Review sheet for exam 3

The best way to study for the exam is to learn how to do all of the assigned practice problems. If you run out of problems, learn to do all of the problems in the book! Here are some of the chapter review problems that you should try:

- Chapter 4 review: Concept Check, True–False Quiz. Also 1-6, 7-14, 15, 17, 18, 19-33, 35, 45, 50, 52, 53, 65-72, 73
- Chapter 5 review: Concept Check 1-3, True–False Quiz 1-7. Also 1, 3, 7, 8, 9, 13, 45, 47, 55

The following is a list of the topics that I think are important:

- 4.1
  - Know the definitions of absolute max/min, local max/min.
  - Know the statement of the Extreme Value Theorem and how to use it.
  - Know Fermat's theorem.
  - Know what a critical number/point of a function is.
- 4.2
  - Know the statements of Rolle's theorem and the Mean Value Theorem and how to use them to solve problems.
- 4.3
  - Understand what the derivative and second derivative of a function tells you about the graph of a function.
  - Know how to use the first and second derivative test.
- 4.4
  - Know the statement of and how to use L'Hôpital's rule.
- 4.5
  - Be able to sketch graphs that take into account the domain, intercepts, symmetry, asymptotes, periodicity, intervals of increase and decrease, local extrema, concavity and inflection points of a function.
- 4.7
  - Know how to use calculus to solve optimization problems.

- 4.8
  - Know how to use Newton's method.
- 4.9
  - Know the definition of an antiderivative.
  - Know how to compute antiderivatives using the techniques of 4.9.
  - Know how to solve initial value problems.
- 5.1: Areas and distances
  - Know and understand the definition of area (See page 365)
  - Be able to compute L_n, R_n, and M_n and know how to interpret these quantities geometrically.
  - Understand the connection between distance and area
- 5.2: The definite integral
  - Know the definition of the definite integral.
  - Given a definite integral, know how to rewrite it as a limit of Riemann sums.
  - Understand the interpretation of an integral as net area.
  - Know when a function is integrable (Theorem 3 on page 373)
  - Be able to compute definite integrals by calculating the net area bounded by a graph.
  - Know and know how to use the properties of integrals listed on pages 379-381.
- 5.3: The fundamental theorem(s) of calculus
  - Know the statements of both of the fundamental theorems of calculus.
  - Understand how a function defined by an integral behaves. I'm referring to functions of the form
    $$g(x) = \int_a^x f(t)\,dt$$
    . You should be able to take the derivative of functions defined in this way. Integrate this knowledge with what you learned about graph sketching in chapter 4.
  - Know how to use the part 2 of the fundamental theorem to compute definite integrals.