Math 126 E - Spring 2012
Mid-Term Exam Number One
April 19, 2012

Name: _____   Student ID no. : _____

Signature: _____   Section: _____

1	10	
2	15	
3	10	
4	10	
5	10	
Total	55	

- Complete all five questions.

- Show all work for full credit.

- You may use a scientific calculator during this examination. Graphing calculators are not allowed. Also, other electronic devices are not allowed, and should be turned off and put away for the duration of the exam.

- If you use a trial-and-error or guess-and-check method when an algebraic method is available, you will not receive full credit.

- You may use one hand-written 8.5 by 11 inch page of notes. Write your name on your notesheet and turn it in with your exam.

- You have 50 minutes to complete the exam.

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1. Find the equation of the plane containing the line

$$x = 3 + 4t, y = 2 - t, z = 1 + 5t$$

and the point (1,2,3).

2. (a) Find a cartesian equation for the polar curve

$$r = \frac{1}{\sin \theta} + \frac{1}{\cos \theta}$$

(b) Find the point where the curve given in (a) intersects the line $y = 5$.

(c) Give two polar representations, one with a positive r and one with a negative r, for the point you found in (b).

3. Find the curvature of the curve
$$\vec{r}(t) = \langle t, t^2, t^3 \rangle$$
at the point $(-1, 1, -1)$.

4. (a) Find parametric equations for the tangent line to the curve

$$x = e^t, y = e^{-t}, z = \ln t$$

at the point $t = 2$.

(b) Determine the coordinates of the intersection of the line you found in (a) and the yz-plane.

5. Find the area of the triangle with vertices (0,1,1), (1,2,0), and (2,2,2).