• Homework B will be due on Wednesday, 36 January 2003. For this homework, I would like
to you to 1. State the intermediate value theorem. 2. Use the intermediate value theorem to
show that \( x^4 - 7x^2 + 10 = 0 \) has a root.
Please write your answers in complete sentences.

• On Monday, 10 February 2003, we will move to our new classroom, White Hall Classroom
Building 212. Lectures will be in this room for the rest of the semester. Recitations will not
move.

• Our first exam will be on Tuesday, 11 February 2003. The exam will be from 7:30-9:30 pm
in the White Hall Classroom Building 106. All of our exams will be in this room.

• The error of the week: Abuse of the equal sign.

\[ \lim_{x \to 1} \frac{x^2 - 1}{x - 1} = x + 1. \]

The equality is not correct. The result of the limit is a number, while the expression \( x + 1 \)
usually represents a function.

• The quiz on Thursday, 6 February 2003 will be cover section 2.1 of the text. Please know
the definition of the derivative and be able to compute derivatives using the definition.

• Please keep up with the homework assignments. I will use these assignments and my
lectures as I try to think of examination problems.

• A review sheet will be available on Wednesday, 5 March 2003, to help you prepare for the
exam.

• There will be two interesting lectures sponsored by the the Departments of Chemistry,
Mathematics, Physics and ΦBK. Please consider attending, if the lecture does not conflict
with your calculus recitation.

**Free Public Lecture**, Chaos, a New Science, Thursday, February 6, 2003, Room 155,
Chemistry-Physics Building, Refreshments at 3:30 PM in Room CP 179

This is a general pictorial and non-mathematical introduction to an ongoing scientific
revolution–of interest to anyone who has wondered why the weather is not necessarily
predictable, or why snowflakes and fingerprints are thought to be in a ”no-two-alike”
category

**Colloquium**, Friday, February 7: Quantum Mechanics in the Large: The 2001 Nobel Prizes,
Friday, February 7, 4:00 PM, Room 155, Chemistry-Physics Building, Refreshments at 3:30
PM in Room CP 179

In the 1920’s Bose and Einstein suggested that a novel type of particle, which we now call a
Boson, might have unusual properties–one of these being the possibility that many Bosons
might occupy a single quantum state. Einstein suggested that gases of atoms might actually do this, and the 2001 Nobel Prizes in Physics reflect the recent success in actually carrying out the “Bose-Einstein Condensation” in the laboratory. In this introduction to “coherent matter waves,” some history and current state-of-the-art experiments are introduced. It is seen that “quantum mechanics in the large” is in the here and now.

- Below are a few puzzles for your amusement.
  - Can you find a function which is continuous, but not differentiable?
  - Suppose $f$ is differentiable at 0. Show that the limit
    $$\lim_{h \to 0} \frac{f(h) - f(-h)}{h}$$
    exists and find its value.
    If the above limit exists, is the function differentiable at 0?