Definition of the Derivative 2

- 1. Put f'(a), f'(b), f'(c) and f'(d) in order from least to greatest.
- 2. What is meant by $\frac{f(c) f(a)}{c a}$? 3. Which is the smallest $\frac{f(c) - f(a)}{c - a}, f'(c), \frac{f(c) - f(d)}{c - d}, f'(b)$?
- 4. For each problem below make a high quality graph, find the equation of the tangent line at the given point, sketch the tangent line on your graph and confirm your answer with a graphing calculator.
 - a. $f(x) = x^3$; (-1,-1) b. $f(x) = \sqrt{x}$; (4,2)
- 5. Use the definition of the derivative to find f'(x).

a.
$$f(x) = 2x^2$$

b. $f(x) = \sqrt{x-1}$
c. $f(x) = 3x^3 + 3x^2$

6. Use the definition of the derivative to find the equation of the tangent line at the given point.

- a. $f(x) = \sqrt{x}$ at x = 4 b. $f(x) = -3x^2 + 1$ at x = -1
- 7. Use your calculator to find the derivative and the equation of the tangent line at the given point.

a.
$$f(x) = \frac{3x-1}{2x-3}$$
 at
 $x = -2$
b. $f(x) = \sqrt[3]{2x-1}$
 $dx = 1$
c. $f(x) = (2x-1)^3$
 $dx = -1$

- 8. Perfectly graph y = sinx the derivative of y = sinx on the same graph on the interval $\left[-2\pi, 2\pi\right]$. What is the derivative of sine?
- 9. Perfectly graph y = cosx the derivative of y = cosx on the same graph on the interval $\left[-2\pi, 2\pi\right]$. What is the derivative of sine?

Use the figure to answer 10 and 11. 10. Identify each.

- a. f(1) and f(4)b. f(4)-f(1)c. $y = \frac{f(4)-f(1)}{4-1}(x-1)+f(1)$
- 11. Insert > or <.

a.
$$\frac{f(4)-f(1)}{4-1}$$
 $\frac{f(4)-f(3)}{4-3}$

b.
$$\frac{f(4)-f(1)}{4-1}$$
 $f'(1)$







c. $f(x) = (x+1)^2$; (-2,1)

Answers

- 1. f'(b), f'(c), f'(a), f'(d)
- 2. Slope of the secant line thru the points a and c
- 3. f'(b)

4. -









10. -

a. f(1)=2, f(4)=5

- b. 5 2 = 3
- c. Y = x + 1

11. -

a. > b. <