

Math 21A Midterm 2 Study List

3.1 Tangents and the Derivative at a Point

- Computing slope
- Building secant lines
- Building tangent lines

3.2 The Derivative as a Function

- Definition: Derivative
- Alternative formula for the derivative
- Using definition of derivative (or alternative form) to compute derivative
- Sketching derivative graph from function graph (or vice-versa)

3.3 Differentiation Rules

- Power rule
- Multiples, sums, and differences rules
- Product rule
- Quotient rule
- Higher order derivatives
- Proof: Product rule

3.4 The Derivative as a Rate of Change

- Definition: Rate of change
- Definition: Velocity
- Definition: Acceleration
- Gravity problem

3.5 Derivatives of Trigonometric Functions

- Trigonometric derivative rules
- Evaluation of basic angles
- Right triangle trigonometric identities
- Pythagorean identities
- Proof: Derivative of sine

3.6 The Chain Rule

- Chain rule

3.7 Implicit Differentiation

- Implicit differentiation with respect to any variables

3.8 Derivatives of Inverse Functions and Logarithms

- Definition: Logarithm
- Logarithm rules
- Solving logarithmic or exponential equations
- Definition: Limit definition of e
- Solving limits with limit definition of e
- Derivative of logarithms
- Derivative of exponentials
- Logarithmic differentiation
- Proof: Derivative of logarithm
- Proof: Derivative of exponential

3.9 Inverse Trigonometric Functions

- Definition: Inverse trigonometric functions
- Finding the inverse of a function
- Derivative of inverse trigonometric functions
- Proof: Derivative of inverse sine
- Proof: Derivative of inverse tangent

3.10 Related Rates

- Related rate problems

3.11 The Differential

- Definition: Differential
- Definition: Exact change
- Definition: Exact error, Relative % error, and absolute % error
- Estimating function values
- Linearization
- Estimating percentage error

Notes:

- Any definition listed can be asked on the test.
- Any formula used in any computation above can be asked on the test.
- Make sure to know your geometric relationships used in the related rate problems.