Guidelines for Exam 2

MATH 471

- **Theorems you are expected to be able to state and prove**:

  1. Rolle's Theorem

  2. Mean Value Theorem

  3. Suppose that a function f is differentiable on an interval $[a, b]$. Then f' is bounded if and only if f is Lipschitz.

  4. Refinement Lemma in integration: If P is a partition of an interval $[a, b]$ and Q is a refinement of P then
     (a) $L(P, f) \leq L(Q, f)$
     (b) $U(Q, f) \leq U(P, f)$

  5. The Archimedes Riemann Theorem

  6. A monotone function is Riemann integrable.

- **Theorems you are expected to be able to apply**:

  1. All of the above

  2. Differentiable functions must be continuous

  3. Differentiating the sum, product (product rule), and composition (chain rule) of two differentiable functions. Derivative of the inverse of a function.
     (**Important note: The inverse of a function f^{-1} is different from the function $\frac{1}{f(x)}$**)

  4. Linearity, additivity, and other properties of the integral.

  5. A continuous function defined on a closed bounded interval is Riemann integrable.

- **Must be able to clearly state all the definitions:** For example: Lipschitz function, differentiability and derivative at a point, partition in Riemann integration, upper and lower sums/integrals in Riemann integration, Riemann integrable function, etc.

- **Be familiar with all the examples and counter-examples discussed in class.**

- **Be familiar with all the problems from Homeworks 4-6. Consider going over the solutions provided for the homeworks.**