Math 126 AA,AC - Winter 2009
Mid-Term Exam Number One
February 3, 2009
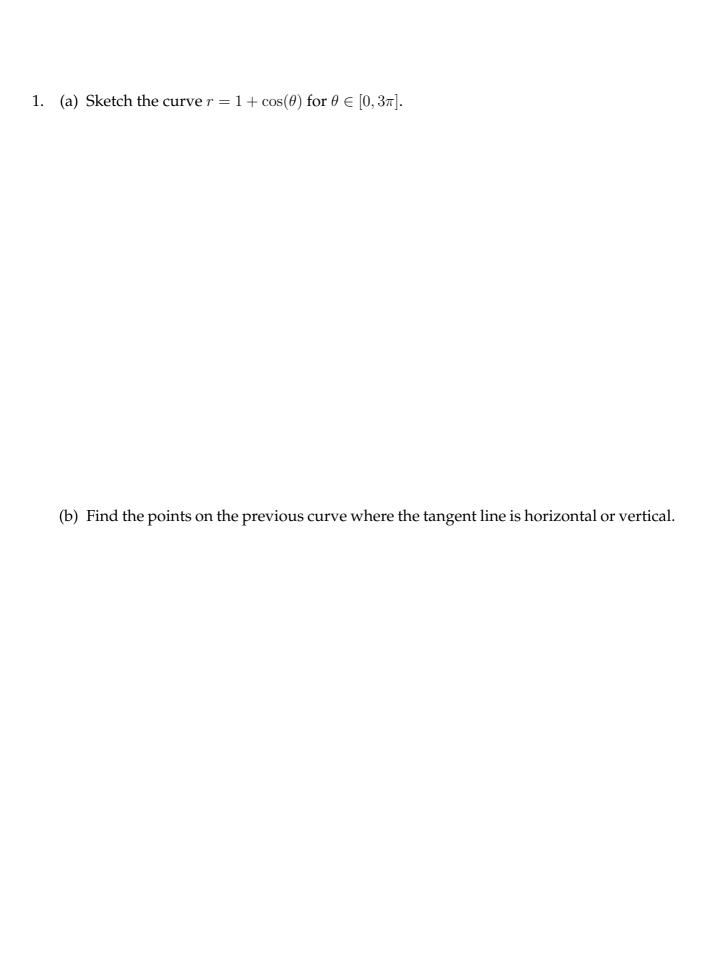
Instructor: E. Milakis

Name: _____   Section: _____

1	15	
2	10	
3	10	
4	15	
Total	50	

- Complete all questions.

- Please BOX your final answer.

- You may use a scientific, non-graphing calculator during this examination. Other electronic devices are not allowed, and should be turned off for the duration of the exam.

- If you need more room, use the back of the previous page and indicate to the reader that you have done so.

- You may use one (single side) hand-written 8.5 by 11 inch page of notes.

- Show all work for full credit.

- You have 50 minutes to complete the exam.

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1. (a) Sketch the curve $r = 1 + \cos(\theta)$ for $\theta \in [0, 3\pi]$.

   (b) Find the points on the previous curve where the tangent line is horizontal or vertical.

2. (a) Check if the planes
$$x + 3y + z = 2 \text{ and } 2x + y - z = -1$$
are parallel. If not find a parametric equation of the line of intersection of the two planes.

(b) Find, correct to the nearest degree, the angle between these two planes.

3. (a) Determine whether the lines

$$\vec{r_1}(t) = \langle 2, -1, 0 \rangle + t\langle -1, 1, 1 \rangle \quad \text{and} \quad \vec{r_2}(s) = \langle 1, 3, 0 \rangle + s\langle -2, -1, 3 \rangle$$

are parallel, skew or intersecting. If they intersect find the point of intersection

(b) Find (if exists) an equation of the plane that contains these lines.

4. (a) Identify and sketch the graphs of the paraboloid

$$z - 1 = -(x^2 + y^2)$$

and the plane $z = x - 1$. Explain in details.

(b) Find a vector function that represents the curve of intersection (trace) of the previous surfaces.