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

Name: $\qquad$ Section: $\qquad$

| 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.

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

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

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

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

6. Find the curvature of the curve defined by

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

at the point $t=0$.

