Math 125C **First Midterm** **October 18, 2007**

Your Name

Your Signature

TA's Name #

Quiz Section

- This exam is closed book. You may use one $8\frac{1}{2} \times 11$ sheet of handwritten notes (one-sided).
- Graphing calculators are not allowed. Do not share notes.
- In order to receive credit, you must show your work. Do not do computations in your head. Instead, write them out on the exam paper.
- Place a box around $\boxed{\text{your final answer}}$ to each question.
- If you need more room, use the backs of the pages and indicate to the grader where to find your work.
- Raise your hand if you have a question or need more paper. Good luck!

Problem	Total Points	Score
1	8	
2	12	
3	10	
4	10	
5	10	
6	3	
Total		

Don't open the test until everyone has a copy and the start of the test is announced.

1. [**8 points total**] Evaluate the following integrals.

(a) [**4 points**] $\displaystyle\int \frac{x^2}{\sqrt[3]{x^3+2}}\,dx$

(b) [**4 points**] $\displaystyle\int \frac{\sec^2\theta}{1+\tan^2\theta}\,d\theta$

2. [**12 points total**] Evaluate the following integrals. Simplify as mush as possible but leave your answers in **exact form**. Do not give a decimal answer.

(a) [**4 points**] $\displaystyle\int_0^1 \frac{e^x}{\sqrt{1-e^{2x}}}\,dx$

(b) [**4 points**] $\displaystyle\int_1^e \frac{\ln x}{x}\,dx$

(c) [**4 points**] $\displaystyle\int_{-2}^{2} x(1+x^2)^{17}\,dx$

3. [**10 points total**] Let $\mathcal{R}$ be a region in the first quadrant bounded by the ellipse

$$\frac{x^2}{4} + \frac{y^2}{9} = 1$$

(a quarter of an ellipse). Use the *left end-point* Riemann sum with $n = 3$ to estimate the area of the region $\mathcal{R}$. Draw the picture of the region and clearly sketch the three rectangles you use for approximation.

Note: For this problem you may either leave your answer in the exact form (e.g., $\sqrt{5} + 1$) or give a decimal.

4. [**10 points total**]

A small electric car travels along a straight track. The velocity of the car is given by the function

$$v(t) = 12t - 3t^2 \text{ ft/sec.}$$

(a) [**4 points**] How far away is the car from its starting point after 5 seconds?

(b) [**6 points**] Find the *total distance* traveled by the car during the first 5 seconds.

5. [**10 points total**] Let $\mathcal{R}$ be the region in the first quadrant bounded by the curves $y = x^2$, $y = 2 - x^2$ and the vertical line $x = 0$.

(a) [**2 points**] Sketch $\mathcal{R}$.

(b) [**6 points**] Compute the volume of the solid of revolution obtained by rotating $\mathcal{R}$ around the line $y = -1$.

6. [**3 Bonus points total**] (No partial credit.) Let $\mathcal{R}$ be the region in the first quadrant bounded by the curves $y = x^2$, $y = 2x - x^2$ and the vertical line $x = 0$. Set up (but do not evaluate) the integral to compute the volume of the solid of revolution obtained by rotating $\mathcal{R}$ around the y-axis. Use Disk/Washer method.