Midterm Exam

Math 10B **Name:** _____
10/15/08 **Section:** _____

Read all of the following information before starting the exam:

- READ EACH OF THE PROBLEMS OF THE EXAM CAREFULLY!
- Show all work, clearly and in order, if you want to get full credit. I reserve the right to take off points if I cannot see how you arrived at your answer (even if your final answer is correct).
- Give your answers in exact form, for instance:

$$\frac{1}{2}\left(e^{\pi}+e^{2\pi}\right).$$

  as opposed to 279.31617.
- A single 8 1/2 × 11 sheet of notes (double sided) is allowed. Calculators are permitted.
- Circle or otherwise indicate your final answers.
- Please keep your written answers clear, concise and to the point.
- This test has 5 problems and is worth 100 points. It is your responsibility to make sure that you have all of the pages!
- Turn off cellphones, etc.
- Good luck!

1	
2	
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$\sum$	

1. (*20 points*)

a. (*15 pts*) Find a left hand approximation with 4 boxes for

$$\int_0^{\pi} \frac{e^{-x^2}}{1+x^2} dx.$$

Identify n and Δx.
Leave your answer in exact form (eg. $\frac{1}{2}\left(e^{\pi}+e^{2\pi}\right)$).

b. (*5 pts*) Is your answer an over- or under-estimate of the true value? Why?

2. (*20 points*)

a. (*10 pts*) Use an integral comparison with $\frac{1}{x}$ to give a bound for

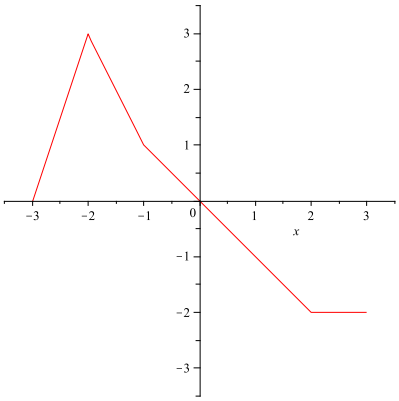
$$\int_1^e \frac{|\cos(x)|}{x} dx.$$

b. (*10 pts*) Find

$$\int_{-100}^{100} x^3 \cos(x) e^{-x^2} dx.$$

Justify your answer.

3. (*20 points*)
Below is a graph of $f'(x)$. NOTE: This is a graph of the derivative of f.



Plot the graph of $f(x)$, assuming that $f(0) = 2$. Label at least 3 points.

4. (*20 points*)
Find the following indefinite integrals:

a. (*6 pts*)

$$\int 3(x+1)^2 dx$$

b. (*7 pts*)

$$\int \frac{\sec^2(x)}{\tan(x)} dx$$

c. (*7 pts*)

$$\int x\cos(x) dx$$

5. (*20 points*)

a. (*10 pts*) Suppose the velocity of a car is given by at time t is $v(t) = \sqrt{t}$ *mph*. How long does it take the car to drive 60 miles?

b. (*10 pts*) Solve the initial value problem

$$\frac{dy}{dt} = 3x^2 - \frac{1}{x}, \quad y(e) = 2.$$