

**Math Exploration:  
Exploring the Infinitely Big and the Infinitely Small**  
Math 110H, Spring 2012

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**Office Hours:** Tuesday 4-5 PM and Thursday 10-11 AM  
or stop by, or via skype (email me!).

Mathematical Explorations is an introductory course designed to provide the liberal arts major with an opportunity to develop a broader appreciation of mathematics by exploring ways in which the artistic, aesthetic, intellectual, and humanistic aspects of mathematics are as important as its utility.

## **Welcome**

Welcome to Math 110: Exploring the Infinitely Big and the Infinitely Small! In this course we will explore how mathematicians view and use infinitely large and small numbers. You will also learn about some historically important mathematicians, their lives and thoughts and accomplishments. Depending on time we will venture into some ideas of calculus without ever needing the technical details you would see in a traditional (pre-)calculus course. In this class **you** will be discovering the mathematics by working through sets of investigations in groups during class time. There will be no traditional lecture.

There is no traditional textbook for this course, which means, you have to come to class to see what happens. Mathematics can be fun and challenging at the same time. I expect you to spend at least two additional hours every week on homework, literature, group work, and projects.

## **PLATO**

We will use a PLATO site for our class for discussions, to collect some of the homework and for additional resources. Please go to PLATO from Westfield.ma.edu and log into our class for the first exploration and assignment: your (mathematical) autobiography.

## **Notebook**

All your work has to be written in a notebook during this semester. I will not collect your notebook but your notebook will be the only resource you are allowed to use for a quiz and exam. Assignments you are handing in will be written on separate pieces of paper or electronically.

**Attendance**

Exploration, collaboration, and communication are essential for this class, therefore, attendance is mandatory and active participation contributes to your grade. No make-ups will be given for missed quizzes or exams, except in the event of a true, documented emergency where the instructor is notified in advance--if possible. In such a circumstance, it is the student's responsibility to contact the instructor to make alternate arrangements.

**Homework**

There will be homework on a regular basis. If you are absent, you are expected to find out the assignment and complete it prior to the due date. For full credit, you must show all your work, express yourself clearly and do the work neatly. Please staple your assignments and use paper with smooth edges. Late work will not be accepted.

**Projects**

Individual and small group projects will be assigned. These may have a substantial writing component, may require use of a calculator or computer and could include posters or presentations. These could also serve as starting points for independent research, or presentations at conferences such as the Hudson River Undergraduate Mathematics Conference.

**Class Participation and class presentations**

We will work on a lot of problems in class, in groups, and on the blackboards. You are expected to contribute, discuss, communicate and present your group's material to the rest of the class.

**“Help!”** You are warmly invited to come and see me whenever you are faced with questions, confusion or concerns -- or to share an exciting discovery. Office hours are times when I'm available *specifically for you*. Please do take advantage of this opportunity. In addition, if my office door is open throughout the week: you are welcome to check in for help on those occasions, as well. If our schedules don't match, email or skype is a good way to get in touch: feel free to suggest a few times that would work for your schedule and we can make special arrangements.

**Academic Honesty**

Anyone detected cheating in any assessment, the final examination, or the collected exercises, whether aiding or being aided, will receive a zero for that exam or exercise. I encourage students to seek assistance on homework assignments whenever there is a need: in my office, at the tutoring center, or with fellow students. However, one should not simply copy somebody else's work. What you write on your paper should always reflect your understanding of the material. If you were helped in a substantial way, note your helper's name next to the assignment. (Ideas for this syllabus, for instance, are owed to my colleague Volker Ecke).

## Grading

The final exam will be 20%, homework will be 20%, quizzes and projects will be 20%. The other 40% will account for class participation. You can ask me throughout the semester about your current participation grade. You can miss class three times. For every class that you are absent after those three, your total grade will go down by 3%.

To get an **A** in the class I expect you to attend regularly, participate positively and meaningfully in your group work and in whole-class discussions, give your best effort in solving the mathematical investigations, be reflective and independently change your perception of doing mathematics if applicable, be prepared for every class, asking all your questions, in addition to attaining perfect grades on homework, quizzes, projects and exams.

If you attend class regularly and you participate in your group, but if you for instance don't share your thinking regularly with the whole class, you can only attain a **B**.

If you attend class regularly and participate in your group, but you don't participate in whole class discussions and you don't give your best effort in doing mathematics, your homework is poorly written or you are not prepared for class you can only attain a **C**.

If you attend class regularly, but you don't participate in your group, your homework is poorly written or you are not prepared for class you can only attain a **D**.

Not attending class regularly and poor preparations and homework will lead to an **F**.

I will use the following grading scale:

%	95-100	90-94	87-89	84-86	80-83	77-79	74-76	70-73	67-69	60-66	0-59
	A	A-	B+	B	B-	C+	C	C-	D+	D	F

**Best wishes for a successful semester!**

**Course Objectives:**

Math 110 will enable students to accomplish for following objectives:

1. Recognize, understand, utilize, integrate, and communicate mathematical concepts, mathematical methods and logical reasoning.
2. Apply mathematical concepts, mathematical methods, and mathematical reasoning within an analytic framework.

**Course Requirements:**

Math 110 will

1. Introduce traditional mathematical concepts, constructs, systems, algorithms, and methods of inquiry and analysis.
2. Provide an environment where students can construct, investigate, learn, and/or apply those attributes described in Course Requirement 1.

**Learning Outcomes:**

After successful completion of the course the students will be able to:

- Create visual representations of patterns in exploring the infinite.
- Create and test abstract mathematical conjectures about patterns.
- Communicate mathematical ideas and reasoning in written and oral form.
- Evaluate other students' mathematical thinking and reasoning.
- Communicate excitement about aspects of mathematics.
- Analyze the value of inquiring why a conjecture is true.
- Describe and illustrate how mathematicians think and work.
- Demonstrate the development of a broader perception of mathematics and its place in the world.
- Describe aspects of the history of mathematics, for example how the perceptions of the infinite have changed over time.