

MATH 113: Honors One-Variable Calculus (IBL)
Johns Hopkins University
Fall 2015

Instructor:

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Class Meeting

MWF 1:30 - 2:45 in Krieger 308/309
(we are currently scheduled only to 2:20 on Fridays)

Course Objectives

Honors calculus approaches the topics underlying calculus 1 and calculus 2 with a newfound sense of rigor and mathematical maturity. It is assumed that you already know how to compute using the basic tools of calculus; this course examines the theoretical and conceptual foundation that calculus is based on. We will begin with the basics of the real numbers and formal logic, make precise definitions, and ultimately prove everything in the course ourselves.

By the end of the semester, you will have rigorously proved many of the major theorems in Calculus. You will also have developed skills of logical reasoning and proof-writing, and will have learned how to read, write, and discuss mathematics like a mathematician.

Collaboration

This course will largely be taught in the mode of Inquiry Based Learning (IBL). This means that for the most part, I will not lecture and prove things for you. Rather, *you* will prove the propositions by working together in groups. It is also expected that you will be able to explain your proofs to each other; a mark of a good mathematician is how well they can explain their thoughts to others.

It is our hope that the IBL format will foster creativity and a deep understanding of the material. However, its success depends heavily on the students: you *must* be actively engaged and prepared for class every day!

Text

Most of the text for the course will be written by you, the students, throughout the semester. I will periodically hand out worksheets with definitions and the statements of results to be proven. After the material is worked-on/presented in class, you are expected to formally write up the proofs. These results will compose a **journal**, which will then serve as your reference text for the class. An additional textbook reference for the course is Michael Spivak's *Calculus*, 4th edition.

Assignments and Exams

At the end of every class period, a selection of propositions from the sheets will be selected for the following class. Your main “homework” is to prepare yourself for the discussion of these propositions, as you will ultimately be proving these results by the end of the next class. You are ***highly encouraged*** to work with your classmates on these proofs outside of class, particularly at problem sessions.

You will turn in sections of your journal regularly for grading: comprising the propositions and proofs we have discussed in class, except for those marked as exercises. **You will be required to type your journal using the math typesetting system \LaTeX .** It is recommended that you take notes in class as we go, so that this is an easy chore and not a gargantuan feat. There will also be weekly homework assignments, consisting of specially tailored problems and questions from the Spivak text.

You are highly encouraged to work on homework together on both your homework and journals, but you **must** write up all of your results *individually*.

There will also be a final exam, and final project/presentation. There will not be any midterms.

Grading

Your grade will be determined by the following weighting scheme:

- 30% – Participation
- 30% – Homework and Journal
- 30% – Final Exam
- 10% – Final Project

Academic Honesty

Collaboration is applauded in this class. I highly encourage you to work on proofs and on homework with your peers *outside of class*; we will also collectively refine proofs in class. That being said, you must write up every proof and homework problem in your own words. **Copying another person’s work, or copy/pasting typed proofs, is expressly forbidden.**

I expect you to comport yourself with honor, as derived from respect for the academic program, your peers, and your instructors. Academic dishonesty will be punished severely, either by nullifying a particular grade or your entire grade for the semester.

Remember: work together and never be afraid to ask questions. Needing help is understandable, and asking for help is completely reasonable; cheating is unreasonable and inexcusable.