This list is intended as the start of a study guide. There is no guarantee that because a topic is listed here that it will be on the midterm, nor is there a guarantee that every problem on the midterm is represented in the list below. I've broken down the topics into three categories: problem solving, tasks, and basic computations. You can expect to find all of these categories represented on the midterm. The midterm will cover:

- **Chapter 3** Sections 4 and later.
- **Chapter 4** Section 1.

You will want to do the following:

- Go over all of your quizzes. If I asked you a question on a quiz, you can assume that I like that kind of question.
- Go over ALL webassign problems you were not able to solve.
- Go over ALL homework problems you were not able to solve. You should pay close attention to Addendum problems. If I decided to write up a question, you can assume I thought it was important.
- Go over any group worksheets. If there are parts you don't understand, look at the solutions, and ask questions if needed.
- For strictly computational problems (i.e. computing implicit derivatives), try some sample problems from the text: there are answers in the back for the odd problems.
- I guarantee you there will be a related rates problem, and a linearization problem. Please know this material.
- Go over the list of topics on the next page.
- Study both of the sample exams. There is a large breadth of material we've covered!

Problem Solving and the Big Picture

- Solve word problems involving rates of change.
- Understand what the linear approximation is and how to use it.
- Use the relationship between rates of change and slopes of tangent lines to interpret graphs.
- Solve basic related rates problems.
- What is an implicitly defined function? How is it different from an explicitly defined function?
- Given a function describing a physical quantity (e.g. temperature as a function of time, or density as a function of temperature) be able to interpret the meaning of the derivative as a rate of change.
- Understand the relationship between positions, velocities and accelerations. Be able to solve word problems involving these quantities.

Tasks and Computations:

- Compute instantaneous rates of change.
- Be able to use the constant multiple, sum, product, power, and quotient rule.

- Be able to use the chain rule.
- Find the derivative of an inverse function.
- Compute slopes of tangents lines of functions.
- Determine the tangent line at a point on a graph or an implicitly defined curve.
- Find an implicit first or second derivative.
- Use logarithmic differentiation to simplify the computation of a derivative.
- Be able to compute linear approximations.
- Use the linear approximation to approximate the value of a function.
- Use Netwon's method to approximate the solution of $F(x) = 0$.