Math 125C **First Midterm** **Winter 2013**

Your Name

Your Signature

Student ID #

	Yuanlong		Chris	
Section (Thu.)	11:30	10:00	11:30	10:00
(circle one)	CA	CB	CC	CD

Problem	Total Points	Score
1	12	
2	8	
3	8	
4	12	
5	10	
Total	50	

- This exam is closed book. You may use one $8\frac{1}{2} \times 11$ sheet of notes.
- 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 YOUR FINAL ANSWER to each question.**
- If you use a trial and error (or guess and check) method when an algebraic method is available, you will not receive full credit.
- If you need more room, use the backs of the pages and indicate to the reader that you have done so.
- Raise your hand if you have a question.

1 (12 points) Compute the following integrals. Give your answers in exact form.

(a) (4 points) $\displaystyle\int_1^4 \frac{\sqrt{z}+3}{z}\,dz$

(b) (4 points) $\displaystyle\int_0^{\pi/4} \frac{\sin t}{\cos^3 t}\,dt$

(c) (4 points) $\displaystyle\int \frac{x^2}{\sqrt{1-x^6}}\,dx$

2 (8 points) Let $f(x) = \int_1^{2x-1} 3t^2 + \ln(t)\, dt$. Find the equation of the tangent line to $y = f(x)$ at $x = 1$.

3 (8 points) Calculate the limit $\lim_{n\to\infty} \sum_{i=1}^{n} \frac{999}{n} \cdot \frac{1}{1 + \frac{999}{n} i}$ by writing it as a definite integral and solving the integral.

4 (12 points) Tafu is driving his car along a stright street. The velocity of his car is given by $v(t) = 90t^2 - 50t$ mi/hr, where t is measured in hours. Tafu reaches his destination after one hour. The car can drive 35 miles per gallon of fuel. How much fuel did Tafu use up for this journey?

5 (10 points) Let R be the region in the first quadrant bounded by $y = 6x - x^2$ and $y = x^3$. Set up an integral that computes the volume of the solid generated by rotating R around the line $y = -3$. DO NOT EVALUATE.