Math 261
Exam 1 Review Sheet

Section 1.1 Algebra Review

• Understand lines, including slope, finding equations, parallel and perpendicular lines, and x and y - intercepts of lines.
• Be able to solve inequalities both algebraically and by using "sign testing".

Section 1.2 Functions Review

• Know the definition of a function.
• Know how to interpret the graph of a function (including finding the domain, range, function values, and increasing/decreasing intervals).
• Know and be able to use interval notation.
• Be able to find formulas and values for combinations of functions (sum, difference, product, quotient, composition).
• Understand and be able to graph piecewise defined functions.

Section 1.3 Trigonometry Review

• *Memorize* the key values of all six basic trig functions.
• Understand and be able to use inverse trig functions.
• Be able to solve trig equations and apply basic trig identities.

Section 2.1 Introduction to Limits

• Understand the intuitive idea of a limit.
• Know how to investigate limits by creating tables of values.
• Know the definition of one - sided limits.
• Know how to find the value of a limit based on a graph.
• Be able to find the limit of a piece-wise defined function.

Section 2.2 Definition of Limit

• *Memorize* the formal definition of a limit.
• Given a function and a specific ϵ value, be able to find a specific δ value based on the given ϵ value.
• Be able to prove the value of a limit using the ϵ - δ definition.
• Know what it means for a limit to **not** exist.

Section 2.3 Techniques for Finding Limits

• Know the properties of limits and be able to use them to find the limits of various combinations of functions.
• Know theorems about the limits of polynomial, rational functions, and roots of functions.
• Know and be able to apply the Sandwich Theorem.
• Be able to compute limits using both theorems and algebraic methods.

Section 2.4 Limits Involving Infinity

• Be able to compute limits as $x \to \pm\infty$.
• Be able to express one and two sided limits where the function goes to ∞ or $-\infty$.
• Be able to use limits to find the vertical and horizontal asymptotes of a function.

Section 2.5 Continuous Functions

• Know the definition of continuity of a function at a point $x = c$.
• Be able to classify points of discontinuity as removable, jump, or infinite discontinuities.
• Know the definition of continuity on an interval: (a, b) or $[a, b]$.
• Be able to determine the intervals where a given function $f(x)$ is continuous.
• Know theorems about the continuity of combinations of functions, polynomials, and rational functions.
• Be able to find the points of discontinuity of a given function.
• Know and be able to apply the Intermediate Value Theorem.