Math 126E **Second Midterm** **Autumn 2014**

Your Name

Your Signature

Student ID #

	Hanchao		Avi	
Section	12:30	1:30	12:30	1:30
(circle one)	EA	EB	EC	ED

Problem	Total Points	Score
1	8	
2	8	
3	9	
4	16	
5	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. Turn off your cell phone.
- 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 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.

$\boxed{1}$ (8 points) The position of a particle is given by $\mathbf{r}(t) = 4t\,\mathbf{i} + 2t^2\,\mathbf{j} + \ln t\,\mathbf{k}$. Find all points on the path where the velocity is perpendicular to the acceleration.

$\boxed{2}$ (8 points) Calculate the equation of the tangent plane to the hyperboloid $3x^2+5y^2-z^2 = 8$ at the point $(2, -1, 3)$

$\boxed{3}$ (9 points) Find the absolute minimum of the function $f(x, y) = y^2 - xy + x$ on the triangular region in the first quadrant where $x + y \leq 7$.

$\boxed{4}$ (16 points) Evaluate the following double integrals. Give your answers in exact form.

(a) (8 points) $\displaystyle\int_0^2 \int_{x^2}^4 x^5 e^{y^2}\, dy\, dx$

(b) (8 points) $\displaystyle\int_{-3}^3 \int_0^{\sqrt{9-x^2}} 4x^2 + 5y^3 + 4y^2 \ dy\, dx$

$\boxed{5}$ (9 points) Clovis must calculate the area of a triangular field. He measures edge **a** to be 150ft and edge **b** to be 200ft. He measures angle **C** to be 60°. The error in his edge measurements is half a foot. His angle measurement has an error of 2°.
Use a linear approximation to estimate the maximum error in his area calculation.
(Recall that the area of a triangle is given by $\frac{1}{2}ab\sin\theta$.)