Math 126A/B **Exam #2** **10 May 2007**

Your Name

Your Signature

Student ID #

Quiz Section

Professor's Name

TA's Name

- Turn off and put away all electronic devices except your non-graphing calculator.
- This exam is closed book. You may use one $8\frac{1}{2} \times 11$ sheet of handwritten notes (**only one side** may be used). Do not share notes.
- Give your answers in exact form. Do not give decimal approximations unless they are specifically requested.
- In order to receive credit, you must show your work on the exam paper, with some explanation in English, if appropriate. Do not do computations in your head. Instead, write them out on the exam paper.
- **Place a box around YOUR FINAL ANSWER to each question.**
- If you need more room, use the **back of the previous page** and indicate to the reader that you have done so.
- Raise your hand if you have a question.

Problem	Total Points	Score
1	10	
2	10	
3	10	
4	10	
5	10	
Total	50	

1. (a) [**5 points**] Describe the curve defined by the vector function

$$\mathbf{r}(t) = \langle t + 1, 2t, 2t + 1 \rangle .$$

(b) [**5 points**] Reparametrize the curve $\mathbf{r}(t)$ with respect to arc length measured from the point where $t = 0$, in the direction of increasing t.

2. Let $f(x, y) = (2x^2 + y^2 + x) \ln (x^2 + y^2 - 4)$.

(a) [**5 points**] Find and sketch the domain of f.

(b) [**5 points**] Compute $f_x(3, 1)$.

3. (a) [**5 points**] Find an equation of the plane through the points $(1, 0, 0)$, $(0, 1, 0)$, and $(0, 0, 1)$.

(b) [**5 points**] Compute the distance from the point $P(2, 0, 0)$ to the plane described in part (a).

4. A curve is given by the equation $r = 2(1 - \cos\theta)$ in polar coordinates.

(a) [**5 points**] Sketch the curve.

(b) [**5 points**] Find all the points on the curve where the tangent line is horizontal.

5. Let $\mathbf{r}(t) = \langle t^2, 2t, t \rangle$.

(a) [**6 points**] Find the unit tangent vector $\mathbf{T}(t)$, the unit normal vector $\mathbf{N}(t)$ and the binormal vector $\mathbf{B}(t)$ at the point where $\mathbf{T}$ is parallel to the plane $x + y + z = 0$.

(b) [**4 points**] Find the curvature of $\mathbf{r}$ at the point identified in part (a).