The following are some of my ideas about how to do well and really get something out of this class. Some of the ideas are specific to mathematics, but many are generally applicable. I welcome any comments or suggestions.

I. General

a) Problem solving is a skill that must be learned and then practiced. It is often helpful to ask yourself many questions about the process of solving a particular problem:
   - What information am I given?
   - How much of that information have I used? After all, at our level it is rare that the problem states extra information, so you should expect to use all the information given.
   - What is it I am trying to show? Can I rephrase it? (This is especially true for proofs.)
   - What are the tools I’ve learned recently that might help me solve this problem? For example, most problems in a particular section will use one or more techniques from that section in the solution (but not always).
   - For proofs: If I remove one of the hypotheses can I see why the statement is no longer true?
   - Can I draw a picture or diagram that helps?

My friends in education tell me that this process is called metacognition, since you are thinking about your thought processes.

b) Pay attention in class. Ask questions when you are confused. Also, ask questions when you understand something and would like to take it a step further or want to know how it connects to previous material.

c) Keep up with the homework.

d) Read a section before the lecture. Don’t expect to understand all of it when reading, but by reading it you may help yourself to understand my lecture. After the lecture, reread.

e) Talk a lot with your classmates (outside of class, I mean). Explain new topics to each other. Compare your homework solutions and help each other find errors.

f) Make use of office hours.

g) Experiment on the computer.

h) Mathematics has some similarities with learning a foreign language. You need to master vocabulary words and also some aspects of syntax.

II. Homework

a) Start early. Read the section (before the instructor lectures). Read through the problems. Look up unfamiliar terms in the index. Read the section again. Try the problems. Reread. Retry. Etc.

b) Always make a first attempt at the problems on your own. Working with your friends and classmates is fine, but don’t deceive yourself that you understand the material when it is actually your friend or tutor who has done all the work.

c) Avoid using a solutions manual. There is too much temptation to get a “hint” on every step – by the time you have finished the problem you have not actually done any work.

c) Draw pictures and diagrams if they will help.
d) Evaluate your answers to see if they make sense. If a problem asks you to find the length of a box edge and you get $-3$ for an answer then you have probably made a mistake.
e) Write up your homework very clearly. Explain your steps at an appropriate level. Use English sentences in your writeup, not just a sequence of equations (look at how examples are written up in the textbook for guidance). This means that using correct grammar and complete sentences is important.

III. Before the exam

a) Begin reviewing for the exam one to two weeks before the exam.
b) Always work review problems before the review session(s). Remember that I am quite good at calculus (from long experience) so I can make the problems look straightforward and easy. You won’t gain much by watching me if you haven’t already attempted the problems.
c) Useful questions to ask yourself
   - What are the new concepts since the last exam?
   - How do they fit in with older topics (both from this course and from previous courses)?
   - Do I understand these concepts? Can I apply them to solve problems?
   - Can I do the problems reasonably quickly without looking at notes or the book as I will have to do on the exam? (Work your way up to this, of course.)
   - What were my weaknesses on previous exams? Have I mastered that material?
d) Get a good nights sleep before the exam. Six to eight hours of sleep will probably help you more than staying up all night cramming. This means learning the material before the last night (slow and steady — see part (a)).

IV. During the exam

a) Read the entire exam first, before beginning on any problems.
b) Do the problems that you find easiest first.
c) Be strategic — don’t spend a lot of time on a 3 point problem if that time would be better spent on a 10 point problem.
d) Write your answers out as clearly as possible. Doing this on the homework will be good practice. It helps also for partial credit.
e) If you are stuck on a problem but know what technique to use then write that down.
f) Think about the answers that you do get. If you get $-3$ for the length of a side and can’t figure out where your error is, then consider making a note on the exam that your answer must be wrong. The grader may then realize that you are thinking about your work and give more partial credit.

V. After getting the exam back

a) Make sure that your score has been totalled accurately.
b) Review the entire exam. Note what you have gotten right and what you have not.
c) Figure out why you got some of the problems wrong. After all, an exam should give you as much information as it does the instructor.
d) Rework the problems that you lost points on. Use your resources: the book, friends, the Learning Center, your TA, the professor. Ask lots of questions.