

Math 111.01 Summer 2003  
Assignment #0

This assignment is due at the beginning of class on **Wednesday, June 25, 2003**. You must submit all problems that are marked with an asterix (\*). **YOUR ASSIGNMENT MUST BE STAPLED. UNSTAPLED ASSIGNMENTS WILL NOT BE ACCEPTED!**

1. \* Send me an email which includes your name, your hometown, and your anticipated major, as well as answers to the following two questions: Why are you taking this course? and How do you feel about math? (Be honest!)
2. Read all of the course policies, including “Words of Wisdom.” Visit and explore our Math 111 course home page.
3. Read “To the Student” on page xvii of Stewart.
4. Explore the Tools for Enriching Calculus CD that is included with your textbook. Find out about its modules and homework hints. See if there are any hints for the exercises assigned in problem 6 below.
5. Complete the “Basic Algebra Review” worksheet which can be downloaded and printed from our Math 111 course home page. Even though the solutions are provided, you should still work through many of the exercises. This will help you to “get back into the swing of things” after a few months off, and to help you honestly assess your high school mathematics background.
6. \* Do the following exercises from Stewart.
  - Appendix A pages A6–A7: #17, 18, 26, 27, 30, 37, 41
  - Appendix B pages A16–A17: #11, 13, 16, 17, 23, 37, 38, 39, 43, 53
  - Appendix C pages A27–A29: #1, 4, 5, 6, 13, 15, 18, 29, 30, 40, 41, 43, 45, 48, 50
7. Read “A Preview of Calculus” on pages 3–9 of Stewart. The purpose of reading this section is twofold. It will give you some flavour for what calculus is, as well as many of the ideas we will learn this semester. More importantly, it will get you ‘reading math.’ One of the most difficult things for beginning university students is learning and retaining material written in scientific textbooks. Reading a textbook in mathematics, physics, chemistry, biology, or economics, is vastly different than reading an English, history, political science, philosophy, or sociology textbook. For many incoming students, the most challenging part of the transition from high school is learning how to learn from difficult and technical sources. The investment of time and effort now will pay off in the next four years.

*(Continued)*

**8.** The following two problems were seen on a previous calculus final examination. At the end of the semester you should be able to solve them, although you probably won't be able to now. It is meant to illustrate that there is more going on here than in high school calculus.

- You have been given the task of designing a number of TCAT bus shelters for the city of Ithaca. Each shelter is in the shape of a large rectangular box with a square top, no floor, and open in the front. The materials for the top cost \$20 per square foot, and the materials for the sides cost \$12 per square foot. You are allowed to spend no more than \$5000 per shelter. What dimensions should you make the shelter so that they enclose the largest possible volume? Verify that your answer is the maximum.

- Let  $R_n = \sum_{j=1}^n \frac{1}{n} \ln \left( 1 + \frac{j}{n} \right)$ .

(a) Interpret  $R_n$  as a Riemann sum for a certain function  $f(x)$  and hence evaluate  $\lim_{n \rightarrow \infty} R_n$ .

(b) Use the result of (a) to evaluate

$$\lim_{n \rightarrow \infty} \frac{[(n+1)(n+2)(n+3) \cdots (2n)]^{1/n}}{n}.$$