Math 360 **Spring 2010** **Guide for Test 2**

The test is in class on Tuesday 11 May and covers Chapter 3. You must notify me in advance if you have to miss the test.

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

1. [Limits and their definition.] Complete the following table:

Thing	means $\forall$	goal amount	$\exists$	control	such that	controlling	$\Rightarrow$	goal	(extra conditions)
$x_k \to x$	means $\forall$	$\epsilon > 0$	$\exists$	K	such that	$k > K$	$\Rightarrow$	$\lvert x_k - x\rvert < \epsilon$	
$\lim_{x\to a} f(x) = L$	means $\forall$		$\exists$		such that		$\Rightarrow$		$\forall x_k \to a$
$x_k \to -\infty$	means $\forall$		$\exists$		such that		$\Rightarrow$		
$\lim_{x\to\infty} f(x) = L$	means $\forall$		$\exists$		such that		$\Rightarrow$		
	means $\forall$		$\exists$		such that		$\Rightarrow$	$f(x_k) > B$	
	means $\forall$		$\exists$		such that		$\Rightarrow$	$\lvert f(x) - L\rvert < \epsilon$	
	means $\forall$		$\exists$		such that	$0 < x < \delta$	$\Rightarrow$		
	means $\forall$		$\exists$		such that		$\Rightarrow$		
	means $\forall$		$\exists$		such that		$\Rightarrow$		
	means $\forall$		$\exists$		such that		$\Rightarrow$		

2. [Continuity]

   (a) State the formal definition for a function being continuous at a point. [Def 3.1.2 (or ϵ–δ version)]

   (b) Use this definition to prove that $f(x) = ***$ is continuous at $x = **$.

   (c) Define what is means for a discontinuity to be [removable/ jump/ essential] and illustrate with a graph.

3. [Theorems]

   (a) State the Intermediate Value Theorem.

   (b) Prove one of the (nontrivial) cases of the Intermediate Value Theorem.

   (c) State the Extreme Value Theorem.

   (d) Prove the Extreme Value Theorem.