

MAT1300 Midterm 2 Review-Section A & B

1 Material

Sections from the book to study (8th Edition):

- Chapter 3:
 - 3.1: Increasing and Decreasing Functions
 - 3.2: Extrema and the First Derivative Test
 - 3.3: Concavity and the Second Derivative Test
 - 3.4: Optimization Problems
 - 3.5: Business and Economics Applications, including elasticity of demand
 - 3.6: Asymptotes
 - 3.7: Curve-sketching
- Chapter 4:
 - 4.3: Derivatives of Exponential Functions
 - 4.5: Derivatives of Logarithmic Functions
 - 4.6: Exponential Growth and Decay
- Chapter 5:
 - 5.1: Basic Rules of Antidifferentiation
 - 5.2: Integration by U-substitution
 - 5.3: Exponential and Logarithmic Integrals

2 Topics

Key concepts from Chapter 3:

1. Increasing/decreasing behaviour of a function; *using the derivative to find where a function is increasing or decreasing.*

2. Critical points of a function; *finding critical points*
3. Local extrema; *classifying the critical points using first- or second derivative test*
4. Concavity and inflection points
5. Absolute extrema; *finding the absolute min or max of a function on a given interval*
6. Optimization; *solving optimization problems, both geometrical (volume, area, etc.) and economical (cost, revenue, profit)*
7. Elasticity: *computing elasticity of demand; elastic vs. inelastic*
8. Asymptotes and curve-sketching.

Announcement: There will be a curve-sketching question on Midterm #2. For practice, you should work on the following examples:

1. $f(x) = x^3 + 3x^2 - 9x + 4$. (Don't worry about x -intercepts.)
2. $f(x) = \frac{x+1}{x-1}$
3. $f(x) = 2|x - 1|$

Key concepts from Chapter 4:

1. Derivatives of exponential functions; *know calculation rules*
2. Derivatives of logarithms: *know calculation rules*
3. Exponential growth and decay: *setting up a formula, using given data to solve for unknowns; solve problems similar to the examples studied in class (population growth, compound interest, exponential decay)*

Key concepts from Chapter 5:

1. Basic rules of integration. *know calculation rules*
2. U-substitution
3. Finding the constant of integration.
4. Exponential and logarithmic integrals.

Announcement: There will be NOT be an area question on Midterm #2.