Mathematics 1BM
Second Midterm Exam

Professor K. A. Ribet
April 9, 1997

60 Evans and 2060 VLSB
9:10–10 AM

Your Name: _____ TA: _____

This booklet comprises a cover sheet and four pages of questions. Please check that your booklet is complete; write your name on this cover sheet and the four question sheets. As you turn through the pages, look for the easy questions — do them first. Remember that this exam is only 50 minutes long!

- You need not simplify your answers unless you are specifically asked to do so.
- It is essential to write legibly and *show your work*.
- If your work is absent or illegible, and your answer is not perfectly correct, then no partial credit can be awarded.
- Completely correct answers which are given without justification may receive little or no credit.

During this exam, you are not allowed to use calculators or consult your notes or books.

Problem	Maximum	Your Score
1	9	
2	14	
3	14	
4	8	
Total	**45**	

At the conclusion of the exam, hand in this exam paper to your TA.

Your Name: _____

1 *(9 points)***.** Solve the initial-value problem $y^2y' = 3e^x + 4, \quad y(0) = 1.$

Your Name: _____

2a *(8 points).* For which values of x does the series $\sum_{n=2}^{\infty} \frac{n^3}{3^n} x^n$ converge?

2b *(6 points).* Let $f(x)$ be the sum of the series above. Find $f^{(100)}(0)$.

Your Name: _____

3a *(7 points).* Decide whether $\sum_{n=1}^{\infty}(-1)^n \tan\frac{1}{n^2}$ converges absolutely, converges conditionally, or diverges.

3b *(7 points).* Evaluate $\sum_{n=0}^{\infty}(-1)^n \frac{(\ln 2)^n}{n!}$.

Your Name: _____

4 *(8 points)*. Find the Maclaurin series for the function $\frac{1}{\sqrt{1-x^2}}$.