We have the third hour exam in CB118 from 7:30pm-9:30pm on Tuesday, 13 November 2001. Below are a few problems to help you review for the exam. In addition to what is listed below, students should be familiar with the correct solutions to all homework that was collected and with material presented in lecture.

The third exam will cover the sections from Chapter 3 as listed in the syllabus and there will be questions on "Sigma notation", the first section in Chapter 4. Mathematical induction will be covered in homework after test 3, but will not be examined. This will give us an extra day of review at the end of the semester.

- Please know about absolute maxima, absolute minima, local maxima, local minima, local extreme values, absolute extreme values, critical numbers and Fermat's theorem. Understand the procedure for finding absolute extrema as in box (8) on page 187. As a first step towards understanding, you should know what is in box (8) on page 187. You should be able to use the procedure to solve problems as in the text. You should be able to explain why it works for continuous functions on closed intervals and may not work in other situations.

- §3.1 #1, 3, 39, 45, 47, 49.

- Please understand the mean value theorem and Rolle's theorem. You do not need to study the proofs of these theorems. You may be asked to use these theorems to prove the first derivative test for increasing or decreasing functions. You may be asked to use the mean value theorem to establish inequalities such as $\sin x \leq x$ for $x \geq 0$.

- §3.2 #7, 31.

- Monotonicity or increasing and decreasing functions. Know the definition of increasing or decreasing function, the first derivative test for increasing or decreasing functions and the first derivative test for local extrema.

- Concavity. Know the definition of concave up, concave down and inflection point. Know the second derivative test for concavity and for local extrema.

- You should be able to illustrate the first and second derivatives tests with simple functions such as $\pm x^k$ for $k = 2, 3, 4$. Can you find a function which has a critical number at 0, but does not have a local extremum at 0?

- §3.3 #1, 5, 7, 17, 33.

- §3.4 #1, 2, 9, 15, 17, 21, 23, 25.

- Please know the precise definition of limits at infinity. You will not be asked to carry out a proof involving the precise definition. You should be able to work problems such as the homework problems 66a) in section 3.5.

- §3.5 #1, 3, 5, 7, 9, 11, 17, 19.

- §3.6 #11, 13, 35.

- Please know the first derivative test for absolute extreme values in section 3.8 as well as the test from section 3.1 for finding absolute extreme values on a closed interval.

- §3.8 #9, 11, 13, 15, 21.

- §3.10 #15, 17, 23, 27.

- Be able to find anti-derivatives quickly and correctly. How do you check your answer?

- Evaluate simple sums (with 4 or 5 terms). Convert sums to and from Σ notation.

- §4.1 #11, 13, 19, 21, 23.