

## Midterm 2 Review Guide

### 1 Chapter 2

#### 1.1 Section 9

1. Linear approximation of a function

### 2 Chapter 3

#### 2.1 Section 1

1. What does it mean to be a maximum, minimum, or extreme value?
2. When do we have min/max values (Max-Min Existence Theorem)
3. What are the 3 types of critical points, how do we find them, and what are their significance?

#### 2.2 Section 2

1. What is monotonicity (increasing/decreasing)?
2. How do we find where a function is increasing and decreasing?
3. What is concave up/down?
4. How do we find where functions are concave up and concave down?
5. What are inflection points and how do we find them?

#### 2.3 Section 3

1. What is a local max/min and how does it compare to a global max/min?
2. The First Derivative Test for finding local max/min
3. The Second Derivative Test for finding local max/min
4. What happens when the interval is open? I.E. vertical asymptotes or domain is all real. Are we guaranteed min/max values?

## **2.4 Section 4**

1. Finding Max/Min of practical problems
2. Create the equation of what you are maximizing in terms of the changing variable
3. Find the endpoints of the variable
4. Differentiate the equation and set it equal to zero.
5. Solve for the maximum value
6. In particular study fence and box like problems

## **2.5 Section 5**

1. Use the critical values, inflection points, regions of increasing/decreasing, concave up/down, and local max/min to graph a function.

## **2.6 Section 6**

1. Understand the implications of the mean value theorem

## **2.7 Section 7**

1. Read and understand the concept review questions at the end of the chapter (the answers are at the end of the problem set)

## **2.8 Section 8**

1. What is an antiderivative and how do you find it?
2. Know how to find antiderivatives of polynomials and trig functions.
3. What is the relationship between integrals and derivatives?

## **3 Homework Problems**

Understand and be able to do all of the homework assignments (1-4)

## 4 Practice Midterm

Understand and be able to solve all of the problems from the practice midterm.