Math 125 B and C **Midterm 1** **Palmieri, Autumn 2006**

Your Name

Your Signature

Student ID #

TA's Name and quiz section (circle):

Cady		Cruz		Jacobs	
BA	CB	BB	BC	CA	CC

- Turn off all cell phones, pagers, radios, mp3 players, and other similar devices.
- This exam is closed book. You may use one $8\frac{1}{2}" \times 11"$ sheet of handwritten notes (one side).
- Graphing calculators are not allowed.
- Give your answers in exact form, not decimals.
- In order to receive credit, you must **show all of your work**. If you do not indicate the way in which you solved a problem, you may get little or no credit for it, even if your answer is correct.
- **Check your work carefully.** We will award only limited partial credit.
- Place a box around your answer to each question.
- If you need more room, use the backs of the pages and indicate that you have done so.
- Raise your hand if you have a question.
- This exam has 5 pages, plus this cover sheet. Make sure that your exam is complete.

Question	Points	Score
1	14	
2	11	
3	7	
4	10	
5	8	
Total	50	

1. (a) (7 points) Compute $\int \left(3x^4 - \frac{1}{x} + 5\cos(x)\right) dx$.

(b) (7 points) Compute $\int \sec^2(2x)\tan^5(2x)\, dx$.

2. (a) (4 points) Compute $\int_{-1}^{1} \sqrt{1-x^2}\, dx$. [Hint: interpret the integral as an area.]

(b) (7 points) Compute $\int_{1}^{2} x(2-x)^7\, dx$.

3. (7 points) Find the interval (or intervals) on which the curve

$$y = \int_2^{x^2-x} (1+\sin^2(t))\,dt$$

is increasing.

4. A spaceship is at rest in space. At time $t = 0$, the pilot turns the engine on, and then turns it off when $t = 4$. As a result, the spaceship's acceleration is given by

$$a(t) = \begin{cases} 10, & \text{if } 0 \le t \le 4, \\ 0, & \text{if } t > 4. \end{cases}$$

(a) (5 points) What is the spaceship's velocity when $t = 2$? When $t = 4$? When $t = 10$?

(b) (3 points) Find a formula for $v(t)$, the velocity of the spaceship, valid for all $t \ge 0$.

(c) (2 points) How far has the spaceship traveled after 10 seconds?

5. (8 points) Consider the region bounded by the curve $y = 1/x$, the line $x = 1$, and the line $y = c$ for some constant $c > 1$. Rotate this region about the y-axis. For what value of c is the volume of the resulting solid equal to 2π?