Math 125C **Second 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	12	
3	8	
4	8	
5	10	
Total	50	

- This exam is closed book. You may use one $8\frac{1}{2} \times 11$ sheet of notes.
- Do not share notes.
- Graphing calculators are not allowed.
- 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 indefinite integrals.

(a) (6 points) $\int \sin^5\theta \cos^3\theta \, d\theta$

(b) (6 points) $\int \frac{1}{y\sqrt{y^2-25}} \, dy$

2 (12 points) Compute the following definite integrals. Give your answers in exact form.

(a) (6 points) $\displaystyle\int_3^5 \frac{5x^2}{x^2 - 3x + 2}\,dx$

(b) (6 points) $\displaystyle\int_0^1 t\,\sin^{-1} t\,dt$

3 (8 points) A rope is used to pull a bucket full of water up from a well that is 10 m deep. The rope has a total mass of 5 kg. The bucket of water has a mass of 11 kg. The acceleration due to gravity is 9.8 m/sec^2. Set up an integral that computes the work done in lifting the bucket all the way up. **Do not simplify or evaluate the integral.**

4 (8 points) Use the Trapezoid Rule with $n = 5$ to approximate the average value of the function $\phi(x) = \sin(1/x)$ on the interval $x = 1$ to $x = 4$. Round your answer to 3 decimal places.

5 (10 points) Determine if the improper integral $\int_{-1}^{0} \frac{e^{1/t}}{t^3}\,dt$ is convergent or divergent. If it is convergent, evaluate it.