MATH1210: Midterm 3 Study Guide

The following is an overview of the material that will be covered on the third exam.

§3.3 Local Extrema and Extrema on Open Intervals

- The definition of a local maximum or minimim as well as the definition of a local extreme value.
- The First Derivative Test.
- The Second Derivative Test.
- The definition of an inflection point/critical point, and how to identify them from the graph of a function.

§3.5 Graphing Functions Using Calculus

- I guarantee that there will be a graphing problem on the exam. It will be worth 20-30 points. Know how to apply the methods of calculus to draw a *detailed* graph of a function. See example 1 in §3.5.

§3.4 Practical Problems

- You should be able to apply the theorems of the previous 3 sections to "real world" problems.
- This includes maximizing area, volume, profit, etc.

§3.6 The Mean Value Theorem for Derivatives

- The Mean Value Theorem for Derivatives.
- Using the Mean Value Theorem for Derivatives.

§3.7 Solving Equations Numerically

- The Bisection Method for finding solutions to $f(x) = 0$.
- Newton's Method for finding solutions to $f(x) = 0$.

§3.8 Antiderivatives

- Know how to compute indefinite integrals, including using the power rule and the "Generalized Power Rule" (in class I called this "the chain rule backwards").
- Don't forget the integration constant, C.

§4.1 Introduction to Area

- Summation notation
- Evaluating sums using the special sum formulas on page 218 of the text. These formulas will be given on the exam.

§4.2 The Definite Integral

- Computing the midpoint, left, and right Riemann sums for a given function and partition.

- The definition of the definite integral, and an understanding of what it measures.
- Basic properties of the definite integral, like additivity:

$$\int_a^c f(x)dx = \int_a^b f(x)dx + \int_b^c f(x)dx$$