

Math 124, Sections I and F, Winter 2006, Midterm II

February 21, 2006

Name \_\_\_\_\_

Quiz Section \_\_\_\_\_

**Instructions.**

- There are 4 questions. The exam is out of 40 points. You have 60 minutes.
- You are allowed to use one page of notes written only on one side of the sheet in your own handwriting. You can have formulas or theorems you have trouble remembering on your sheet but not any specific examples or solved problems.
- You may use a calculator which does not graph and which is not programmable. Even if you have a calculator, give me exact answers. ( $\frac{2\ln 4.25}{1.8}$  is exact, 1.61 is an approximation for the same number.) I would prefer if you did not use your calculator.
- **Show your work.** If I cannot read or follow your work, I cannot grade it. You may not get full credit for a right answer if your answer is not justified by your work. If you continue at the back of a page, make a note for me. **BOX your final answer.**

Question	points
1	
2	
3	
4	
Total	

1. Find  $y'$ . You need not simplify your answer.

(a)

$$y = e^x - \sin(x^2) + \log_5 x$$

(b)

$$y = \frac{3^x + 5}{\ln x + x^3}$$

(c)

$$y = x^2 \sqrt{e^x - x}$$

(d)

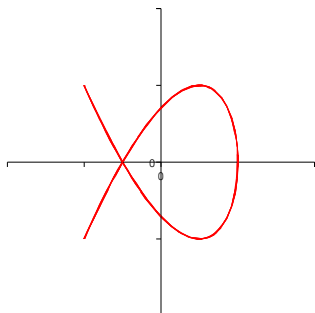
$$y = (\ln x)^{\ln x}$$

2. Find the equations of the tangent lines to

$$x = \cos 2t$$

$$y = \sin 3t$$

at the  $y$ -intercepts. Below is the graph of the curve. Do not use it to estimate slopes. Give exact answers.



3. When is the graph of

$$x - 2y + y^2 = 3$$

concave up? Hint: The graph is concave up when  $\frac{d^2y}{dx^2} > 0$ .

4. Suppose that an ostrich 5 ft tall is walking at a speed of 4 ft/s directly towards a street light 10 ft high. How fast is the tip of the ostrich's shadow moving along the ground?