Quiz no. 1 (1220-5 Calculus II, Fall 2006)

Your name: ____________

September 5, 2006

No calculators allowed! (Today only.)
20 min.

1. (a) (2 points) If \( f(x) = \ln(x^2 + 2) \), what is \( f'(x) \)?

   (b) (3 points) Compute
   \[
   \int_1^3 \frac{t^2}{t^3 + 1} dt.
   \]

2. (3 points) The definition of \( \ln x \) is

   \[ \ln x = \underline{\text{___________}} \]

   The domain of \( \ln \) is \underline{\text{___________}}.
3. (5 points) Given that

\[ y = \frac{(x + 2)^{\frac{1}{3}} (x^2 - 2)}{\sqrt{x + 3}}, \]

find \( \frac{dy}{dx} \) by logarithmic differentiation.

4. (6 points) Show that \( f(x) = -x^3 - 3x \) has an inverse function \( f^{-1}(y) \).
   What is \( (f^{-1})'(4) \)?
   
   *Hint:* You can guess \( x \) such that \( f(x) = 4 \).

5. (5 points) For \( f(x) = \frac{3x+4}{2x+3} \), find a formula for \( f^{-1}(x) \).