Math 175-004 **Midterm 3 Review** **April 17, 2008**

General Points:

- There is just one fundamental way to prepare for an exam. Understand the material!
- You'll answer questions on the exam itself. All you need to bring is a writing utensil.
- When you receive the exam, **relax** and proceed deliberately. If you don't know how to do a problem, skip it and return to it later. Accuracy is paramount, speed is useless!
- Check your answers.
- During the exam, **all books, notes, and electronic devices must be out of sight.**

Exam topics: Chapter 8, section 8.1–8.9 (homeworks 8–11)

8.1: Sequences

1. Know what it means for a sequence to converge.
2. Know the sum, difference, product, quotient, and constant multiple rules.
3. Know the continuous functionn theorem for sequences.
4. Know how you can use l'Hôpital's rule for sequences.
5. Be familiar with the six common sequences in Theorem 5 on p. 509.
6. Know what it means for a sequence to be nonincreasing or nondecreasing.

8.2: Infinite series

1. Know what a partial sum of an infinite series is, and how they are used to define the convergence of a series.
2. Know the formula for an infinite geometric series, and where the series converges.
3. Know the nth-term test for telling if a series diverges.
4. Know the sum, difference and constant multiple rule for series.
5. Be comfortable with re-indexing series.

8.3: Integral test

1. Know the integral test and how it can be used to determine if a series converges or diverges.
2. Know the p-series test and how it is derived.
3. Review how the remainder of an infinite series can be estimated with the integral test.

8.4: Comparison tests

1. You should definitely know how to apply the comparison test to determine whether a series diverges or converges.
2. You should also be very familiar with the limit comparison test and how to apply it.

8.5: Ratio and root tests

1. Know how to apply the ratio test, and know its limitations.

2. Know how to apply the nth root test, and know its limitations.
3. These are very good tests for determining the radius of convergence of a Taylor (or MacLaurin) series converges.

8.6: Alternating series, absolute and conditional convergence

1. Know the three criteria for determing if an alternating series converges.
2. Review the technique for estimating an alternating series.
3. Know the definitions for absolute and conditional convergence. Know how to tell if a series converges absolutely.

8.7: Power series

1. Know the definition for the radius of convergence of a power series and how to determine it.
2. Know the rules for term-by-term differentiation and integration of power series and how these can be used to get new power series for functions.

8.8: Taylor and Maclaurin series

1. Know the formula for determining the Taylor or Maclaurin series of a function f.
2. Know the difference between Taylor and Maclaurin series.
3. Know how to compute the Nth order Taylor polynomial of a function.

8.9: Convergence of Taylor series

1. Know the equation for the remainder of order N, $R_N(x)$, in Taylor's formula.
2. Know how to estimate the remainder term in Taylor's formula and how this can be used to estimate the error in an approximation of a function by its Taylor polynomial.
3. Know how to compute the Taylor series of functions that are defined only as integrals.