**M361K Fall 2008**
**First Day Handout**

**Unique #:** 59065  
**Class Meets:** MWF 10—11 in RLM 6.114

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**Instructor:** Ted Odell odell@math.utexas.edu  
**Office:** RLM 11.124 **Phone:** 471-4157  
**Office Hrs:** MWF 11—12 (or set up an appointment with me at another time)  
**Web site:** [http://www.ma.utexas.edu/text/webpages/odell.html](http://www.ma.utexas.edu/text/webpages/odell.html)

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**GRA:** Tim Blass tblass@math.utexas.edu  
**Office:** RLM 12.144 **Phone:** 475-8689  
**Office Hrs:** TTh 1:30—3:00

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**Exams:** Two midterms (October 3, November 5) and a final exam (December 12, 2—5 PM)

**Grades, etc:** Homework 25%, Participation 20%, Midterms 15% each, Final 25%

**Text:** Will be posted on Blackboard. *Do Not Buy Any Books.*

**Syllabus:** See [http://www.ma.utexas.edu/dev/math/Courses/Syllabi/M361K.html](http://www.ma.utexas.edu/dev/math/Courses/Syllabi/M361K.html)

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**Students with Disabilities:** The University of Texas provides, upon request, appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259 or 471-4641.
Remember when you learned to ride a bike. You got on it, fell off, got on it, fell off,... until you learned to ride. This class will operate similarly. The name for it is Inquiry Based Learning or IBL. In many if not most of your classes the professor lectures, you take notes and learn what you were told. In IBL you figure it out for yourself. Your learning will be deep and long lasting. Moreover, you will develop skills, not just mathematical, that can last a lifetime. You will learn how to analyze a problem and come up with a solution. You will develop confidence in yourself and will learn how to explain and defend your ideas.

The text for our class will be posted by chapter on Blackboard. It will look like a math book with the proofs removed—they are given as problems for you to solve. I will let you know which problems to prepare and your homework is to do so. Then the next class you or your classmates will present the solutions. This clearly takes a lot of effort and you will not be very good at it initially. I will serve as moderator, asking questions of the presenter and the audience about the proof. I will also present some material as the need arises.

What is a proof? It is a clear explanation of why the theorem is valid. Your audience should be another student in the class who is clueless as to what the proof is—not me. Let’s look at an example proof. This is not from our class.

**Text: Definition:** An integer $n$ divides an integer $m$, denoted $n \mid m$, if there exists an integer $k$ so that $nk = m$.

**Theorem 1.1.** Let $n, m, r$ be integers with $n \mid m$ and $n \mid r$. Then $n \mid (m + r)$.

*Proof.* By the definition there exist integers $k_1$ and $k_2$ so that $nk_1 = m$ and $nk_2 = r$. So

$$nk_1 + nk_2 = m + r.$$ 

Hence $n(k_1 + k_2) = m + r$. Since $k_1 + k_2$ is an integer, by definition $n \mid (m + r)$. □

Note the use of complete sentences in the proof.

Now you will probably need some help, at least at times. I encourage you to visit my office hours or that of our GRA, Tim Blass. You can also discuss the problems with others in the class. You are not allowed to consult any books, websites, people not in our class,...

“How to solve a problem” is not easily answered and has been the subject of numerous entire books. You learn by doing it, just as you learned to ride a bike. Start by understanding exactly what is assumed and what must be proved. The definitions play a key role here as in the example Theorem. You also should review earlier theorems to see how they can be used in your argument. Problem 1.23 might well follow easily from, say, Problem 1.21 and a definition.

Our topic is analysis, more precisely a careful study of calculus. Well, not the mechanical part you learned well ($\int x \, dx = \frac{x^2}{2} + c$) but the reason why everything you learned works.
You will keep a looseleaf notebook of your solutions. You are writing your own text. I said “looseleaf” because you can then easily replace wrong or poorly written proofs.

When in the audience your job is to follow the argument and ask questions if you do not understand something. We will all be polite in doing so. Presenting is a skill that needs to be learned. A common mistake is going too fast. Slow down.

We will use the doccam for presentations.