12/3/2003   MA 171 Calculus A   Name:_____

Dr. Lunsford   Quiz 14 – The Last Quiz!   (20 Points Total)

I. Use the function $f(x) = x^3 + 2x$ and its graph below to answer the following. (6 points total)

(a) Find the average rate of change of f from $x = -2$ to $x = 2$.
Draw the line on the graph whose slope represents this rate of change. (2 points)

Plot for Problem I

(b) Find all $c \in [-2, 2]$ such that the instantaneous rate of change of f at c equals the average rate of change of f from $x = -2$ to $x = 2$. For each value of c, draw the line on the graph whose slope represents the rate of change of f at c. (4 points)
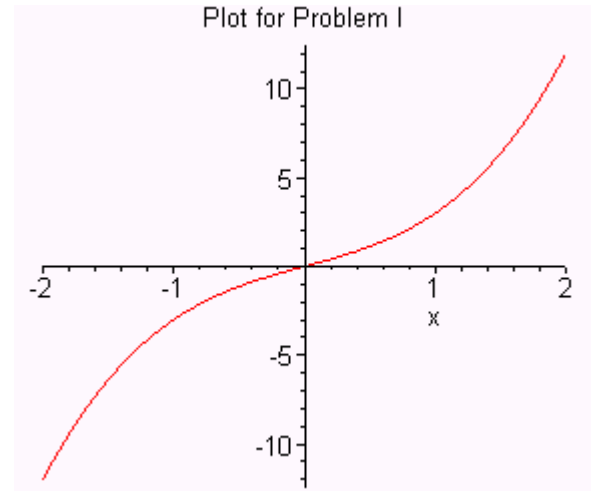
II. Use the function $f(x) = 5 - 3x^2 + x^3$ to answer the following questions. (4 points each - 8 points total)

(a) Find all intervals on which f us increasing. Neatly show all of your work and clearly indicate your answer.

(b) Use the second derivative test for relative extrema to determine all relative extreme values of f. Clearly indicate the extreme values and where they occur.

III. Find the indicated limits. Neatly show all of your work. (3 points each, 6 total)

(a) $\lim\limits_{x \to 0^+} x \ln x$

(b) $\lim\limits_{w \to 0} \dfrac{1 - \cos 3w}{w^2}$