

Syllabus for Math 295
Fall Term 2010
Classes MTWF 1–2 PM, East Hall 1372

Instructor: Professor Karen E. Smith

East Hall 3074

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Office hours: Mondays 2–3, Thursdays 12-1, and by appointment.

Course Assistant: Ruthi Hortsch;

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Office Hours: Thursdays 5-6, and by appointment

Discussion Session: Tuesdays 5-6

Text: Spivak, *Calculus, 4th edition*

Goal: The aim of this course is to understand why calculus really works, to learn how to prove mathematical statements, and to develop the ability to think mathematically. *It is assumed that you have already shown yourself to be a strong student of the mechanics of calculus—that you can integrate, differentiate, state some basic theorems, and apply basic calculus to solve problems*, at the AB level of the AP Calculus exam (see <http://www.collegeboard.com/ap/calculus/html/cours002.html>). Math 295 redevelops the entire theory of calculus from first principles, with emphasis on concepts, abstraction, and the internal structure of calculus, rather than on computation or applications. Along the way, we will cover lots of new ideas, and everything will be rigorously proven. Indeed, the most important thing you will learn is how to precisely discuss mathematical concepts, and how to discover new ideas and *rigorously prove them* on your own.

If you have not had any calculus, please see me. Having seen Calculus BC, differential equations, linear algebra or other “college math” does *not* provide any advantage in Math 295. In fact, such students may be at a disadvantage if it means they have not taken the time to think deeply and skeptically about the meaning of the *real numbers* (or worse— if they have developed an “attitude”!).

Grade: There will be homework counting 40%, two midterm exams counting 15% each, and a final counting 30%. The midterms will occur in class the fourth and ninth weeks (approximately) and the final on Wednesday December 15, 4-6 pm. The exam problems will be similar to homework problems; some may be distributed several days before the actual written exam.

Homework: Homework will be assigned every Friday and will be due at the beginning of class on the following Friday. Late homework will not be accepted (it receives a zero). The two lowest homework grades are dropped. *The homework is by far the most important part of this course.* You are encouraged to discuss the problems with other students, as well as the course assistant, but you must write up your solutions independently. Warning: It is unbelievably easy to detect plagiarism in mathematics; if you are caught, you will fail.

To facilitate the grading of homeworks: do the problems in order, write on only one side of the paper, and use standard sized paper. No credit will be given for misstated problems.

The sole problem on Homework Zero is to fill out the form at

<http://instruct.math.lsa.umich.edu/>

(click the Student Info Form link).

Exams: There are no alternate or makeup exams (except in cases of extreme human tragedy). The exam problems will be similar to homework problems. In other words: do your homework and understand it!