Calculus I — Russell Brown
Assignments — November 17, 2000
Homework assignments:

- Homework #15, Due Monday, 27 November 2000. Section 5.5 #6, 18, 20. Section 5.6 #2, 20, 34.
- Homework N. Due Tuesday, 28 November 2000. Section 5.6 #24.
- Homework O. Due Thursday, 30 November 2000. Section 5.7 #60. Please explain how you arrive at each of your answers.
- Homework #16. Due Friday, 1 December 2000. Section 5.7 #12, 14, 48. Section 5.8 #10, 30, 48, 60. Hint: Problem 48 is simpler than it appears. In #60, try to relate the integral you are trying to find to an integral over an interval where $\sin(2x) \geq 0$.

Exam 3. I am disappointed at our performance on the third exam. Around 20% of the students have A's, which is adequate, though I always wish it were higher. However, there are far too many D's and E's. Most of the questions were closely based on homework problems. The students who take their homework seriously do well on exams.
The average is approximately 67 points. Note that problem 4 was graded out of 15 points, rather than 10. To adjust the scores I will do the following. 1. Gradelines are lowered as follows: 88 is the lowest A, 75 is the lowest B, 65 is the lowest C, 55 is the lowest D. 2. In addition, students will be able to earn a C in the course, but not a higher grade, based on their performance on exams 1, 2 and the final. Such students will have their grade computed out of 300 exam points and 150 homework points and will need 70% to earn a C.

Below are some suggestions as you study the last few sections prior to the final.

1. In section 5.5, know the definition of integral. However, in problems we will only use the simpler procedure from section 5.4. The treatment of area in section 5.4 is simpler because it only uses partitions with equally spaced points.
2. The interval additivity property in section 5.5 is useful for simplifying a problem by dividing a complicated integral into several simpler integrals. See §5.8, #60 for an example of this. This property is also used in the proof of the the first fundamental theorem of calculus.
3. Know the statements and proofs of both fundamental theorems of calculus.

4. From section 5.6, be able to use FTC I to differentiate integrals as in the homework, see section 5.6 #13-22 for examples. Use the additivity property to evaluate integrals by writing as sum of simpler integrals. Observe that there is no product or quotient rule for integration.

5. Use the comparison and bounded properties to estimate integrals, see §5.6 #33-36. Use geometric arguments to evaluate certain integrals.

6. Why is FTC 2 useful?

7. The mean value theorem for integrals is a restatement of the mean-value theorem for functions. It can be used to estimate integrals in ways that are similar to our attempts to use the mean value theorem to estimate functions. I will not emphasize the mean-value theorem for integrals. Instead, we will estimate integrals using the comparison and boundedness properties of §5.6.

8. Section 5.8. Learn to compute. Evaluating integrals by simple substitutions is an extremely important life skill. You should be able to do all of problems 1–46 in §5.8.

9. The symmetry theorems for integrals are a favorite source of "trick question". If you have an integral that is impossible to evaluate, perhaps it is zero because the integrand is odd and the interval is $[-a, a]$.