Calculus

1.9 Multiple Representations (Limits)

Notes

Write your questions and thoughts here!

1. If f is a piecewise function with two linear "pieces" such that $\lim_{x \to 5} f(x)$ does not exist, which of the following could be representative of the function f.

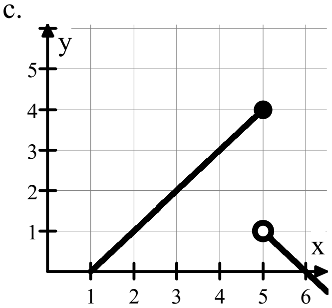
a.

$$f(x) = \begin{cases} 2x - 1, & x < 5 \\ 14 - x, & x > 5 \end{cases}$$

b.

x	2	3	4	5	6	7	8
$f(x)$	10	8	6	1	6	11	16

c.



2. Find the value of $\lim_{x \to 4^-} \frac{|x-4|}{x-4}$

1.9 Connecting Multiple Representations of Limits

Calculus

Practice

Evaluate each limit.

1. $\lim_{x \to 7^-} \frac{|x-7|}{x-7}$

2. $\lim_{x \to 3^+} \frac{x-3}{|x-3|}$

3. $\lim_{x \to -1^+} \frac{|x+1|}{x+1}$

4. $\lim_{x \to 8^+} \frac{|x-8|}{x-8}$

5. $\lim_{x \to 2^-} \frac{|x-2|}{x-2}$

6. $\lim_{x \to -9^-} \frac{x+9}{|x+9|}$

7. Let f be a piecewise function with two linear "pieces" where $\lim_{x \to 5} f(x) = \frac{1}{4}$. Which of the following could represent the function f?

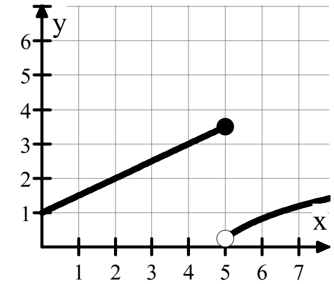
a.

$$f(x) = \begin{cases} \frac{x-5}{x^2-6x+5}, & x \neq 5 \\ 4, & x = 5 \end{cases}$$

b.

x	4.8	4.9	4.999	5	5.001	5.1	5.2
$f(x)$	0	0.2	0.249	4	0.251	0.3	0.5

c.



8. Let g be a piecewise function with two linear "pieces" where $\lim_{x \to 3} g(x) = 6$. Which of the following could represent the function g?

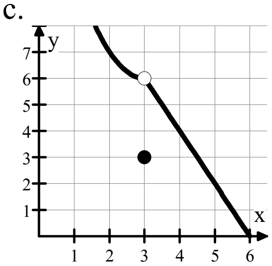
a.

$$g(x) = \begin{cases} \frac{x^2-x-6}{x-3}, & x \neq 3 \\ 6, & x = 3 \end{cases}$$

b.

x	2.8	2.9	2.999	3	3.001	3.1	3.2
$g(x)$	6.2	6.01	6.001	1	4.999	4.9	4.8

c.



9. If h is a piecewise function with two linear "pieces" linear function such that $\lim_{x \to 4} h(x)$ does not exist, which of the following could be representative of the function h?

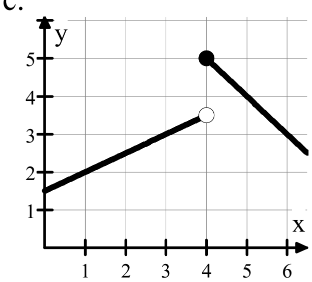
a.

$$h(x) = \begin{cases} \frac{1}{2}x + 3, & x < 4 \\ 13 - 2x, & x > 4 \end{cases}$$

b.

x	1	2	3	4	5	6	7
$h(x)$	-4	-1	2	1	$\frac{16}{3}$	$\frac{17}{3}$	$\frac{18}{3}$

c.



10. If $f(x) = \begin{cases} \frac{(x-3)^2(x^2+1)}{|x-3|} & \text{for } x \neq 3 \\ 2 & \text{for } x = 3 \end{cases}$, then $\lim_{x \to 3} f(x)$ is

(A) 0 (B) 2 (C) 10 (D) Nonexistent