Math 261
Exam 2 Review Sheet

Section 3.1 Tangent Lines and Rates of Change

- Understand that the slope of a secant line gives the average rate of change over an interval.
- Understand that the slope of a tangent line gives the instantaneous rate of change of a function.
- Be able to work basic applications involving velocity and displacement functions.
- Be able to use the limit definition of the derivative to find the slope of a tangent line.
- Know how to find the equation of a tangent line to a function at a specific point.

Section 3.2 Definition of Derivative

- Memorize the formal limit definition of the derivative of a function.
- Know how to find the derivative of a given function using the formal definition.
- Understand differentiability on open and closed intervals, and be able to determine where a given function is differentiable.
- Understand right and left hand derivatives, vertical tangent lines, corners, and cusps.
- Know that differentiable functions are continuous, but continuous functions may not be differentiable.
- Memorize and be able to apply differentiation formulas for constant functions, lines, and power functions.
- Know the different forms of derivative notation discussed in class.

Section 3.3 Techniques of Differentiation

- Memorize and be able to apply differentiation rules for sums, differences, products, and quotients of functions.
- Be able to use these differentiation rules in the context of an application problem.
- Understand and be able to utilize the proofs of basic differentiation formulas.

Section 3.4 Derivatives of Trigonometric Functions

- Memorize the differentiation formulas for all 6 basic trig functions.
- Be able to find equations for tangent lines to functions involving trigonometric functions.
- Know the proofs of trigonometric differentiation formulas.

Section 3.5 Increments and Differentials

- Understand the idea of linear approximation using increments
- Be able to use increments and differentials to find approximations.
- Be able to find the error in estimates found using linear approximation.

Section 3.6 The Chain Rule

- Memorize the chain rule and be able to apply it to compute the derivative of a composite function.
- Be able to Combine the chain rule with other differentiation techniques.

Section 3.7 Implicit Differentiation

- Know the difference between implicit and explicit functions.
- Be able to find the derivative of a function that is defined implicitly.
- Be able to find equations for the tangent line to a point on an implicit curve.

Section 3.8 Related Rates

- Know the general method for solving related rates problems.
- Understand the connection between related rates and implicit differentiation.
- Be able to use related rates to compute rates of change and to solve application problems.