

Math 261
Exam 1 Review Sheet

Section 1.1 Algebra Review

- Understand equations of lines, parallel and perpendicular lines, and x and y - intercepts
- Be able to solve inequalities both algebraically and by using “sign testing”

Section 1.2 Functions Review

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

Section 1.3 Trigonometry Review

- *Memorize* key values of 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 limits from a graph
- Be able to find the limit of a piece-wise defined function

Section 2.2 Definition of Limit

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

Section 2.3 Techniques for Finding Limits

- Know theorems about the limits of $f(x) = c$ and $f(x) = x$
- Know the properties of limits and be able to use them to find the limits of 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 computing limits as $x \rightarrow \pm\infty$
- Be able to express one and two sided limits where the function goes to ∞ or $-\infty$
- Memorize the formal definition of $\lim_{x \rightarrow \infty} f(x)$
- Be able to use limits to find the vertical and horizontal asymptotes of a function

Section 2.5 Continuous Functions

- 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