Math 126 C - Winter 2006 Mid-Term Exam Number Two February 16, 2006

1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
Total	60	

- Complete all questions.
- 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 use a trial-and-error or guess-and-check method, or read a numerical solution from a graph on your calculator, 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.
- Show all work for full credit.
- You have 50 minutes to complete the exam.

Name:

1. Eliminate the parameter in the following parametric equation pair to get a Cartesian equation for the curve that involves no trigonometric functions.

 $x = \cos t, y = \sin t - \cos t$

2. Consider the curve defined parametrically by the parametric equations

$$x = \ln \ln t, y = \ln t - (\ln t)^2.$$

Find the equation of the tangent line to the curve at the point t = e.

3. Find the parametric equations for the tangent line to the curve defined by

$$x = t^3 - t, y = t^6 + t^2 + 1, z = \frac{1}{2}t^2 + 5t$$

at the point (0, 1, 0).

4. At what point does the curve $y = e^x$ have maximum curvature?

5. Find the length of the curve defined by

$$\vec{r}(t) = \left\langle \frac{2\sqrt{2}}{3} t^{3/2}, t, \frac{1}{2} t^2 \right\rangle, 0 \le t \le 4$$

6. Find the curvature of the curve defined by

$$\vec{r}(t) = \left\langle \frac{1}{2}t^2 - 2t, t^2 - t, t^2 + t \right\rangle$$

at the point t = 0.