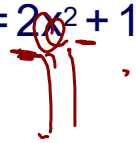
Warm-up

Find the instantaneous rate of change (the derivative) for the functions...

$y = 2x^2 + 1$ *at* $x = a$



$y = 2x^2 + 10$ *at* $x = a$

Dec 4-10:44 AM

Calc 4 Life

Section 3.5

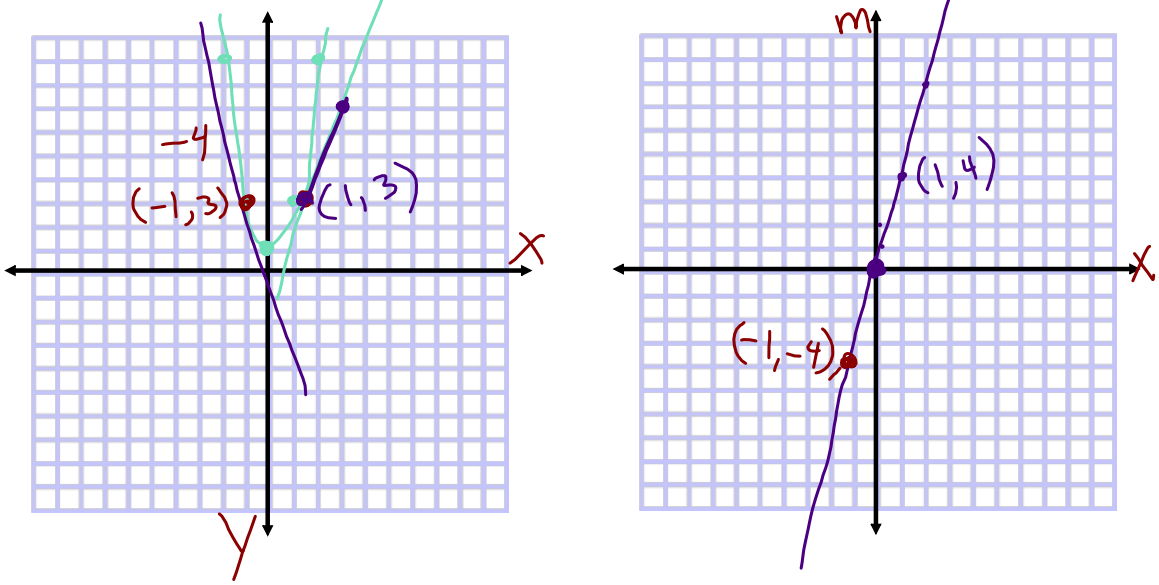
May 13-10:02 PM

Graphs of $f(x)$ and $f'(x)$.

the derivative function

$f(x) = 2x^2 + 1$

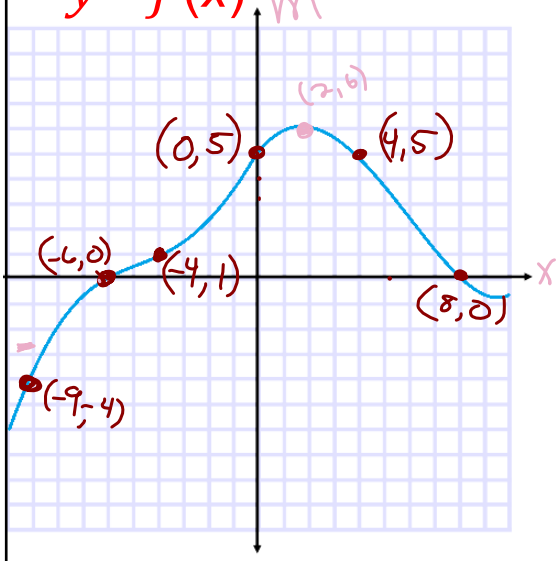
$f'(x) = 4x$



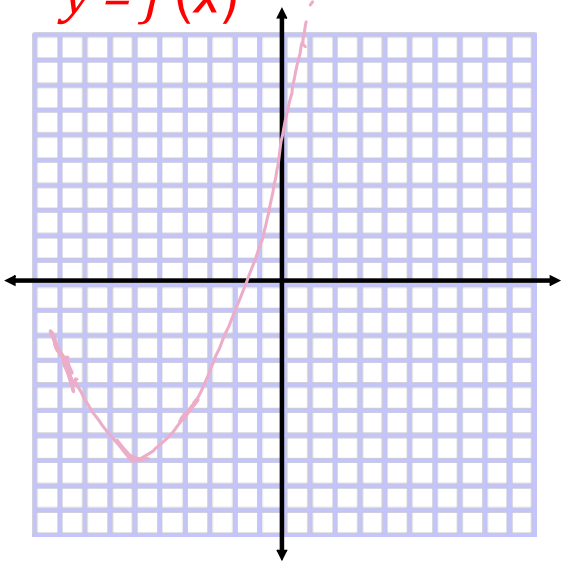
Sep 25-8:11 AM

Analyzing $f(x)$ from graph of $f'(x)$.

$y = f'(x)$



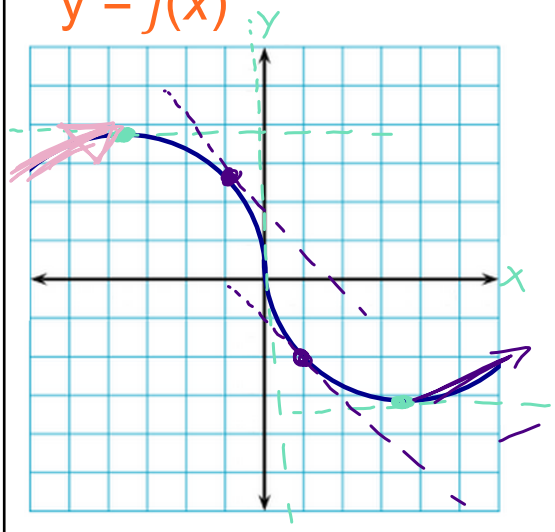
$y = f(x)$

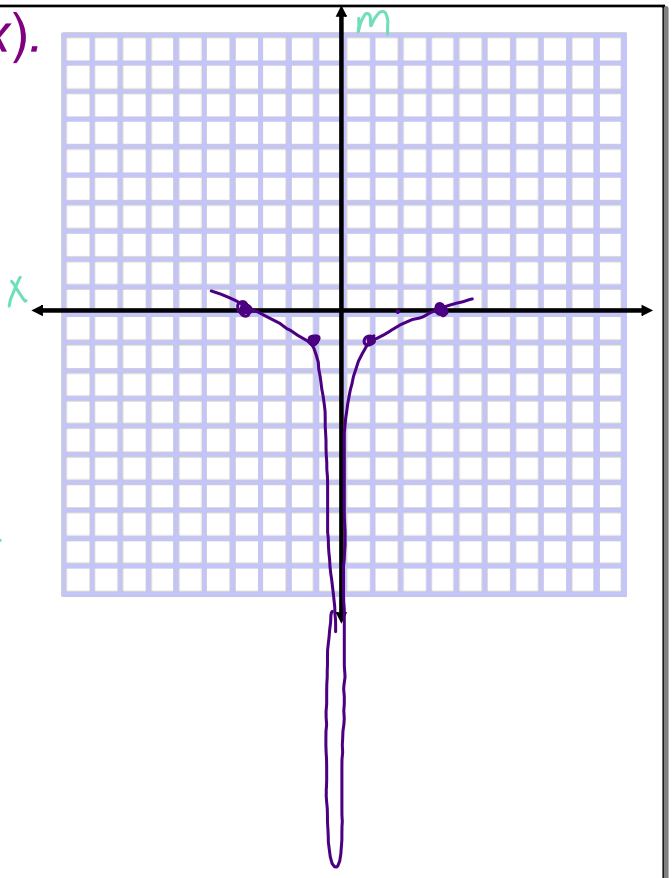


Sep 25-8:11 AM

Graphing $f'(x)$ from $f(x)$.

$y = f(x)$

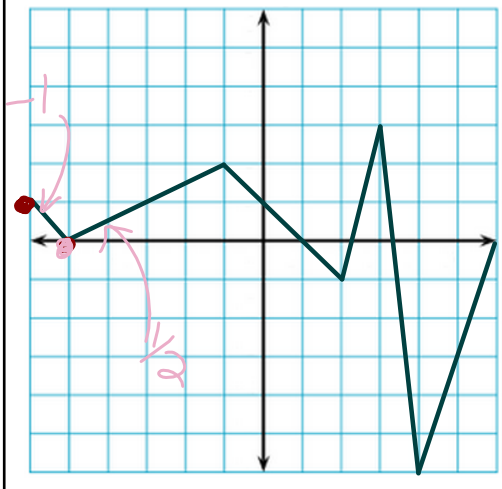


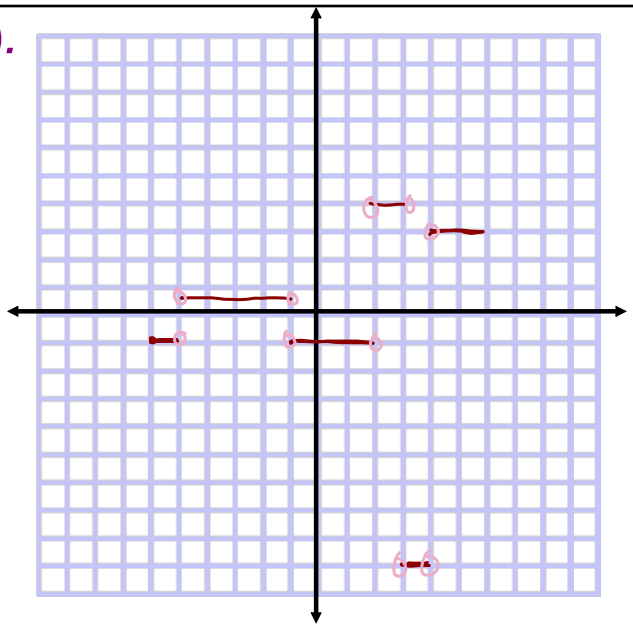


Sep 25-8:11 AM

Graphing $f'(x)$ from $f(x)$.

$y = f(x)$





Sep 25-8:11 AM

Warm-up Day 2

Find the instantaneous rate of change (the derivative) for the function $f(x) = \frac{1 + x^2}{x}$ *at* $x = x$.

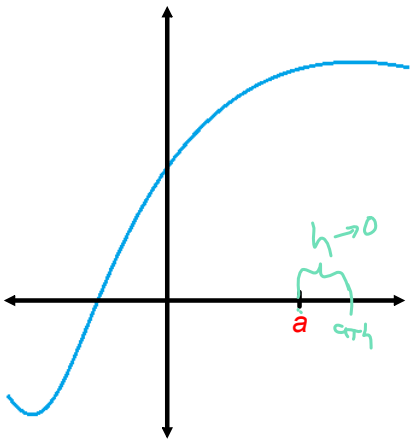
Then use a graphing utility to sketch a graph of the function $y = f(x)$ *and its derivative,* $f'(x)$.

Dec 4-10:44 AM

Definitions of Derivative

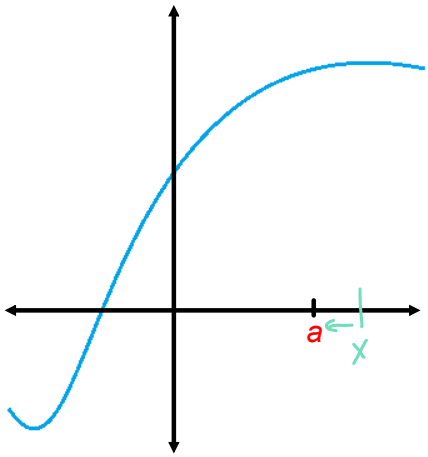
Definition

$$\lim_{h \to 0} \frac{f(a+h) - f(a)}{(a+h) - a}$$



Alternate Definition

$$\lim_{x \to a} \frac{f(x) - f(a)}{x - a}$$



Sep 25-8:15 AM

Find the derivative for the functions using the alternate definition...

$y = 2x^2 + 1$ *at* $x = 4$

$2(4)^2+1 = 33$ $a=4$ $f(4)$

$\lim_{x\to a} \frac{f(x)-f(a)}{x-a} = \frac{2x^2+1-33}{x-4} = \frac{2(x^2-16)}{x-4} = \frac{2(x+4)(x-4)}{x-4}$

$\lim_{x\to 4} 2x+8 = 16$

$y = x^6 + x$ *at* $x = a$

$-(a^6+a)$

$\lim_{x\to a} \frac{x^6+x-a^6-a}{x-a} = \frac{(x^6-a^6)+(x-a)}{(x-a)}$

$\frac{(x^3-a^3)(x^3+a^3)+(x-a)}{x-a}$

$\lim_{x\to a} \frac{(x-a)(x^2+ax+a^2)(x^3+a^3)+(x-a)}{x-a}$ 1

$x-a$

$(a^2+a^2+a^2)(a^3+a^3)+1$

$(3a^2)(2a^3)+1$

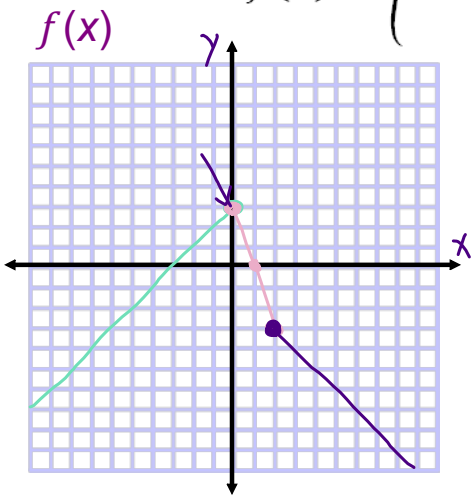
$6a^5+1$

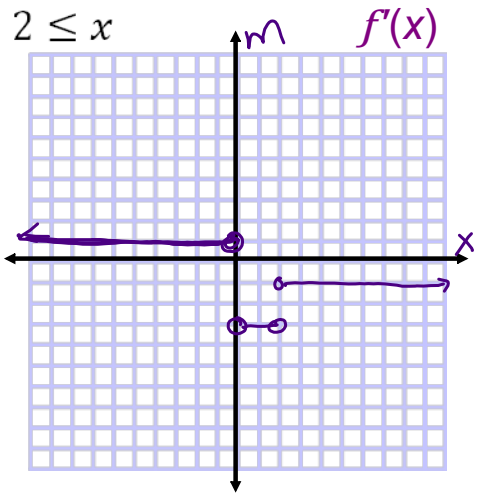
Dec 4-10:44 AM

One-Sided Derivatives

Graph $f(x)$ and $f'(x)$.

$$f(x) = \begin{cases} x+3, & x < 0 \\ -3x+3, & 0 \le x < 2 \\ -x-1, & 2 \le x \end{cases}$$



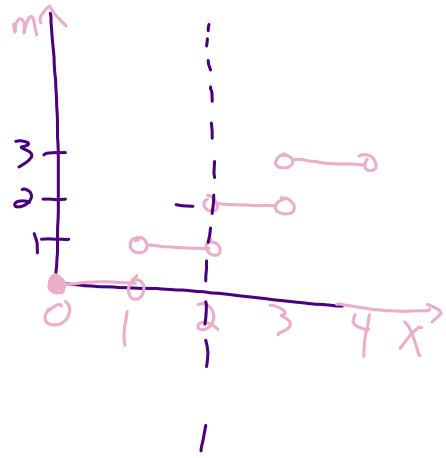


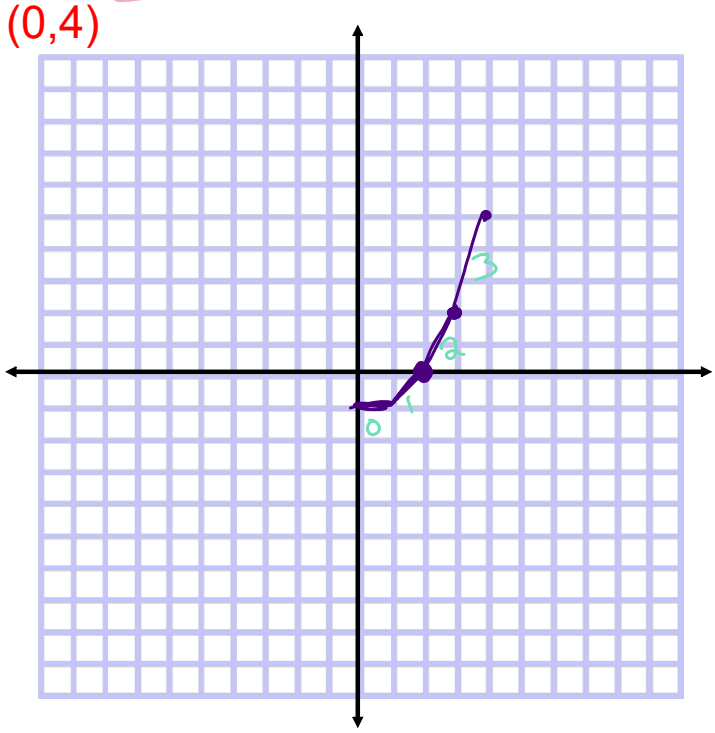
Sep 26-8:53 AM

Sketching $f(x)$ from $f'(x)$.

Sketch a graph with the following characteristics:

- $f'(x)$ = int x , 0 < x < 4 and x ≠ 1, 2, or 3
- $f(x)$ is continuous on (0,4)
- $f(2) = 0$





Sep 25-8:11 AM

Homework

Page 189 - 190

9-14 all, 17, 25

Page 181

21b - 26b (only part b, using alternate definition)

May 13-10:02 PM