Math 126D   **First Midterm**   **Spring 2009**

Your Name   Your Signature

Student ID #

	Vishal	Daeshik
Section	1:30 2:30	1:30 2:30
(circle one)	DA DB	DC DD

Problem	Total Points	Score
1	8	
2	8	
3	9	
4	8	
5	8	
6	9	
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. Explain why your answers are correct.

- **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)   Consider the polar curve $r = e^{\theta}$ where $0 \leq \theta \leq 2\pi$. Find all points (x, y) on the curve where the tangent line is horizontal.

2 (8 points)   Consider the curve in $\mathbf{R}^2$ with parametric equations $x = t^2 - 1, \quad y = t^3 - 12t$.
For which values of t is the curve concave up?

3 (9 points)   Calculate the length of the curve

$$x = t^3 - 3t, \quad y = 3t^2$$

between the points $(0, 0)$ and $(2, 12)$.

4 (8 points)   Do the lines $\dfrac{5-x}{3} = \dfrac{4-y}{5} = \dfrac{z+2}{7}$ and $4 - x = \dfrac{y+7}{3} = z - 3$ intersect?
If so, give the coordinates of the point of intersection.

5 (8 points)   Find parametric equations for the tangent line to the graph of $\mathbf{r}(t)$ at the point $(3, 0, 0)$, where

$$\mathbf{r}(t) = \left\langle \sqrt{t^2 + 8}, \ t\sin(\pi t), \ \ln(2t + 3) \right\rangle.$$

6 (9 points)   Compute the distance from the point $(2, 1, -1)$ to the line of intersection of the two planes $x = 3$ and $y + z = 2$.