

**Math 1b Section 2 Midterm #2, 3/21/06, 3:40 PM – 5:00 PM**

Please write your solution to each of the 6 questions on a separate sheet of paper with your **name, GSI, and SID#** on it. Each question is worth 10 points. Please put a box around your final answer. *All answers must be justified to receive full credit.* No notes or calculators are allowed. Please hand in your exam to your GSI. Good luck!

1. Does the following series converge or diverge?

$$\sum_{n=1}^{\infty} \frac{\sqrt{n + \cos n}}{\sqrt{n^3 + n^4}}$$

2. Does the following series converge or diverge?

$$\sum_{n=1}^{\infty} \frac{1}{n^{(n/100)}}$$

3. Approximate the definite integral

$$\int_0^1 \sin(x^3) dx$$

with an error of at most  $10^{-3}$ . Please give an answer of the form  $a/b$  where  $a$  and  $b$  are integers.

4. Find the *interval* of convergence of the power series

$$\sum_{n=2}^{\infty} \frac{2^n(x+1)^n}{\ln n}.$$

5. Find the 17<sup>th</sup> derivative of the function

$$f(x) = \frac{x^2}{(1+x^3)^2}$$

at  $x = 0$ . Please write the answer in the form  $a \cdot b!$  where  $a$  and  $b$  are integers.

6. Find the sum of the series

$$\sum_{n=2}^{\infty} \frac{n(n-1)}{2^{n-2}}.$$