

Math 261
Exam 2 Review Sheet

Section 3.1 Tangent Lines and Rates of Change

- Secant lines and the average rate of change over an interval
- Tangent lines and instantaneous rates of change
- Applications involving velocity and displacement
- Using the limit definition to find the slope of a tangent line
- Finding the equation of a tangent line, other tangent line computations

Section 3.2 Definition of Derivative

- The formal limit definition of the derivative of a function
- Finding the derivative of a given function using the definition
- Differentiability on open and closed intervals, finding where a function is differentiable
- Right and Left hand derivaives, vertical tangent lines and cusps
- Differentiable functions are continuous, but continuous functions may not be differentiable
- Differentiation fomrulas for constant functions, lines, and power functions, differentiation notation

Section 3.3 Techniques of Differentiation

- Differentiation rules for sums, differences, products, and quotients of functions
- Applying these rules to find the derivative of various functions
- Application problmes involving tangent lines and rates of change or other basic derivative computations
- Proofs of differentiation formulas

Section 3.4 Derivatives of Trigonometric Functions

- Differentiation formulas for the 6 trig functions
- Finding slopes and tangent line equations for functions involving trigonometric expressions
- Proofs of trigonometric differentiation formulas

Section 3.5 Increments and Differentials

- Understand the idea of linear appoximation using increments
- Know the formulas for the increments of a function δy and the differential of a function dy
- Using increments and diferentials to find approximations.
- Using increments and differentials to do error calculations and error estimates

Section 3.6 The Chain Rule

- Using the chain rule to compute the derivative of a composite funtion
- Combining the chain rule with other differentiation techniques
- Basic applications of the chain rule

Section 3.7 Implicit Differentiation

- Know the difference between implicit functions and explicit functions
- Finding the derivative of an implicit function
- Finding tangent lines to points on implicit curves

Section 3.8 Related Rates

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