HNRS 125 – QUIZ 6 – 17 OCTOBER 2002

Answer all of the following questions in the space provided. Show all work as partial credit may be given. Answers without justification, even if they are correct, will earn no credit.

1. Consider the function \( f(x) = \begin{cases} 
1 & \text{if } x < 0 \\
1 - x^2 & \text{if } x \geq 0 
\end{cases} \)

   (a) (3 pts.) Is \( f(x) \) continuous at \( x = 0 \)? Why or why not?

   (b) (5 pts.) Calculate the difference quotients \( \frac{f(h) - 1}{h} \) for \( h = .05, .01, .01, \) and \(-.05\). Do you think \( f(x) \) is differentiable at \( x = 0 \)?

2. (2 pts. each) Find the derivative of each function given below.

   (a) \( 2x^3 + 3x^2 \).

   (b) \( \frac{x^2 + 1}{x} \).