

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

January 31, 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. **Hand in your notes with your exam paper.**
- 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.

Question	points
1	
2	
3	
4	
Total	

1. The price of the stock CLCLS was \$55 on January 3, 2006 and \$75 on January 17, 2006. Assuming that the price $P(t)$ grows exponentially, where t is the number of days after January 3, 2006:

(a) Write down a formula for the price $P(t)$.

(b) When will the stock price be double its initial value of \$55?

(c) What is the average rate of change in the stock price from January 3 to January 18? What are the units for the average rate of change?

2. Evaluate the following limits. Give explanations for your answers (other than I tried some numbers on my calculator). If the limit does not exist, explain why.

(a) $\lim_{x \rightarrow \infty} \frac{4x^4 + 4x^3 + 1}{2x^2 - 7x^3 + 2x^4}$.

(b) $\lim_{x \rightarrow 2} \frac{x^2 + 3x - 1}{x - 2}$

(c) $\lim_{x \rightarrow 3} \frac{\sqrt{6+x} - x}{x - 3}$

(d) $\lim_{x \rightarrow 2^-} \frac{x+3}{x^2 - 3x + 2}$

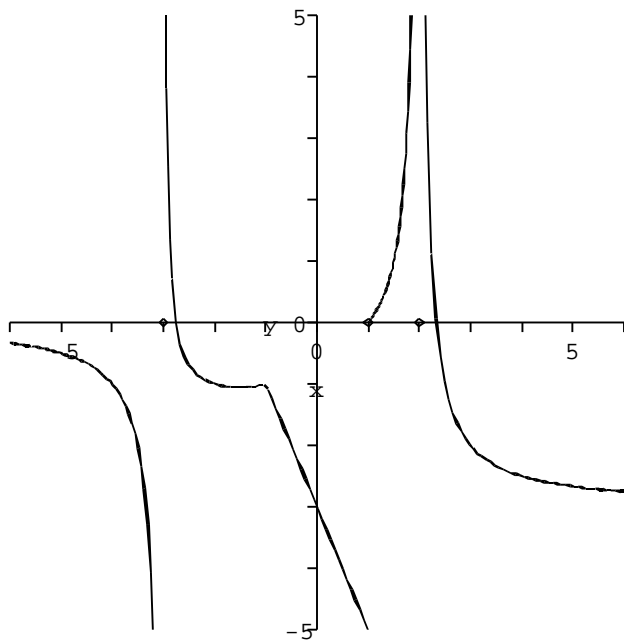
3. Find the values m and b which make

$$f(x) = \begin{cases} mx + b & x \leq 1 \\ 3 - x^2 & x > 1 \end{cases}$$

differentiable at $x = 1$.

Hint: It might help to sketch a graph of the parabola $y = 3 - x^2$.

4. Answer the following based on the graph of $y = f(x)$ below. If it is a numerical answer, round to the nearest integer. You do not need to explain your answer.



(a) $f'(0) =$

(b) $f'(-1) =$

(c) $\lim_{x \rightarrow -2^+} f(x) =$

(d) $\lim_{x \rightarrow \infty} f(x) =$

(e) At which point(s) is f continuous but not differentiable?