

MTH 380 Test 2 August 8, 1995 NAME _____

1.) Use the **definition** of the derivative to find $f'(x)$ where $f(x) = x^2$.

(2.-5.) Find the derivative of each of the following using the shortcut rules. Please make your work easy to follow for partial credit.

2.) $y = \sqrt{2}$

3.) $f(x) = x^4 + 3x^2 - \sqrt{x}$

4.) $h(x) = \frac{1}{(x^3 + 5)^3}$

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

6.) Find the equation of the line tangent to the graph of $y = x^3 - 2x + 2$ at $(0,2)$.

7.) Find the absolute maximum and minimum of $y = x^3 - 2x^2 + x + 4$ on the interval $[0, 5]$.

absolute maximum: _____

absolute minimum: _____

8.) Ken Long of Runners' Forum Inc. is buying some running footies to sell in his store. Nike has a type of footie that they are phasing out so they offer Long a deal according to the amount Long buys. The deal Nike offers is described by the following equation where P stands for the invoice price of the order of footies and x stands for the number of pairs of footies.

$$P(x) = \begin{cases} 3x - 0.0001x^3 & \text{when } 0 < x \leq 150 \\ 3.75x - 0.0001x^3 & \text{when } x > 150 \end{cases}$$

A. Find the marginal price for the 50th, 100th, and 130th pairs of footies. Recall that the marginal price is the rate of change of price and rate of change is measured by slope.

50th:

100th:

130th:

B. What is the average price for the first 50 pairs, 100 pairs, and 130 pairs of footies.

50 pairs:

100 pairs:

130 pairs:

9.) Graph the following problem labeling all critical points, inflection points, asymptotes, x & y intercepts. Label the points with the x & y values in proper point notation. Label asymptotes with the equation of the line. Pay attention to concavity while graphing.

$$f(x) = \frac{12}{x^2 + 12}$$

