

Math 130 Syllabus

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Office Hours: • Wednesdays 5:00-6:00 (location TBA)
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Text materials: available at Bob's Copy Shop in University Square

Class Overview

The best way to learn mathematics is to do mathematics. This means trying hard problems, struggling with new ideas, and sharing your ideas with others. Because of this, you will spend most class time working in small groups on the problems found in the course pack.

The goal of this class is to help you move beyond merely being able to perform mathematical algorithms and regurgitate facts; you will develop a deep understanding of these algorithms and “facts,” along with the ability to recognize and employ them flexibly.

My function in class will be as a guide who helps focus your learning experience. As an analogy (although not a perfect one), think of a sports coach or a music instructor. In order to learn to play the piano, you actually have to play the piano. However, a piano teacher helps you to learn to play better by watching you play, noticing mistakes, noticing your strengths, and offering ways you might improve your technique. Just as a piano teacher cannot help you learn to play the piano by playing for you, I cannot help you learn by doing the math for you. This means that instead of telling you how to do a problem or giving you the answers, I will guide you toward solutions and help you determine their validity. Expect me to ask me to ask a lot of questions.

(Just to be clear: you will not be required to play the piano in Math 130!)

We will spend some time discussing, as a class, our results and difficulties with various problems. This will give you a chance to communicate your ideas to others and to see how others have approached or solved a given problem. We will also spend some class time discussing more general issues.

Course Expectations and Grades:

Below is an outline of what you are expected to do in this class. Even though it is a 100-level class, most students find Math 130 to be extremely challenging and a significant amount of work.

- Attendance and Participation (15 percent of your grade)

Because so much of the learning in this class will occur in the classroom, it is essential that you come to class, actively engage in the work of your group, and participate in class discussions. This part of your grade includes staying on task, working with your group members, asking pertinent questions and engaging productively in class discussion.

- Homework (50 percent)

Your homework will consist of Problem Reports, Reflections, and additional problem sets. You should expect 1-2 written assignments per week on average.

The Problem Reports will generally consist of a description of the problem, your solution to the problem, and an explanation of why your solution works. These may be assigned to be done in groups or individually.

You will also write several reflections throughout the semester. These reflections might be based on readings, problems, or videos related to the course. They should be well-reasoned and well-written.

- Exams (35 percent)

There will be two exams:

- Exam I, which will be an out-of-class exam on the evening of Thursday, October 21 from 7:15 to 9:15.
- Exam II, which will be on Sunday December 19th at 10:05 am. This is during Finals Week, although it may have a take-home component.

Course Topics

- Warm-Up: We will practice problem solving and writing up our results as well as discussing the set-up of the class.
- Number Systems: Just as studying a foreign language gives you insight into the structure and nuances of English, we will study other number systems (some from different cultures) to gain insight about our own number system.
- Arithmetic: We will develop a deep understanding of addition, subtraction, multiplication and division—what they mean, how the algorithms work and *why* the algorithms work. In addition, we will look at how some elementary-school students solve arithmetic problems.
- Sets and Operations: The basic ideas of sets (collections of things) and operations (ways of acting on things) will give us new ways to talk—and think—about what we've covered in arithmetic.
- Number Theory: We will cover basic ideas of factoring numbers into primes and what factorization can tell us about numbers.
- Fractions: Fractions are one of the hardest topics for elementary school children. We will take another look at what fractions mean and how we do arithmetic with fractions.