

JANUARY 14

Explain how to find a missing constant in order to make a piecewise function continuous.

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

Limit of a function

the y-value the function
approaches as you get
closer & closer to a
specific x-value

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

(c is any number)

Right-Hand Limit

the limit as you approach
the x-value from the right

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

(x-values are greater than c)

Left-Hand Limit

the limit as you approach
the x-value from the left

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

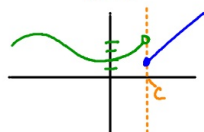
(x-values are less than c)

When does
the limit
not exist?

$$\text{If } \lim_{x \rightarrow c^+} f(x) \neq \lim_{x \rightarrow c^-} f(x)$$

then $\lim_{x \rightarrow c} f(x)$ does not exist

(DNE)

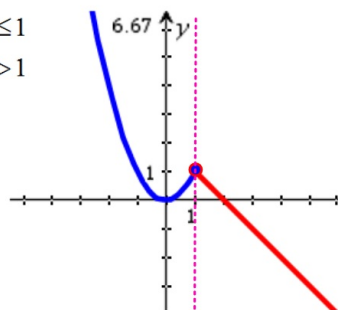


$$\lim_{x \rightarrow c^-} f(x) = 4$$

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

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

$$f(x) = \begin{cases} x^2 & \text{for } x \leq 1 \\ 2-x & \text{for } x > 1 \end{cases}$$

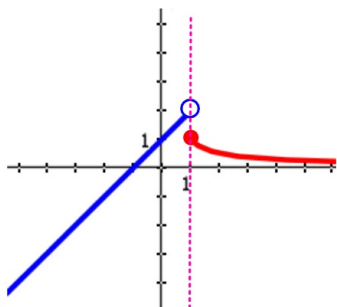


$$\lim_{x \rightarrow 1^-} f(x) = 1$$

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

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

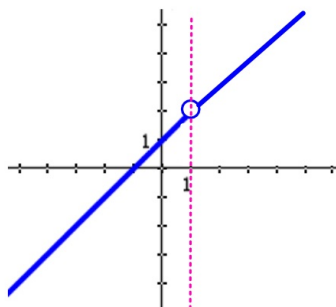
$$f(x) = \begin{cases} x+1 & \text{for } x < 1 \\ \frac{1}{x} & \text{for } x \geq 1 \end{cases}$$



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

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

$$\lim_{x \rightarrow 1} f(x) = \text{DNE}$$



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

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

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

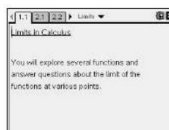
$$f(1) = \text{undefined}$$

Basic Limits
Student Activity

Name _____
Class _____

Open the TI-Nspire document *Basic_Limits.tns*.

How can you find one-sided and two-sided limits graphically? You will examine each graph presented in the TI-Nspire document and answer the questions on the following pages. Grab and move the open circle on the x -axis to help answer the questions. Once you have determined your answer, you may record your results on the worksheet or the TI-Nspire document depending upon your teacher's instructions.



Move to page 2.1.

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

50

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

Press \rightarrow and \leftarrow to navigate through the lesson. Press Tab to move to the Answer section and press Enter to type text.

Basic Limits
Student Activity

Name _____
Class _____

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

Move to page 6.3.

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

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

Move to page 6.4.

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

$f(x) - 1$

Move to page 7.1.

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

$g(x) + 4$

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

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

$c = 2$