Math 229
Exam 3 Review Sheet

Section 11.5 Higher Order Derivatives

• Know how to Find the first, second, third, and higher derivatives of a given function

• Be able to apply multiple differentiation methods to a given function.

• Understanding the meaning of the first and second derivatives of a function and be able to interpret them in a specific situation (for example, given a displacement function $f(x)$, $f'(x)$ is velocity, and $f''(x)$ is acceleration.)

Section 12.1 Applications of the First Derivative

• Understand that the first derivative gives the rate of change of a function at a given point.

• Be able to use the first derivative to find the intervals where a given function is increasing and/or decreasing.

• Know definition of a critical number, and how to find the critical points of a given function.

• Given the graph of a function, be able to identify where the first derivative of a function is positive, where it is negative, where it is zero, and where it is undefined.

• Be able to use the first derivative to find and classify the relative extrema of a given function.

Section 12.2 Applications of the Second Derivative

• Understand that the second derivative of a function gives the rate of change of the rate of change of a function at a given point, that is, its concavity.

• Be able to use the second derivative to find the intervals where a given function is concave up and/or concave down.

• Know definition of an inflection point, and how to find the inflection points of a given function.

• Given the graph of a function, be able to identify where the second derivative of a function is positive, where it is negative, where it is zero, and where it is undefined from the graph.

• Understand the second derivative test and be able to use it to classify the relative extrema of a given function.

Section 12.3 Curve Sketching

• Know how to find and graph the x and y intercepts of a given function.

• Be able to analyze the first and second derivatives of a function in order to determine the increasing/decreasing behavior and the concavity of the function on different intervals.

• Know how to find and graph the relative extrema and inflection points of a function.

• Given a description of a function via information about its first derivative, second derivative, relative extrema, and intercepts, be able to sketch a graph that matches the description.

• Given a function, be able to combine all the curve sketching methods discussed above in order to sketch an accurate graph of the function.

Section 12.4 Optimization I

• Know the definition of absolute extrema.

• Be able to find the absolute extrema of a given function on a specified interval.

• Be able to solve basic application problems involving finding absolute extrema.

Section 12.5 Optimization II

• Know and be able to apply the four step process for solving real word application problems using optimization.

• Familiarize yourself with common type of optimization problems such as maximizing area or volume, maximizing profit or revenue, or minimizing costs.

Chapter 12 Review Problems: p. 808-809 # (1, 3, 11, 13, 14, 23, 26, 33, 37, 40, 43)