**Math 360** **Spring 2010** **Guide for Test 1**

- The test is in class on Friday 23 April and covers Chapters 1 and 2. You must notify me in advance if you have to miss the test.
- There will not be any specific questions on Chapter 1, but you will likely need that material to answer questions about Chapter 2.

Here are some sample test questions/topics. Things written in [brackets] are comments.

1. [Limits and their definition.]
   (a) State the formal definition for $x_k \to x$. [Definition 2.2.2; feel free to consolidate and rephrase.]
   (b) Use this definition to show that the sequence $x_k = ***$ converges to $x = **$. [Actually show how to get $K$ from $\epsilon$.]
   (c) Use this definition to prove:

   If $x_k \to x$ and $y_k \to y$ then [e.g.] $2x_k - x_k y_k \to 2x - xy$.

   [Like part of Theorem 2.4.1 parts 1., 2., or 3.; you cannot use the Theorem in your proof.]
2. [Subsequences and their use.]
   (a) Define what it means for a sequence to be a subsequence of another.
   (b) Define an accumulation point. [Definition 2.3.9]
   (c) [Section 2.3 problem 30 part a, c, or d.]
3. [Other things about sequences.]
   (a) Define what it means for a sequence to be bounded.
   (b) Define what it means for a sequence to be monotone.
   (c) Give an example of a sequence with the properties **** or prove that is impossible.
4. [Bisection argument]
   (a) Define the supremum of a set of real numbers.
   (b) Show that every bounded set of real numbers has a supremum.