

NAME: _____

Student ID #: _____

QUIZ SECTION: _____

Math 124
Midterm I
April 18, 2006

Problem 1	12	
Problem 2	12	
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Problem 4	14	
Total:	50	

- Your exam should contain 5 pages total and 4 problems. Please check your test for completeness.
- You **must explain how you get your answers using techniques developed in this class so far**. Answers with no supporting work, obtained by guess-and-check, or via methods you learned in high school or in other classes will result in little or no credit, even if correct.
- Indicate your **final answer** by placing a box around it.
- Unless otherwise indicated, **leave your answers in exact form** instead of a decimal approximation. That is, $\sqrt{2}$ instead of 1.4142, and $\frac{\pi}{2}$ instead of 1.57. Simplify all you can.
- If you need more room use the backs of pages, but indicate to the reader that you have done so.
- Raise your hand if you have any questions.

GOOD LUCK!

Do you want me to post your grades so far on the class website under the last 4 digits of your student ID?

Yes, please post my grade. Sign to give permission: _____

No, please don't post my grades so far.

1.(12 points) Evaluate the following limits, if they exist:

a) $\lim_{h \rightarrow 0} \frac{\sqrt{1+h} - 1}{h}$

b) $\lim_{x \rightarrow \infty} \frac{-x^2 + 2x + 2}{3x + 5}$

c) $\lim_{x \rightarrow 2} \left(e^x \arccos\left(\frac{x}{4}\right) \right)$

2. (12 points) Let $f(x) = \begin{cases} -3\sin x, & x \leq 0 \\ \ln x, & 0 < x \leq 1 \\ (x-1)^2, & x > 1 \end{cases}$

a) Does $\lim_{x \rightarrow 0} f(x)$ exist? If it does, evaluate it. If it doesn't, justify why not.

b) Does $\lim_{x \rightarrow 1} f(x)$ exist? If it does, evaluate it. If it doesn't, justify why not.

c) At what values of x is $f(x)$ discontinuous? Justify your answer and state what type of discontinuity does it have at each point of discontinuity: removable, jump, or infinite?

3. (12 points) Let $f(x) = \frac{x^2 + x - 6}{x^2 - 5x + 6}$

a) What is the domain of $f(x)$?

b) Find all the vertical asymptotes of $f(x)$. Show all work.

c) Find all the horizontal asymptotes of $f(x)$. Show all work.

