

JANUARY 15

What does it mean to find the  
limit?

JANUARY 14

Students will verbally explain how to  
find the limit of a function  
(using the words:  
y-value, x-value, right, left...)

Move to page 2.1.

1. What is the limit of  $f(x)$  as  $x \rightarrow 1^+$ ?

0

2. What is the limit of  $f(x)$  as  $x \rightarrow 1^-$ ?

4

Move to page 3.1.

3. What is the limit of  $f(x)$  as  $x \rightarrow -2^+$ ?

-1

4. What is the limit of  $f(x)$  as  $x \rightarrow -2^-$ ?

0

Move to page 4.1.

5. What is the limit of  $f(x)$  as  $x \rightarrow 3^+$ ?

3

6. What is the limit of  $f(x)$  as  $x \rightarrow 3^-$ ?

3

Move to page 5.1.

7. What is the limit of  $f(x)$  as  $x \rightarrow 1^+$ ?

0

8. What is the limit of  $f(x)$  as  $x \rightarrow 1^-$ ?

0

Move to page 6.1.

9. What is the limit of  $f(x)$  as  $x \rightarrow 0^-$ ?

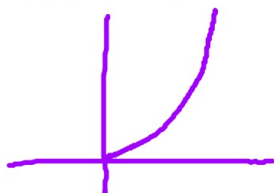
0

10. What is the limit of  $g(x)$  as  $x \rightarrow 0^+$ ?

-1

11. Let  $h(x) = g(x) + 1$ .

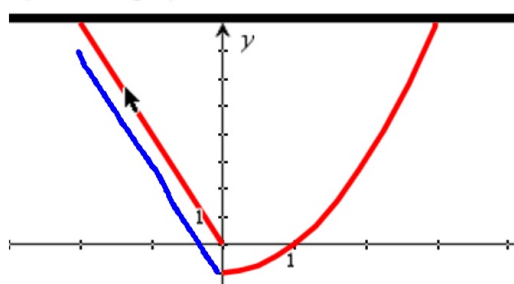
- a. Sketch a graph of  $h(x)$ .



- b. What is the limit of  $h(x)$  as  $x \rightarrow 0^+$ ?

0

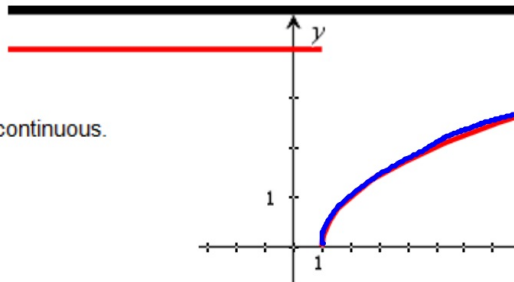
Let  $f(x)$  be the linear graph and  $g(x)$  be the quadratic graph.



12. Define a function  $j(x)$  in terms of  $f(x)$  that makes the graph continuous.

$$j(x) = f(x) - 1$$

Let  $f(x)$  be the linear graph and  $g(x)$  be the non-linear graph.



Move to page 7.1.

13. Define a function  $j(x)$  in terms of  $g(x)$  that makes the graph continuous.

$$j(x) = g(x) + 4$$

Let  $h(x) = f(x) - c$ .

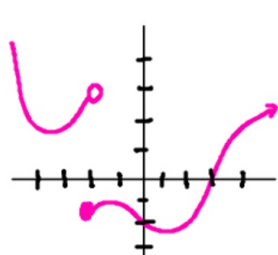
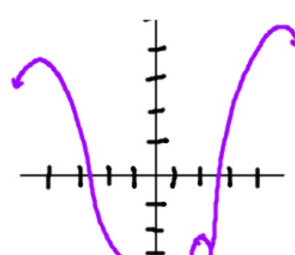
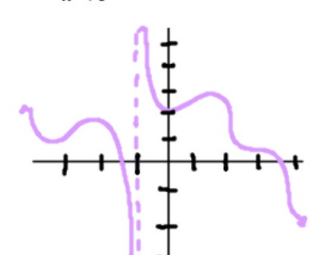
14. What value of  $c$  makes the limit of  $h(x)$  as  $x \rightarrow 1^- = 2$ ?

$$\lim_{x \rightarrow 1^-} f(x) - c = 2$$

$$\lim_{x \rightarrow 1^-} f(x) = 4$$

$$c = 2$$

## Types of Discontinuities

Jump	Removable	Infinite
 $\lim_{x \rightarrow c^+} f(x) \neq \lim_{x \rightarrow c^-} f(x)$	 $\lim_{x \rightarrow c^-} f(x) = \lim_{x \rightarrow c^+} f(x) \neq f(c)$	$\lim_{x \rightarrow c^+} f(x) = \pm\infty$ <p>AND/OR</p> $\lim_{x \rightarrow c^-} f(x) = \pm\infty$ 

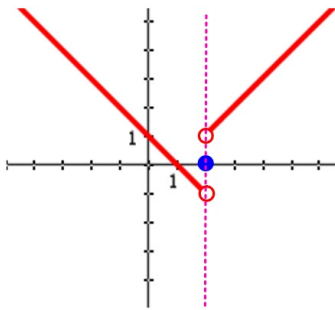
## Continuous Function

$$\textcircled{1} \quad \lim_{x \rightarrow c^+} f(x) = \lim_{x \rightarrow c^-} f(x)$$

$$\textcircled{2} \quad \lim_{x \rightarrow c} f(x) = L$$

$$\textcircled{3} \quad f(c) = L \quad \rightarrow \text{the value of the function is equal to the limit}$$

$$\lim_{x \rightarrow c} f(x) = f(c)$$



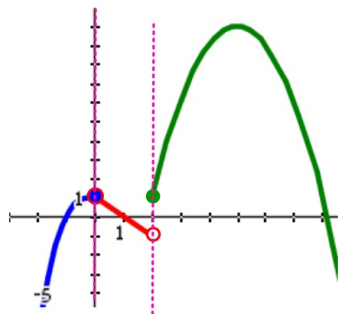
$$\lim_{x \rightarrow 2^-} f(x) = -1$$

$$\lim_{x \rightarrow 2^+} f(x) = 1$$

$$f(2) = 0$$

$$\lim_{x \rightarrow 2} f(x) = \text{DNE}$$

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#51-54,  
57-59



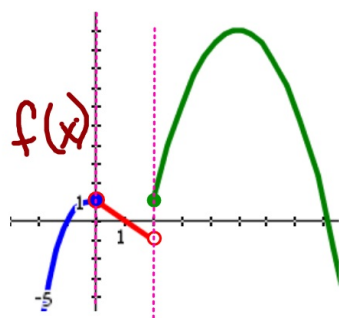
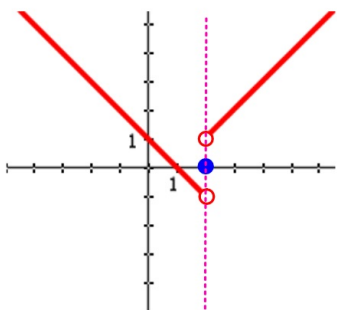
$$\lim_{x \rightarrow 0^-} g(x) = 1$$

$$\lim_{x \rightarrow 0^+} g(x) = 1$$

$$\lim_{x \rightarrow 0} g(x) = 1$$

$$g(0) = 1$$

$$\lim_{x \rightarrow 1} g(x) = 0$$



$$\lim_{x \rightarrow 2^-} f(x) = -1$$

$$\lim_{x \rightarrow 2^+} f(x) = 1$$

$$f(2) = 1$$

$$\lim_{x \rightarrow 2} f(x) = \text{DNE}$$