Format and topics for final exam
Math 131a

General information. The final will be about twice as long as our in-class exams, with 135 minutes in which to complete it. It will take place in our usual room, on Wed Dec 17, from 12:15–2:30pm.

The final will be **cumulative**; in other words, the final will cover the topics on this sheet and also on the previous three review sheets. However, the exam will somehwat emphasize the material listed here from 6.1–6.2. As always, most of the exam will rely on understanding the problem sets and the definitions and theorems that lie behind them. If you can do all of the homework, and you know and understand all of the definitions and the statements of all of the theorems we've studied, you should be in good shape. You should not spend time memorizing proofs of theorems from the book, though understanding those proofs may help you understand the theorems. On the other hand, you should defintely spend time memorizing the *statements* of the important theorems in the text.

As usual: No books or notes allowed, and four basic types of questions, namely, computations, statements of definitions and theorems, proofs, and true/false with justification.

Definitions. The most important definitions we have covered are:

6.1	derivative of f at c	differentiable at c
6.2	relative maximum	relative minimum
	relative extremum	increasing/decreasing function
	strictly increasing/decreasing	

Examples. You will also need to be familiar with the key properties of the main examples we have discussed. Many of the important examples we have encountered have appeared in the assigned problems. In addition, you should also know:

6.1: Function that is continuous at c but not differentiable at c; standard functions and where they are and are not differentiable. Scale of "chocolate-y goodness": no limit, limit but not continuous, continuous but not differentiable, differentiable.
6.2: Applications of the Mean Value Theorem (inequalities/estimates).

Theorems, results, algorithms. The most important theorems, results, and algorithms we have covered are listed below. You should understand all of these results, and you should be able to state any theorem clearly and precisely. You don't have to memorize theorems by number or page number; however, you should be able to state a theorem, given a reasonable identification of the theorem (either a name or a vague description).

6.1: Differentiability implies continuity. Combo rules. Carthéodory's Theorem; Chain Rule.
6.2: Interior Extremum Theorem. Rolle's Theorem; Mean Value Theorem. Zero Derivative Theorem and consequences (Thm. 6.2.5, Cor. 6.2.6). First Derivative Test.

Not on exam. (6.1) Inverse functions. (6.2) Increasing at a point; Intermediate Value Property of Derivatives (Darboux's Thm).

Topics that may be on the final, but not as the sole focus of a question. In other words, questions on the exam may relate to these topics, but there will not be any questions that cover *only* these topics. (1.2) Induction. (2.1) Axioms of the real numbers other than completeness. (2.5) Intervals and the Nested Interval Theorem.

Good luck.