MATH 15, Overview of Mathematics: **Winter 07-08**

COURSE OUTLINE

<u>Text (required)</u>
The Language of Mathematics, by Keith Devlin (W.H. Freeman, 1998, 2000)

<u>Instructor</u>
Keith Devlin, office: Cordura Hall 114, tel: 725-3286, e-mail: devlin@stanford.edu

<u>Lecture times</u>   M W F 10:00–10:50AM

<u>Location</u>   BLDG 160, Wallenberg Hall, Peter Wallenberg Lecture Theater

<u>Office Hours</u>   Tuesdays 10:00–noon, or by appointment (send me email), in Cordura 114.

<u>Aim of course</u> To provide a view of mathematics as a living, growing, creative human endeavor that classifies as both a science and an art, to give you a feeling for, and some mastery of, the mathematical way of thinking, and to be aware of some of the many applications of mathematics in today's world.

<u>Topics</u> We shall start out with a general discussion of the nature of mathematics, picking up a bit of the history on the way. After that, the main aim will be to investigate several important topics in mathematics. The exact choice will depend on the interests of the class, as determined by a student questionnaire completed during the first class meeting.
        The course is intended to involve some class discussion and a presentation at the end. Your active participation is essential for this course to be a success.

<u>Subject Matter</u> My experience teaching this kind of course suggests that you may not have any real idea of what mathematics is. (High schools typically focus on the acquisition of a small number of specific mathematical skills.) Expect to read, to write a paper, to discuss ideas, and to be creative. Expect to examine our world and ourselves in a novel way, a way developed by thousands of years of combined human intellect. Do *not* expect to spend much time learning how to 'solve problems' (in the sense of a typical high school math course). If you do not like the sound of all of this, you should find another class before the course gets under way. This is definitely not a course to improve your math skills (though that may be a by-product for some).

<u>The book</u>. There is no *textbook* for this course, as such, but there is a required course *reader*, my own *The Language of Mathematics.* The material in this book forms the backbone of the course, and part of the course will involve reading all but two chapters of the book, at a rate of one chapter a week. I'm not a fan of quizzes, but I (and you) need to judge how well you are mastering the material. The easiest way for me to that is through a weekly (closed book) quiz. The quizzes do not require solving math problems. Nor are they about memorization of facts in the book. Rather they are designed to let us **both** know how well you understood the material covered in the book.

<u>Workload</u> In addition to your active participation in the class, you should expect to put in five or six hours a week in the form of further study (mastering any mathematical idea takes time and effort), reading, doing any homework assignments, and discussing ideas with each other. If you find yourself having a lot of trouble with the course, *first* ask yourself if you are putting in this amount of time, and *then* come to see me about it. (Seeing me or anyone else without first putting in the appropriate amount of time is in any case unlikely to be of much help to you. Mathematics is like that. So are most other disciplines for that matter.)
        You can collaborate on homework assignments. In fact, I encourage this. But you must write it up yourself. If the work you hand in is joint work, indicate clearly on the top of the first page who your collaborators are. Alternatively, and far preferable, after discussing the assignment with others, work out your own final version and write it up alone. Please note that

handing in work that is not solely your own without proper credit given to collaborators constitutes academic dishonestly (plagiarism).

Grading The course will be assessed on the basis of the weekly quizzes, a small number of homework assignments and an 8–12 page final paper. The final mark will be made up as follows:

Weekly quizzes (8)	50%
Final paper/presentation	40%
Homework	10%
Attendance bonus*	5%

* I put this in as opportunity for students who feel they are particularly weak in mathematics to gain a small bonus. You get 5% for attending every class but 1, 4% for every class but 2, etc., down to 1% for every class but 5.

To assign letter grades based on the numerical marks, I'll follow the procedure often referred to as "grading on the curve."

The paper The final paper (including the presentation) counts for 40% of the final mark, so you should treat it seriously. It will involve a lot of time and effort. *Don't leave the paper until the last minute*. For most of you, the topics we consider will be quite new, so you are bound to encounter a lot of difficulty with the paper. The smart approach is to *start early*, very early. Then when you meet difficulties, you can consult with your colleagues *or come and see me*. Be prepared to go through several draft versions. No one expects you to be able to do this unaided. But if you leave it too late, that is what you will be faced with.

Caution This course is certainly different from most other university mathematics courses, and students who feel their math skills are a bit weak may well be drawn toward it. **But it is not an easy class.**

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THE NOT-SO-FINE PRINT

Agreement

Welcome to MATH 15, *Overview of Mathematics*. This a very different kind of mathematics class.

This class only works if you are as committed to it as I am. Though I hope you stay in the class and do well in it, if you do not feel you can make that commitment, you should transfer at once to another class. By staying in the class beyond the end of the first complete week of the quarter, you are accepting the conditions of the course itemized below, and are committing to yourself, to your fellow students, and to me, the instructor, to maintain a high level of commitment for the whole quarter.

1. **Attendance**. Since the class is built around participation, I do check attendance. But I do not chase up students who don't attend. One of the goals of the class is to develop a mature approach to studying a subject you are unfamiliar with (or may even feel afraid of). The structure of the course is such that if you don't attend regularly, you might well pass but will not get as good a grade as if you came.

2. **Teaching and learning**. This is not a course where I, the instructor, will 'teach' you. Rather, I will do my best *to help you to learn*. You will be largely in charge of what you learn, and whether you learn enough to pass or do well in the course. To a great extent, the class as a whole will shape the course content. Again, if you are not comfortable with this approach, you are advised to switch classes right away.

Keith Devlin
January 7, 2008