Math 126C **Second Midterm** **Winter 2009**

Your Name

Your Signature

Student ID #

	Luke		Chris	
Section	11:30	12:30	11:30	12:30
(circle one)	CA	CB	CC	CD

Problem	Total Points	Score
1	8	
2	6	
3	14	
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.
- In order to receive credit, you must show your work. Explain why your answers are correct.
- If you use a trial and error (or guess and check) method when a calculus method is available, you will not receive full credit.
- **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 reader that you have done so.
- Raise your hand if you have a question.

1 (8 points) Let $\mathbf{r}(t) = (2t-1)\,\mathbf{i} + t^2\,\mathbf{j} + 2\sqrt{t}\,\mathbf{k}$. Find all times t when the tangential component of acceleration is zero.

2 (6 points) Find the equation of the tangent plane of the function $F(x, y) = \dfrac{3y-2}{5x+7}$ at the point $(-1, 1)$.

3 (14 points) Evaluate the following double integrals.

(a) (7 points) $\iint_R xy \sin(x^2 y)\, dA, \quad R = [0,1] \times [0, \pi/2]$

(b) (7 points) $\iint_D y^2 e^{xy}\, dA, \quad D = \{\ (x,y) \mid 0 \le y \le 3,\ 0 \le x \le y\ \}$

4 (12 points) You wish to build a rectangular box with no top with volume 6 ft^3. The material for the bottom is metal and costs \$3.00 a square foot. The sides are wooden and cost \$2.00 a square foot. Calculate the dimesnsions of the box with minimum cost. Use the Second Derivative test to verify that your answer is indeed a minimum.

5 (10 points) A table of values is given for a function $g(x, y)$ defined on $R = [0, 1] \times [1, 4]$. (For example, $g(1, 4) = 9.4$.) Use the table to find a linear approximation to $g(x, y)$ near $(0.5, 3)$. Use it to approximate $g(0.6, 2.8)$. Carefully explain all your reasoning.

	1	1.5	2	2.5	3	3.5	4
0	1	1.8	2.8	3.9	5.2	6.5	8.0
0.25	1.2	1.9	2.9	4.0	5.3	6.6	8.2
0.5	1.4	2.1	3.1	4.2	5.5	6.8	8.5
0.75	1.6	2.2	3.3	4.5	5.8	7.0	8.9
1	1.7	2.3	3.6	4.8	6.1	7.3	9.4