1 The Goal of this Class

What is mathematics? The common understanding of mathematics is that it is the science of how to compute, the theory of calculation and arithmetic, but this is a miscommunication between mathematicians and the rest of the world. Even if one is to make an abstraction of this definition, calling mathematics the study of numbers, one only finds a single field in mathematics, number theory. When one talks to a mathematician, one might be surprised in their actual response on how they view mathematics:

- The mathematician’s patterns, like the painter’s or the poet’s must be beautiful; the ideas, like the colors or the words must fit together in a harmonious way. Beauty is the first test: there is no permanent place in this world for ugly mathematics.
  
  I am interested in mathematics only as a creative art. -G.H. Hardy, “A Mathematician’s Apology”

- Mathematics, rightly viewed, possesses not only truth, but supreme beauty- a beauty cold and austere, like that of sculpture, without appeal to any part of our weaker nature, without the gorgeous trappings of paintings or music, yet sublimely pure and capable of a stern perfection such as only the greatest art can show. - Bertrand Russell

- It is impossible to be a mathematician without being a poet in soul. -Sophia Kovalevskaya

- A mathematician who is not also something of a poet will never be a complete mathematician. - Karl Weierstrass

As one can see, mathematicians do not see their work as a boring science that is devoid of art. Mathematics, loosely defined, can be stated as the study of patterns. These patterns could be anything, from numbers, shapes, planetary motion, language, and anything in the world that is known not to be arbitrary. In this course, we will observe a vista into the land of mathematics. Our goal will not be to develop mathematics as a tool to accomplish set tasks. Rather, we will caravan nomadically through the discipline, develop an understanding of what mathematical thinking is, cultivate a way of thinking abstractly, and expand our critical thinking.
2 The Textbook

The required textbook for this class is (tentatively) *The Language of Mathematics: Making the invisible visible* by Keith Devlin. If you have bought *For all Practical Purposes, 7ed* by COMAP, please return it. The text chosen is more in tune with the spirit of this class, and is less expensive ($15 online, or $51 if you want to get ripped off by Amazon). I will assign readings from this book periodically, as well as selections from other (more literary) sources. I will supplement the class with these sources.

3 Times

3.1 Lectures

The instructor for this class will be Tyler Kelly. The schedule will be Monday through Thursday, 1:00pm-3:10pm, with a 5-10 minute break in the middle of class each day. Class will be held in Room 3C4 in David Rittenhouse Laboratories.

3.2 Office Hours

- Monday 3:30-4:30pm in the office of the Instructor (see front page).
- Tuesday 3:30-4:30pm in the office of the Instructor (see front page).
- By appointment (email me in advance so we may schedule a time.
- In the event of good weather, instructor reserves right to move office hours outside, in order to avoid the ugly interior of David Rittenhouse Laboratories. Such a right will be announced in class the day of the change in venue. If anyone has serious allergies or anything else that would not permit this change of venue, then please let me know.

3.3 Important Dates

- Class will begin July 5, 2011.
- The final exam will be in class on Thursday, August 11, 2011.
- The quiz will be in class on Thursday, July 21, 2011.
- Homework will be due on Wednesdays (in class).
- Essays will be due on Thursdays (in class).
- *Please consult the timetable of assignments to see what next thing is due.*

4 Important Policies

4.1 Exam

There will be a final exam in this course. It is scheduled for 1:00pm - 3:10pm on Thursday August 11, 2011 (the last day of class). A makeup exam will only be given under extremely rare circumstances, such as with the death of a family member. Please contact me at least 24 hours in advance if such a rare event event occurs. In the case of religious observances, one must contact
me within the first week of the beginning of the summer session with the specific dates of requested absence.

The exam will not allow any study aides (textbooks, notes, cell phones, iPads, etc) to be used on the final exam. You may use a four-function calculator on the final exam; however, it may not include a graphing interface or a possible interface to connect to the information grid. If you have any questions about a certain calculators permissibility, it should be addressed before the date of the final exam.

4.2 Quiz

There will be exactly one quiz in this course. It is scheduled for 2:05pm-3:10pm on Thursday July 21, 2011. There will be no review for the quiz, and it will be run as the exam will be. A makeup quiz will only be given under extremely rare circumstances, such as with the death of a family member. Please contact me at least 24 hours in advance if such a rare event occurs. In the case of religious observances, one must contact me within the first week of the summer session with the specific dates of requested absence.

The quiz will be administered with the same provisos as the exam mentioned in the previous subsection.

4.3 Homework

4.3.1 Timeline

There will be five problem sets. They will be assigned every Thursday and collected in class on the Wednesday after. To see each homework assignment, please go to the class webpage. It will be uploaded after class on Thursday. The due dates are also on the timetable of assignments.

4.3.2 Late Homework Policy

No late homework will be accepted, regardless of reason. If you know ahead of time that you will not be able to hand in a homework assignment in person in class on the day that it is due, then it should be given to the instructor in person in class as many days in advance as necessary in order to assure for it to be on time.

4.3.3 Procedure for turning in homework

Homework must be stapled and clearly organized. Put your name and date in a visible place, and write your answers neat and legibly. If I cannot read your solutions, then I have no choice but to grade the problem set with a 0. This is a class on communicating mathematical ideas, so the homework must be written clearly and convey the solution as cleanly and coherently as possible. Incorrect grammar in a humanities course is inexcusable, and the problem sets in this class are no exceptions to this rule. Clarity is just as important as the correctness of the solutions.

A good strategy would be to write a rough draft of your homework, and then carefully write a final draft once you have the solutions.

All writing in this class must be original. Students should not copy any portion of their homework from reference materials or the homework of other students. Students should not use homework from previous years or courses in preparing their own homeworks. The course has a zero tolerance policy on plagiarism. Any student caught plagiarizing will receive a grade of zero on the assignment and may be referred to the Office of Student Conduct for disciplinary action.
4.3.4 Confirmation

When you give me your homework, I will give you a slip of paper that will have your name and a string of letters and digits on it. This is your digital key confirmation signature for your homework. Keep it for your records. In the very unlikely event that your homework gets misplaced, then this will be used to confirm that the homework was indeed turned in, and will result in a perfect grade on the homework. Think of this policy as the homework equivalent to the confirmation code from an online transaction.

4.4 Essays

4.4.1 Timeline

There will be three (mandatory) essays during the course of this class. They will be due and collected in class on Thursdays July 14, July 28, and August 12.

4.4.2 Late Essay Policy

No late essays will be accepted, regardless of reason. If you know ahead of time that you will not be able to hand in a homework assignment in person in class on the day that it is due, then it should be given to the instructor in person in class as many days in advance as necessary in order to assure for it to be on time. Essays may not be turned in via email.

4.4.3 Procedure for turning in essays

Homework must be stapled and clearly organized. Put your name and date in a header and footer. The paper must be written in Times New Roman, 12pt font, 1.5 spacing, with one inch margins around the page, printed with black ink. This is a class on communicating mathematical ideas, so the essay must be written clearly and convey the solution as cleanly and coherently as possible. Incorrect grammar in a humanities course is inexcusable, and the essays in this class are no exceptions to this rule. Clarity and style is just as important as the content.

4.4.4 Confirmation

When you give me your essay, I will give you a slip of paper that will have your name and a string of letters and digits on it. This is your digital key confirmation signature for your homework. Keep it for your records. In the very unlikely event that your essay gets misplaced, then this will be used to confirm that the essay was indeed turned in, and will result in the ability for you to reprint and resubmit the essay for a grade. Think of this policy as the homework equivalent to the confirmation code from an online transaction.

5 Grading structure

5.1 Distribution

Your grade will be composed of: your homework grade, your essay grade, and your final exam grade. The weights are the following:

- Homework 40%, each homework being 8% of your total grade.
- Essays 30%, with weight distributed according to how long the page requirements are.
• Final Exam 20%.
• Quiz 10%.

This class will be curved, but it is safe to say that if you have a 93% grade, you will earn an A. This is a very conservative estimate, as grades will probably be more liberal, depending on overall performance, engagement, and effort of the class. There will be no extra credit in this course.

6 Email

Email is to be used to ask questions regarding the course itself, not the homework problems. I will not work out homework problems via email. We can discuss such issues at my office hours. That said, if I receive enough emails concerning the difficulty of a particular problem, I will take note of this and discuss the problem in lecture at the next opportunity.

7 Group work, Academic Integrity

I am a firm advocate of working together. Cooperative efforts on homework assignments can be a great learning experience, and can increase the efficiency with which assignments are completed. You are encouraged to work with the other students in the class. However, while group work is encouraged, all students must write up their solutions independently, and should not show one another their written up solutions. Do not copy. If I encounter any academic dishonesty (copying homework, plagiarism, misrepresentation of sources, cheating on quizzes or exams, unauthorized use of materials on exams or quizzes, etc.), I will bring this up to the Department of Mathematics and the Office of Student Conduct. Please consult the Office of Student Conduct and the Code of Academic Integrity if you have any questions or need for clarifications. If you are uncertain on what constitutes plagiarism, there are definite examples in the MIT Handbook, which Penn’s Academic Honesty Handbook is derived (see http://web.mit.edu/academicintegrity/handbook/handbook.pdf). It is your responsibility to know what constitutes as cheating, and if you have any questions or need of clarification, they must be asked beforehand. This is your only warning.