

Advice for students in Math 247

Math 247 emphasizes understanding of fundamental mathematics, clarity of logical thought, and communication of mathematical ideas. Along the way we consider many interesting problems, including “brain teasers” of the sort that make mathematics a lively subject. This is a course about understanding and thinking carefully, not about computation or memorizing rules.

Mathematics is a language, and communicating it requires words and sentences. Homework problems and most test questions require clear and complete explanations. Many students have trouble when first asked to write proofs because they have not previously been required to express themselves clearly in writing. To improve your mathematical writing quickly, start by writing draft solutions to homework early. A day or more later, after having had time to forget what you wrote, READ it. If it doesn't make sense or doesn't convince you, rewrite it.

Writing a solution requires saying what you mean and meaning what you say. *Mean what you say*: be intellectually honest. Intellectual dishonesty includes: 1) Stating a “reason” without understanding its relevance. 2) Claiming the conclusion when you know you haven't proved it. 3) Giving an example and claiming you have proved the statement for all instances. We will all be happier if we are honest with each other.

Say what you mean: use sentences that accurately convey your ideas. Careless writing and muddled thinking includes: 1) Providing only a list of formulas, without indicating which is being derived from what and how. 2) Omitting words, thereby writing something other than intended. 3) Improperly negating statements involving variables. 4) Failing to prove both implications in an equivalence. 5) Writing gibberish you wouldn't understand if written by someone else (that's why you need to re-read and revise!). Respect the language, and you can gain the communication skills necessary for success in life.

Communication also involves reading and speaking. The textbook contains many interesting examples, comments, and exercises. We can't discuss it all, and in the honors course we rely on students to take more responsibility for reading to make class time more productive. Speaking mathematics helps you see it in different ways; explaining a proof to a friend will tell you whether you understand it and may help you find a better way to write it. We will break into small groups occasionally for students to explain to each other problems that they have thought about outside of class (separate from written homework).

This course requires effort. I will explain ideas and provide feedback to guide your exploration; you are responsible for the rest. I ask you to make a commitment to intellectual honesty and to learning how to express your ideas; seize the opportunity. If you have trouble understanding what is needed to prove a statement, come tell me what you have been trying, and I will try to correct misconceptions and head you in the right direction.

Make the commitment, and you will gain a lot of personal satisfaction from this course.

–Douglas B. West