Mathematics 242 – Principles of Analysis
Information on Exam 1
September 24, 2004

General Information

The first exam for the course will be given in class on Friday, October 1. This will be an individual, in-class, closed book exam. I will be happy to hold a late afternoon or evening review session to help you prepare. Wednesday, September 29 will probably be the best day for that.

Topics to be Covered

The exam will cover the material we have covered since the start of the semester up to and including class on September 24. This includes material from sections 1-8 and 10-11 in the text. Those sections also contain some topics we did not discuss in class; you *will not be responsible for those.*

1) Logical connectives, truth tables, quantifiers, converse, contrapositive, and inverse statements of implications and their uses in proofs.
2) Sets, set operations and their properties
3) Relations, especially equivalence relations
4) Functions and their properties (especially injectivity, surjectivity)
5) What it means for sets to be equinumerous (or not)
6) Mathematical induction
7) The ordered field properties

What to Expect

The exam will have four or five questions, each possibly with several parts. Some questions will ask for a precise statement of a definition or a theorem we have discussed. Be prepared to give careful statements of

1) All definitions for the first three definitions quizzes (see the course homepage).
2) The Well Ordering Property (axiom) for the natural numbers

Also know the following proofs:

1) The set of all integers is denumerable
2) The open interval $(0, 1)$ in $\mathbf{R}$ is *not* denumerable (the Cantor "diagonal argument")

The other questions will be similar to questions from the problem sets and discussions. Some good review problems to look at are

Section 1/5,8,10,12;

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Section 2/6, 11,12;

Section 3/questions like 3,4,5,7,10 (directions should say "repeat 9");

Section 4/6,8,9,13;

Section 5/4,6,7 (try working out your own proofs first, then check them against the partial proofs given in the problems), 15 (and then prove the given statements);

Section 6/5efgh, 11

Section 7/15, 16, 17, 18;

Section 8/3cd,10

Section 10/4,5,8,9

Section 11/3, 7