Math 21B **Midterm 1** **Fall 2012**

NAME(print in CAPITAL letters, first name first): _____

NAME(sign): _____

ID#: _____

Instructions: There are five problems. Some questions are easier than others so you are encouraged to read the entire exam before beginning your work. Make sure that you have all 5 problems.

Points received:

1	
2	
3	
4	
5	
TOTAL	

1. Evaluate the following definite integrals.

   (a) $\int_{-1}^{3} |x| \, dx$

   (b) $\int_{-1}^{1} 2\sqrt{1-x^2} \, dx$

2. Solve the initial value problem

$$\frac{d^2s}{dt^2} = e^{-t}, \quad s'(0) = 0, \; s(0) = 0\,.$$

3. Find $\lim_{x \to 0} \frac{1}{x^2} \int_0^x \frac{t}{1 + \sin t} \, dt$.

4. Evaluate the following indefinite integrals.

(a) $\displaystyle\int \sqrt{\frac{x^2-1}{x^8}}\, dx$

(b) $\displaystyle\int \frac{\ln x}{x}\, dx$

5. Write the limit

$$\lim_{n\to\infty}\Big[\sum_{k=1}^{n}\left(1+\frac{2k}{n}\right)^4\frac{2}{n}\Big]$$

as a definite integral and evaluate it.