Math 10A Midterm
(version 1)
February 13, 2002

- Please put your name, section number or time, ID number, and sign and date.
- Place your ID card on your desk or in a visible location.
- As this test covers up to but not including Chapter 3, you must calculate derivatives from the definition of the derivative. You may however use other methods to check your answer.
- Calculators are not allowed.
- You must show your work to receive credit.

Print Name: ____________________________________________

Section number or time: ___________________________________

Student ID: _____________________________________________

Signature and Date: _______________________________________

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a) (5 pts) Write down the definition of a function $f(x)$ being continuous at a point $x = a$.

b) (5 pts) Write down the equation for a function that is continuous and defined everywhere but not differentiable somewhere in its domain. Also specify where it is not differentiable.

c) (5 pts) Evaluate $(f \circ f)(2)$ using the table:

\[
\begin{array}{c|ccccc}
   x & 1 & 2 & 3 & 4 & 5 \\
   f(x) & 2 & 4 & 3 & 1 & 3 \\
\end{array}
\]
d) (5 pts) Sketch the graph of \( y = (x + 2)^2 - 1 \).

e) (5 pts) Express \(-\ln 3 + 2 \ln 4\) as a single logarithm.
2)(25 pts total)
Find the equation of the tangent line to the parabola \( y = 4x^2 - 6x \) at the point \((1, -2)\).
3)(25 pts total)
Find \( \lim_{t \to \infty} \frac{t^2 + 1}{\sqrt{4t^4 + t^2 + 5}} \). Show your work in producing the answer.
4) (25 pts total)  
Show there is a root to the equation \( x^2 2^x + x - 1 = 0 \) in the interval \((0, 1)\). If you use a theorem, specify which one you are using.