

MAC2311 Test 3 Outline  
4.1-4.4, 4.6-4.8 (Applications of Differentiation)

4.1 Extrema on an Interval

Major Objectives

- Find the absolute extrema on a closed interval (4.1 Exercises 21-44)
- Find critical numbers (4.1 Exercises 11-20)

Memorize

- critical numbers are where the derivative equals zero or undefined

4.2 Rolle's Theorem and the Mean Value Theorem

Major Objectives

- Apply Rolle's Theorem (4.2 Exercises 23-28)
- Apply the Mean Value Theorem (4.2 Exercises 39-52)

Memorize

- The conditions and conclusions of Rolle's Theorem
- The conditions and conclusions of the Mean Value Theorem

4.3 Increasing and Decreasing Functions and the First Derivative Test

Major Objectives

- Find the open intervals of increasing and decreasing (4.3 Exercises 21-64)
- Apply the First Derivative Test and identify relative extrema (4.3 Exercises 21-67)

Memorize

- Change from decreasing to increasing is a relative minimum
- Change from increasing to decreasing is a relative maximum

4.4 Concavity and the Second Derivative Test

Major Objectives

- Find the open intervals of concave upward and downward (Exercises 1-34)
- Find the points of inflection (Exercises 13-34)
- Use the Second Derivative Test to find relative extrema (Exercises 35-58)

Memorize

- The procedure for the Second Derivative Test
- A point of inflection is where there is a change in concavity

4.6 A summary of Curve Sketching

Major Objectives

- Analyze the graph of a function (Exercises 1-34)
- Sketch the graph of a function (Exercises 41-50)

4.7 Optimization Problems

Major Objectives

- Solve Optimization problems (Exercises 3-16)
- Solve Optimization word problems (Exercises 17-19, 21, 25, 29, 35)

4.8 Differentials

Major Objectives

- Finding differentials (Exercises 11-24)
- Approximating function values (Exercises 41-44)

Memorize

Derivative Formulas 1-24 on page 177