Math 170-006 **Midterm 1 Review** **Sep. 17, 2008**

General Points:

- There is just one fundamental way to prepare for an exam. Understand the material!
- You use one-side of an 8.5 inch by 11 inch piece of paper with notes for the exam.
- You'll answer questions on the exam itself. All you need to bring is a writing utensil and, if desired, a page of notes.
- 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, and electronic devices must be out of sight.**

Exam topics: Chapters 1 and 2, with primary focus on Chapter 2.

Chapter 1

1.1: Domain and range of a function; vertical line test; symmetries of function (i.e. odd or even). Problems: 4, 6, 14, 16, 35, 51, 54.

1.2: Shifting graphs vertically and horizontally; scaling graphs; composition of functions. Problems: 11, 14, 29–47 odd, 65.

1.3: Definition of trigonometric functions; values of the trigonometric functions for various angles (i.e. the unit circle handout); how to use trig. identities (no need to memorize them; I will provide a list of the useful ones); definition of periodic functions and how to determine their periods. Problems: 10, 16, 19, 41, 43, 45, 61, 63.

1.4: Rules of exponents (p. 32); exponential growth and decay. Problems: 14, 15, 20, 21, 36.

1.5: Definition of one-to-one function and horizontal line test; Algebraic technique for finding inverses; properties of the natural logarithm (p. 41); inverse trigonometric functions and their output for special input values (e.g. $\sin^{-1}\frac{\sqrt{3}}{2}$). Problems: 1–6, 19, 23, 29, 31, 46, 51-54, 63.

Chapter 2

2.1: Definition of the average rate of change of a function and graphical interpretation (i.e. slope of the secant line). Problems: 1, 3, 6, 9–16.

2.2: Informal definition of a limit; how to determine the limit from a graph of the function; limit laws, limits of polynomials and rational functions; sandwich theorem and how to use it. Problems: 1–4, 6, 7, 9, 11–60.

2.3: Precise definition of a limit. Problems: 37, 39.

2.4: Informal definitions of the right-hand limit and left-hand limit; Theorem relating right, left, and two-sided limits (Theorem 6, p. 85); $\lim_{x\to 0}\frac{\sin x}{x}=1$; how to compute limits as $x\to\pm\infty$ and the associated limit laws (Theorem 8, p. 91); Horizontal and oblique asymptotes. Problems: 1–5, 9, 10, 17, 21–29, 43, 47, 54, 59, 68, 70

2.5: Informal definition of an infinite limit; how to compute vertical asymptotes and oblique asymptotes. Problems: 1, 3, 7, 13, 17, 21, 25, 31, 33–36, 39, 57

2.6: Definition of continuity at a point (interior and boundary points); definition of left and right continuity; determining the continuity of a function from its graph; the test for continuity (p. 105); properties of continuous functions (Theorem 9); properties of the composition of continuous functions; continuous extension of a function at a point of discontinuity; intermediate value theorem (Theorem 12). Problems: 1–10, 15, 19, 35–38, 46, 51, 54, 55

2.7: Definition of the slope of a curve at a point; definition of the derivative of a function at a point; how to compute the tangent line to a curve at a point. Problems: 2, 8, 16, 17, 27, 28, 30