

HINTS AND PROBLEMS FOR FIRST MIDTERM

1. *Generalities* The material goes until (including) Example 2.31 in Section 2.4. The exam problems will be similar to homework problems and problems done in class, until the problems posted as relevant for the midterm. We plan to post solutions for at least some of them. Besides that, there may also be a number of True/False questions which will not require proofs. It is very important that you understand and know how to use all the basic definitions in our course (such as e.g. convergence, supremum, maximum etc). You are allowed to have **one** hand-written cheat sheet. You can write information on both sides. I will not ask you to reproduce proofs of theorems, so you need not write proofs of theorems on it. But you may have to give proofs similar to those in some homework problems.
2. Look at your homework problems. If you did not get them right, make sure you understand what you did wrong. Take advantage of office hours of the TA and professor, if necessary. The professor will have an additional office hour on Thursday afternoon, 3-4.
3. *Practice* Besides looking over old homework problems, you can do similar problems you can find in the book. To give you an idea what kind of problems you might see, here is a sample:
4(a) Prove that the following sequence does not converge:

$$\left((-1)^n + \frac{1}{n}\right)$$

- (b) Prove that the following sequence does converge:

$$\left(\frac{(-1)^n}{\sqrt{n}} + \frac{1}{n}\right)$$

5. Some true/false questions. No proofs or justifications required (but you should try to find some for yourself, to make sure you got the right answer). There are also lots of true/false questions in the book.
 - (a) The sequence (a_n) converges to the number a if for every $\epsilon > 0$ we can find an N such that $|a_N - a| < \epsilon$.
 - (b) Every sequence has a convergent subsequence