Studying for Calculus I

Reading the text:

- Read through the section before the material is covered in class. Even if you don't completely understand the section, as least you know what will be covered.
- After lecture, review your notes, and look back through the section that was covered; if you are still unsure about something, get clarification.
- If something is labeled Theorem, Definition, or has a box around it, it's important.
- Don't skip over the example problems.
- Keep a separate sheet of all the important formulas along with the page numbers so you can refer back to them later if you need to.
- If you plan to continue with math, don't skip over proofs!
- If you come across something you don't understand, make a note and ask the instructor or TA.

Homework:

- Form a study group or exchange emails and/or phone numbers early in the term.
- Give yourself at least a couple of days to do the homework. If you have questions, you'll have plenty of time to email classmates or discuss them during your study session.

Studying for a test and taking exams:

- Definitions are really important; know what they are and how to use them.
- Review homework and/or chapter review problems.
- Look through the examples in the chapters, and know how they arrived at each step. Also, know how, when given a word problem, to set up the equations. In other words, know the applications really well.
- On the exam:
    - If the formulas aren't given, write the important one on the top before you look over the test. Formulas are sometimes hard to remember under pressure.
    - If you have time at the end, double check your answers, no matter what!
    - If you come across something you can't remember, move on; another problem/section of the test might jog your memory.
    - Know how to use your calculator! The TI-89, for example, can be used to find derivatives and integrals. This doesn't mean you don't have to show work; it's just a great way to double check your work.

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Things to have a firm grasp of:

Limits

- Definition of a limit
- Does a limit exist? (lim x $\rightarrow$ c+ = lim $\rightarrow$c- ; limit as x approaches c from the right is equal to the limit as x approaches c from the left).
- How to evaluate infinite and finite limits
- (ie lim x$\rightarrow$ $\pm\infty$ f(x) and lim x$\rightarrow$ c f(x) where c is a constant)
- Know the special cases (indeterminate forms and 1'Hospital's Rule, removable discontinuities, etc.)
- Properties/Laws of limits

Continuity:

- Definition of continuity and discontinuity
- Test for continuity (lim x $\rightarrow$ c+ = lim $\rightarrow$c- = f© where c is constant)
- Left continuity vs. right continuity
- Continuity on an interval

Derivatives:

- Definition of a derivative
- When you can take a derivative (continuity must exist)
- Derivative of a function using limits (is f ′(a)= lim h$\rightarrow$ 0 [f(a+h) – f(a)] /h)
- Derivative rules: power rule, chain rule, constant multiple rule, difference rule. Product/quotient rule, etc.
- Finding maximums and minimums (concavity, second derivatives)
- Derivatives of trig functions
- Implicit differentiation
- Special cases (derivative of e, logs, exponents, etc.)

Applications:

- Rate of change in volume/area/length/etc. are common applications of derivatives
- Optimization problems
- The chapters usually have great application examples; look through them carefully and know how they arrived at each step. The chapter problems are also great practice.