Quiz 5

Name: _____ Section: _____

Answer questions 1-3 for a total of 100 points. Answer question 4 for 20 additional bonus points. Write your solutions in the space provided and put a box around your final answers.

1. Find the absolute maximum and absolute minimum values of f on the given interval.

   (a) (20 points) $f(x) = x^3 - 6x^2 + 5$, $-3 \leq x \leq 5$

   (b) (20 points) $g(x) = x - \sqrt[3]{x}$, $-1 \leq x \leq 4$

adamski@fordham.edu

2. Consider the function

$$f(x) = (x+1)^5 - 5x - 2.$$

(a) (20 points) Find the intervals on which f is increasing/decreasing and all local maximum/minimum values of f.

(b) (20 points) Find the intervals on which f is concave up/down and all inflection points of f.

3. (20 points) A model used for the yield Y of an agricultural crop as a function of the nitrogen level N in the soil (measured in appropriate units) is

$$Y = \frac{kN}{1 + N^2}$$

where k is a positive constant. What nitrogen level gives the largest yield?

4. (20 points (bonus)) Find the point on the curve $y = \sqrt{x}$ that is closest to the point $(3, 0)$.