Review for Third Exam

The third exam will cover sections 5.1, 5.2, 5.3, 6.1, and 6.2 of the text. The relevant assignments are assignments 19 through 24.

Here is a list of the definitions and proofs which I might ask for on the exam. As usual, if the proof I gave a proof in class is different from the one in the text, you can use whichever one you prefer.

- Definition of continuity of a function at a point (5.1.1).
- Sums, products, quotients of continuous functions are continuous (5.2.1).
- Proof that the composition of continuous functions is continuous (5.2.6). (The proof given in the text looks quite different from the one I gave in class.)
- Definition of bounded function on an interval (5.3.1).
- Proof that a continuous function on an interval $[a, b]$ is bounded (5.3.2). (In class I called this the first part of the Extreme Value Theorem.)
- You should know the definition of an absolute minimum and absolute maximum (5.3.3) and the statement of the "Maximum-minimum Theorem" (5.3.4), but I won't ask for a proof of this theorem on the exam. (In class I called Theorem 5.3.4 the second part of the Extreme Value Theorem.)
- Definition of derivative. In class I defined the derivative as follows: Suppose $f(x)$ is a function and c is a real number. We define the derivative of f at c to be the value (if it exists) of the limit of $\dfrac{f(x) - f(c)}{x - c}$ as x approaches c.
- Proof of the product rule for derivatives (6.1.3(c)).
- You should know the statement of the chain rule for derivatives (6.1.6), but I won't ask for a proof.
- Proof of Rolle's Theorem (6.2.3).
- Proof that if the derivative of a function is zero on an interval, then the function is constant on that interval (6.2.5).

Here is a guide to the sections in the text that will be covered on the exam.

- Section 5.1: read the entire section.
- Section 5.2: read the entire section.
- Section 5.3: read from the beginning of the section through the proof of Theorem 5.3.4. We did not cover the material in Theorem 5.3.5 or beyond.
- We did not cover sections 5.4, 5.5, or 5.6.
- Section 6.1: read from the beginning of the section up through the end of Example 6.1.7(d) on p. 164. (Actually, you can skip Caratheodory's theorem 6.1.5 and the proof of the Chain Rule 6.1.6 if you like. I haven't decided yet if I will prove the Chain Rule in class, and if I do, I will give a different proof.) We did not cover the material in this section on inverse functions (6.1.8, 6.1.9, 6.1.10).
- Section 6.2: read from the beginning of the section all the way through the examples in 6.2.10, ending at the top of page 174. We will not cover the subsection on the intermediate value property of derivatives.