

## Math 124 Topics

### Chapter 2: Limits

- Definition of a limit as in §2.2
- One-sided limits - §2.2
- Infinite limits/Vertical asymptotes - §2.2
- Evaluating limits - §2.3
- Squeeze Theorem - §2.3
- Definition of continuous function - §2.5
- Types of discontinuity - §2.5
- Limits of continuous functions - §2.5
- Intermediate Value Theorem - §2.5
- Limits at infinity/Horizontal Asymptotes - §2.6
- Using limits to compute slopes of tangent lines or velocity of a position function - §2.7
- Definition of a derivative - §2.7
- Regarding derivative as a rate of change - §2.7
- The derivative function - §2.8
- Graphing  $f'$  given a graph of  $f$  - §2.8
- Estimating values of  $f'$  given a table - §2.8

### Chapter 3: Differentiation Rules

- Derivatives for the following types of functions:
  - Polynomial/Radical/Rational Functions - §3.1
  - Exponential ( $a^x$ ) - §3.1, 3.4
  - Trigonometric - §3.3
  - Inverse Trigonometric - §3.5
  - Logarithmic - §3.6
- Differentiation Rules:
  - Power Rule - §3.1
  - Sum and Difference Rule - §3.1
  - Constant Multiple Rule - §3.1
  - Product & Quotient Rule - §3.2
  - Chain Rule - §3.4

- Derivatives as a rate of change in applied problems - §3.7
- Implicit Differentiation - §3.5
- Logarithmic Differentiation - §3.6
- Related Rates - §3.9
- Linear Approximation/Linearizations - §3.10

### Chapter 10: Parametric Equations

- Drawing curves and finding points on a curve described by parametric eqns. - §10.1
- Finding  $x'(t)$  and  $y'(t)$  for parametric equations  $x(t)$  and  $y(t)$  - §10.2
- Finding the slope of the tangents ( $\frac{dy}{dx}$ ) of a parametric curve - §10.2

### Chapter 4: Applications of Differentiation

- Definition of absolute and local maxima and minima - §4.1
- Extreme Value Theorem - §4.1
- Critical Numbers - §4.1
- The Closed Interval Method for finding absolute extreme values - §4.1
- Rolle's Theorem & the Mean Value Theorem - §4.2
- Determining if a function  $f$  is increasing or decreasing given the sign of the derivative  $f'$  - §4.3
- Determining if a graph of  $f$  is concave up or down given the sign of the 2nd derivative  $f''$  - §4.3
- First and Second Derivative Tests for finding local extreme values - §4.3
- L'Hospital's Rule - §4.4
- Optimization problems - §4.7