words mean the same thing), you’ll need to write a complete, rigorous mathematical proof, with due attention to the conventions of mathematical writing that will be explained in the course. At the beginning of each solution, please state clearly what you’re going to prove in the form of a theorem (not a verbatim transcription of the problem statement). Show clearly where the theorem statement ends and your proof begins. For example, if the problem says “Prove that $|a|^2 = a^2$ for every real number a ,” then your solution might look like this:

Theorem: If a is any real number, then $|a|^2 = a^2$.

Proof: There are two possible cases: either $a \geq 0$ or $a \leq 0$. If $a \geq 0$, then by definition $|a| = a$, and thus $|a|^2 = a^2$. If $a \leq 0$, then $|a| = -a$, and so we conclude that $|a|^2 = (-a)^2 = a^2$ by substitution. \square

Exercises vs. Problems

The textbook contains two types of questions: *Exercises* at the end of each chapter, and *Problems* at the end of each part (usually comprising four or five chapters). Most assignments will include some of each. Complete solutions to the Exercises are at the back of the book. To get the most benefit from the Exercises, you should work them out fully and write down a first draft of your answers before looking at the back of the book. Once you’re confident that you have done the best you can, check your answers against the book before writing up your final version. If you discover that one of your answers is wrong, look over the book’s solution to get the general idea, then put the book aside and start over again. Don’t just copy the book’s answer; it’s essential that you *understand* the solution and write it out in your own words.

In particular, I want to caution you against looking at the book’s answers too early in the process. It’s all too easy to fall back on the answer key as soon as you get stuck—and on some of these assignments, I can guarantee that you’ll get stuck. When learning a difficult new mathematical concept, it often happens that the most significant learning happens when you get stuck and don’t know what to do next. The feeling of being stuck can be disconcerting, but you’ll be much more successful in mathematics if you can learn to quell your frustration and use the experience as an opportunity to deepen your understanding, rather than running straight to the answer key. The experience you gain with the Exercises should make it easier to deal with the Problems, for which you won’t have an answer key to fall back on.

When your answers to the Exercises (as opposed to the Problems) are graded, the grader will just check that you have done them all thoroughly; he will usually not check that your answers are correct. That is up to you, by comparing your answers to the ones at the back of the book. On the other hand, your answers to the Problems will be checked carefully for correctness.

Word processing vs. writing by hand

I welcome computer-typeset submissions from those who are comfortable producing mathematical homework assignments by computer. If you do use a computer, please print out your solutions and turn in paper copies.

Because typesetting formulas by computer takes specialized software and a lot of practice, I don’t insist that you use the computer. I’m happy to accept handwritten assignments, as long as they are *neat and legible*, and all mathematical symbols and formulas are clearly decipherable.

If you decide you’d like to learn how to typeset sophisticated mathematics, I’d encourage you to learn about L^AT_EX or MathType. There are links to some resources for both on the class website.