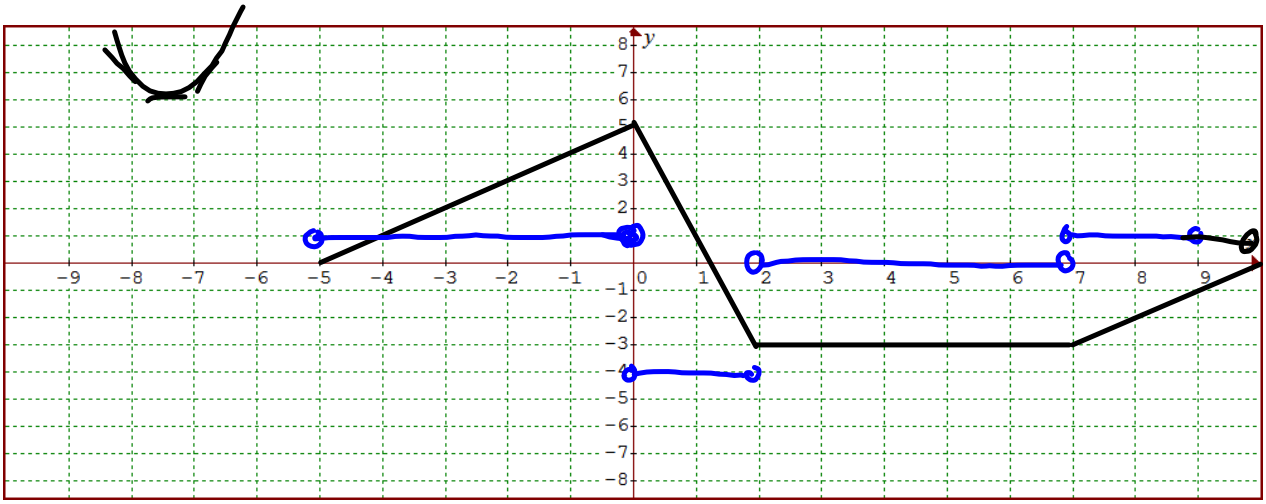
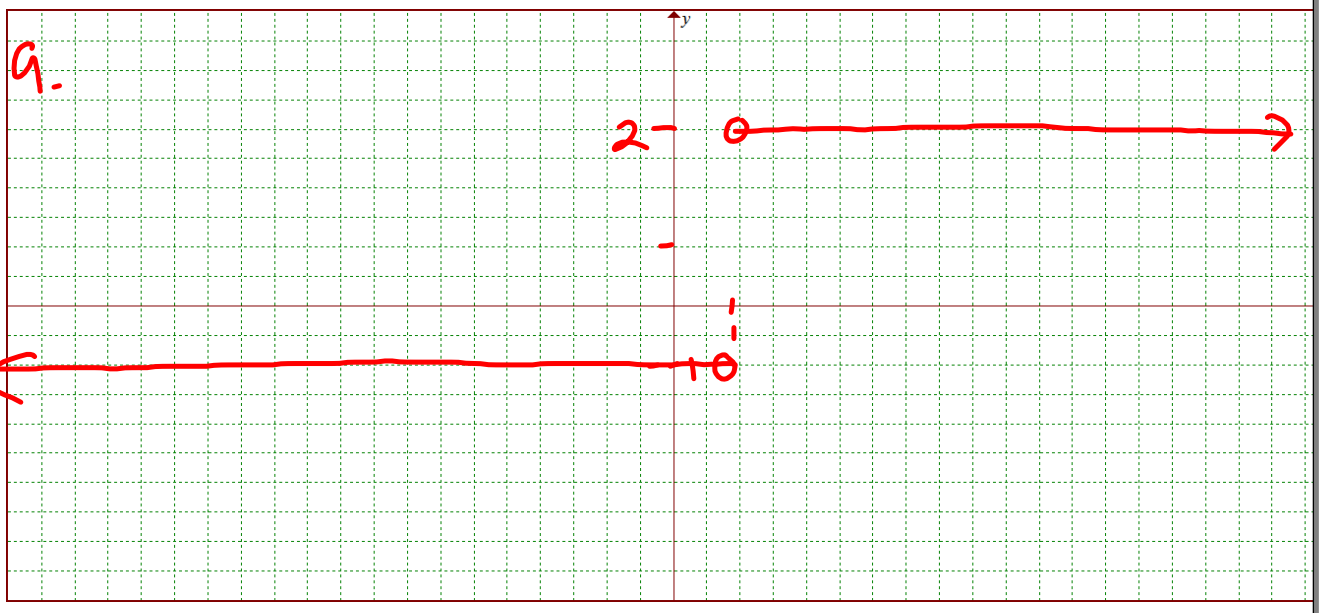
A piecewise function is shown below. Graph the derivative of this function.





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

$$\lim_{h\to 0} \frac{3(x+h)^2+2(x+h)+1-(3x^2+2x+1)}{h}$$

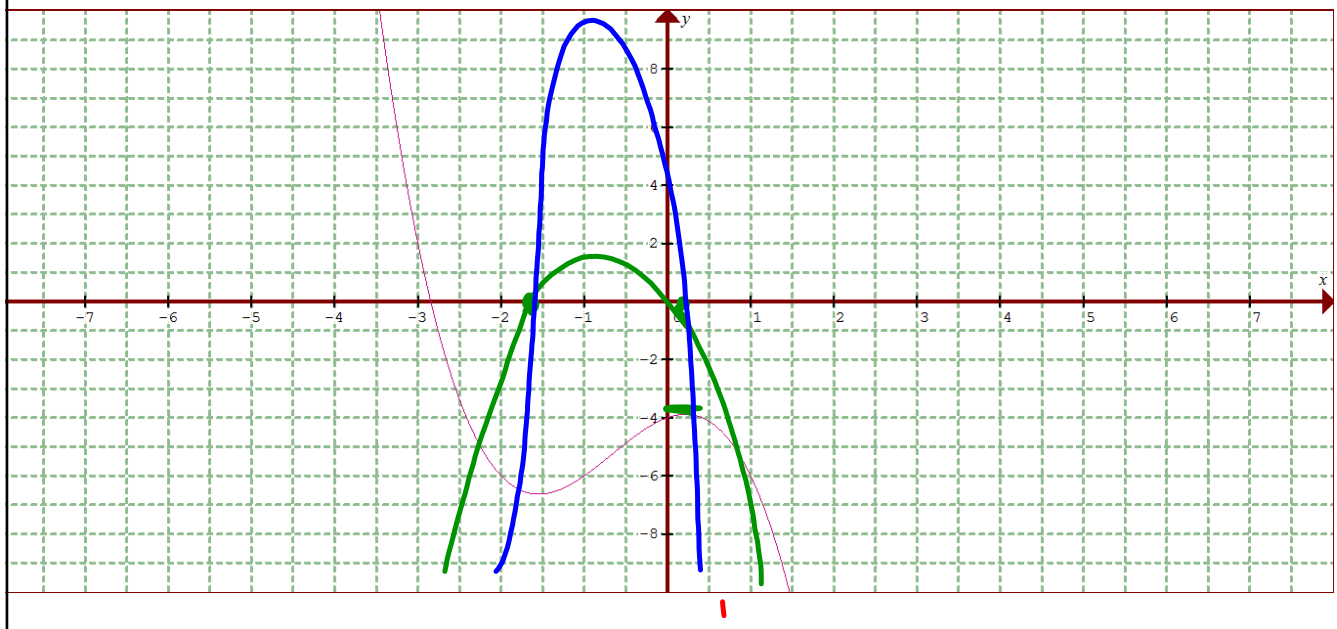
$$\lim_{h\to 0} \frac{3(x^2+2xh+h^2)+2x+2h+1-3x^2-2x-1}{h}$$

$$\lim_{h\to 0} \frac{6xh+3h^2+2h}{h}$$

$$\lim_{h\to 0} \frac{h(6x+3h+2)}{h}$$

$$f'(x) = 6x+2$$

Sketch a possible graph of f '(x) using the graph of f(x) below:



Feb 18-2:17 PM

Calculus 120

Unit 1: Rate of Change and Derivatives

February 14, 2019: Day #9

1. Test on ~~Wednesday~~ Thursday

2. Assignment Due on ~~Friday?~~ Tuesday

3. Quiz

Jan 9-1:43 PM

Curriculum Outcomes

C1. Explore the concepts of average and instantaneous rate of change.

C2. Determine the derivative of a function by applying the definition of derivative.

Jan 24-9:32 AM

Differentiability of Functions

A function is said to be differentiable at "a" if $f'(a)$ exists.

A function is said to be differentiable on an interval if it is differentiable at every number in the interval.

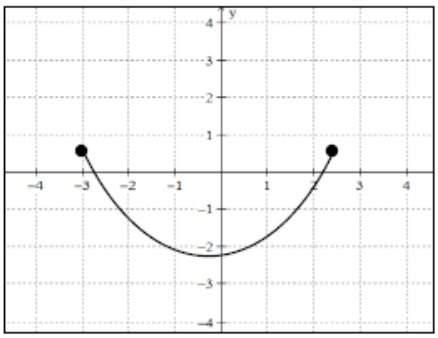
A right-hand derivative is a derivative defined by a right-hand limit.

A left-hand derivative is a derivative defined by a left-hand limit.

Feb 10-6:22 PM

There are five situations in which relations are not differentiable:

1. Functions with restricted domains are not differentiable at their endpoints.



This function is differentiable on what interval? $(-3, 2.4)$

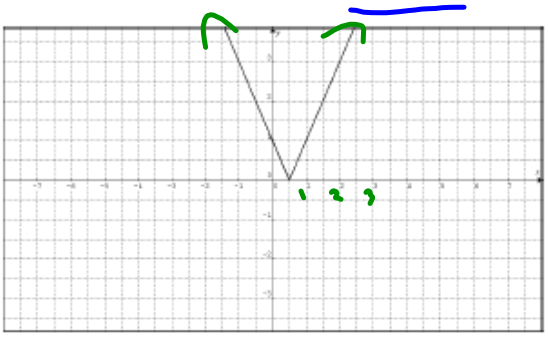
At what point(s) is it not differentiable?

$x = -3$ & $x = 2.4$

$(-3, 0.7)$ & $(2.4, 0.7)$

Feb 10-6:26 PM

2. Functions are not differentiable at corners.

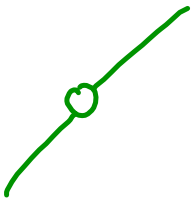


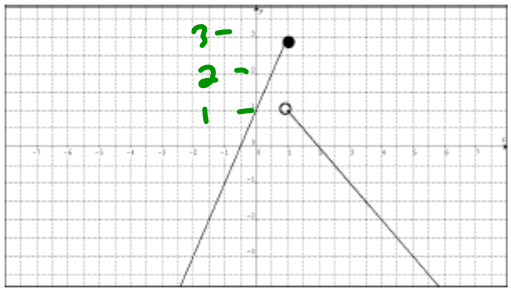
At what point is this function not differentiable? $x = 0.5$ $(0.5, 0)$

Where is the function differentiable?

$(-\infty, 0.5) \cup (0.5, \infty)$

3. Functions are not differentiable at points of discontinuity.





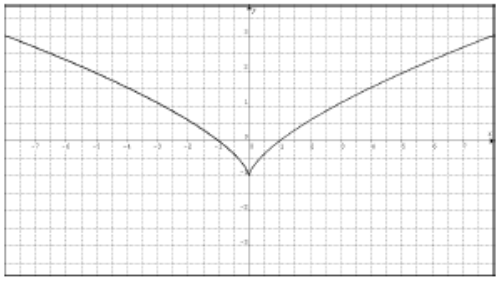
Where is this function not differentiable?

@ $x=1$

$(1,1)$ or $(1,3)$

Feb 10-6:34 PM

4. Functions are not differentiable at cusps. curvy/corner

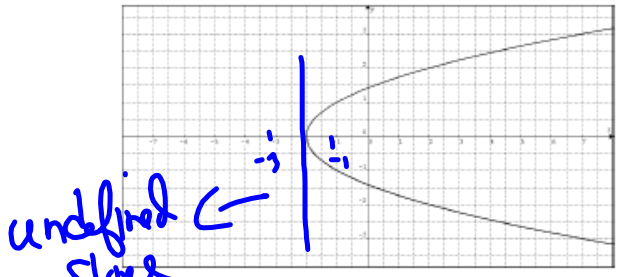


Where is this function not differentiable?

$x = 0$

Feb 10-6:36 PM

5. Functions are not differentiable at points where vertical tangents occur.



At what point is this function not differentiable?

x: -2 (-2, 0)

Feb 10-6:38 PM

Ex: Determine the values of x for which the following functions are not differentiable? Provide reasoning.

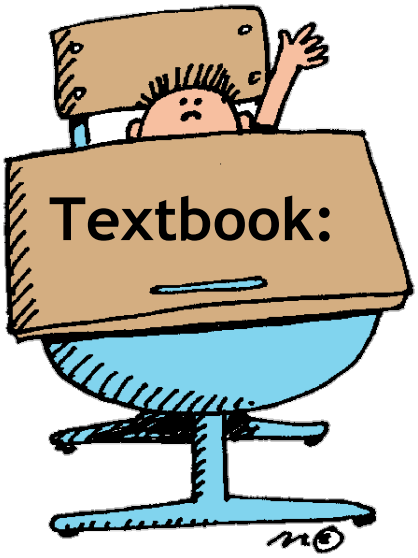
$y = \frac{1}{x-2}$

$y = |x+4| - 1$

$y = (x-1)^{\frac{2}{3}}$

$y = 2\sqrt{x+5} - 2$

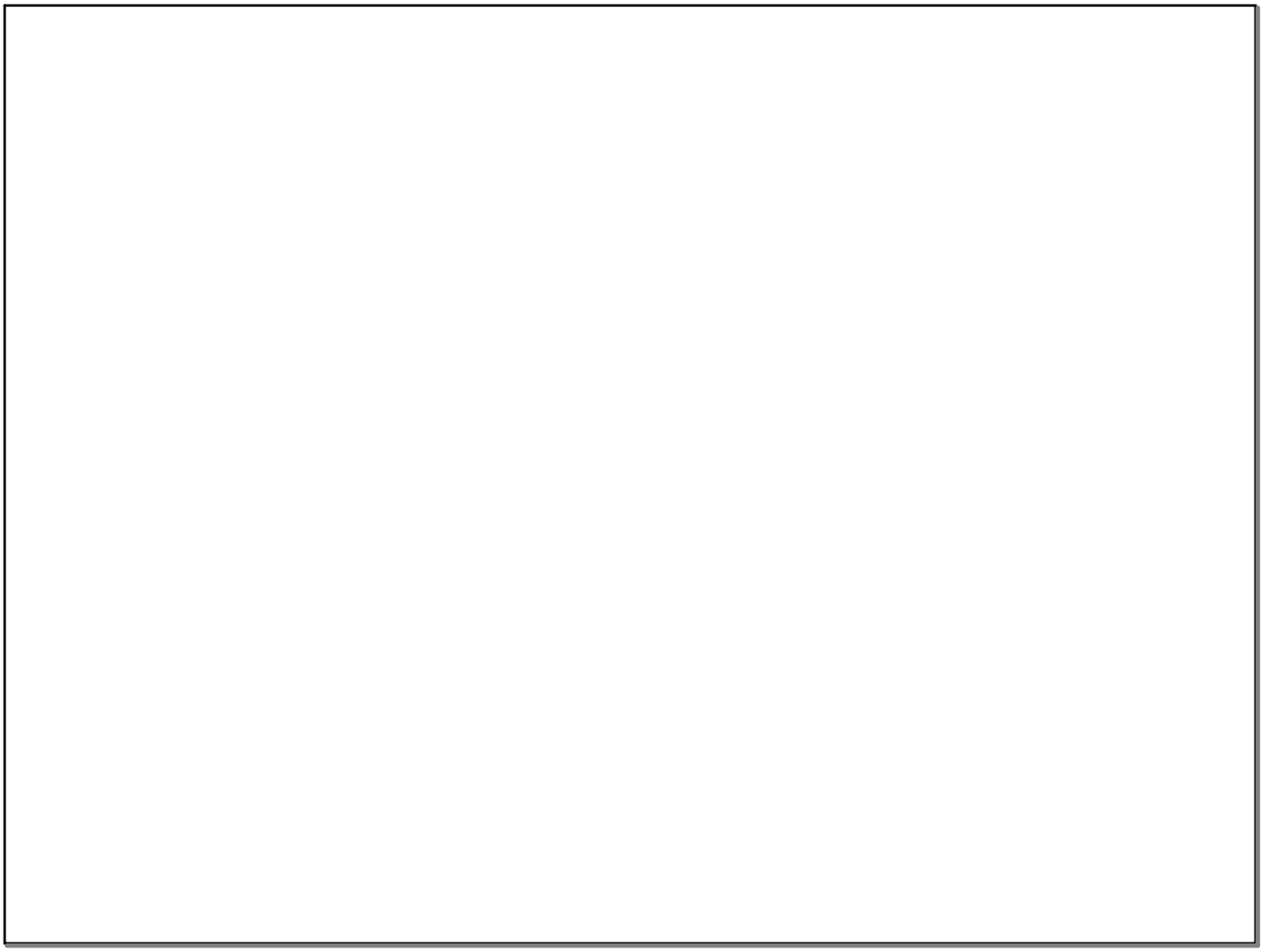
Feb 10-6:39 PM



Practice

Page 114-115 Green Book
#5, 7, 9, 11-16

Jan 13-9:38 PM



Feb 10-6:38 PM

Attachments

2.1_74_AP.html

2.1_74_AP.swf

2.1_74_AP.html