Name:_

- 1. In your own words, explain what a derivative is
- 2. State the limit definition of a derivative
- 3. Match the function (a-d) with the graph of its derivative (I-IV)



For #4-6, use the limit definition to find the derivative of the function 4. f(x) = -2x + 4

5. $f(x) = \frac{1}{x}$

6. $f(x) = \sqrt{x - 2}$

7. Using $f(x) = -3x^2$, predict if the slope of the tangent line will be positive or negative at x = -3, x = 0, and x = 1. Then find the actual slope of the tangent line at these points.

- 8. The function $h(t) = -16t^2 + 60t + 80$ measures height in terms of time. a) Find the average velocity from t =[0,2]
 - b) Find the derivative of the function

c) Using the derivative, find the instantaneous velocity at t = 0, t = 1, and t = 2

9. Use the definition of the derivative to show that f'(0) does not exist where f(x) = |x|.

10. For the function $f(x) = x^2 + 2x + 1$, find the slope of the tangent line at x = -3