MATH 113 – QUIZ 11 – 16 APRIL 2007

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. (3 pts. each) Use L'Hôpital's rule to find the following limits.

(a) $\lim_{x\to 1} \dfrac{x^5+x-2}{4x^3-x-3}$

$\overset{L'H}{=} \lim_{x\to 1} \dfrac{5x^4+1}{12x^2-1} = \dfrac{6}{11}$ //

(b) $\lim_{x\to 0} \dfrac{\cos(x)-1}{8x^2} \overset{L'H}{=} \lim_{x\to 0} \dfrac{-\sin(x)}{16x} \overset{L'H}{=} \lim_{x\to 0} \dfrac{-\cos(x)}{16}$

$= \dfrac{-1}{16}$ //

2. (4 pts.) Set up the Newton's method iteration scheme to find the solution to the equation $x^4 - 20 = 0$. Find the first three Newton iterates when the initial guess is $x_0 = 2$.

$f(x) = x^4 - 20$

$f'(x) = 4x^3$

$x_{n+1} = x_n - \dfrac{x_n^4 - 20}{4x_n^3}$

$= \dfrac{3x_n^4 + 20}{4x_n^3}$

$x_0 = 2$

$x_1 = \dfrac{3\cdot 2^4 + 20}{4\cdot 2^3} = \dfrac{68}{32} = 2.125$ //

$x_2 = 2.11482$ //

$x_3 = 2.11474$ //