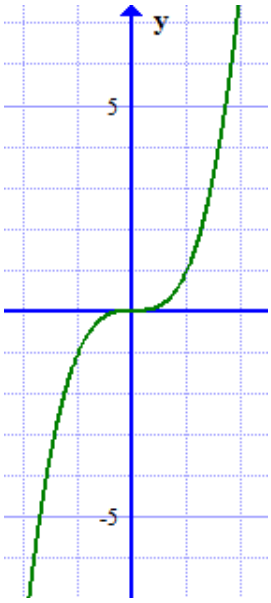
Pre-Calculus Name: Date: Period:

Assignment 1D: Rates of Change

Answer the following problems with as much detail, explanation, and work that is appropriate.



1. Use the formula to find the average rate of change for $f(x) = x^3$ on the intervals
   a. $[0,1]$

   b. $[-1,1]$

   c. $[-1,2]$

2. Show these rates of change for $f(x) = x^3$ graphically for each of the intervals above by drawing the secant lines on the graph to the right. Explain how these lines relate to the rates of change in #1

Find the average rate of change of each function on the interval specified.

3. $f(x) = x + 3$ on $[4,5]$

4. $g(x) = x^2 + 4$ on $[1,4]$

5. $h(x) = x^2 + 2x$ on $[-5,-3]$

6. $p(t) = \frac{x^3-2x}{x^2+1}$ on $[-2,1]$

Find the average rate of change of each function on the interval specified. Your answers will be expressions involving a parameter (b or h).

7. $f(x) = x^3 - 3x$ on $[4, b]$

8. $g(x) = 3x^2 - 2$ on $[x, x+h]$

9. Graph $h(x) = x^5 + 5x^4 + 10x^3 + 10x^2 - 1$ on your calculator.
   a. Find all the local extrema of the function and state what type it is.

   b. Find the increasing intervals.

   c. Find the decreasing intervals.

   d. ***Challenge:*** Define all the intervals that are concave up and concave down. Approximate inflection points.