LESSON MAKER PRO

Where Graphs Go

Find the value a function approaches.

HIGH SCHOOL · F.IF.C.8.c

F.IF.C.8.c "Interpret the behavior of the graph of a function using the concept of limits."

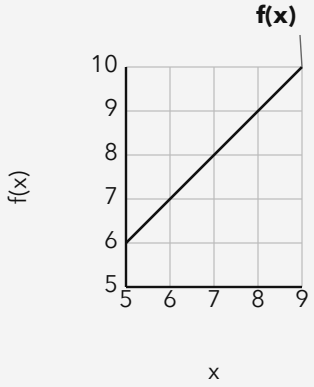
NAME _____ DATE _____

APPROACHING A VALUE

A limit tells you what y approaches as x gets close to a value. For a two-sided limit, the y-values from the left and right must approach the same number.

WORKED EXAMPLE

From the graph, find the limit of f(x) as x approaches 7.



1. From the left, y approaches 8.
2. From the right, y approaches 8.
3. The two sides agree.

Answer: 8

PRACTICE 4 problems

1 Find the limit of $(x^2 - 1)/(x - 1)$ as x approaches 1.

ANSWER _____

2 Find the limit of $x^2 + 1$ as x approaches -2.

ANSWER _____

3 Find the limit of $(5x + 1)/(x + 4)$ as x approaches infinity.

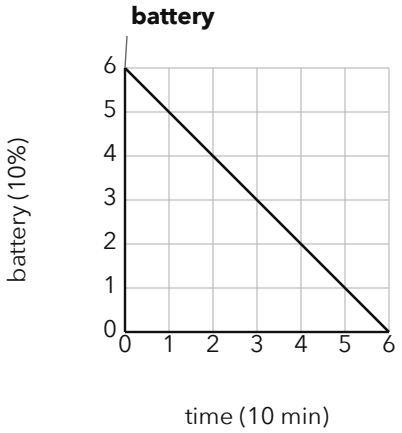
ANSWER _____

4 For f(x) = x + 4 when x < 0 and f(x) = x - 1 when x >= 0, find the limit from the left as x approaches 0.

ANSWER _____

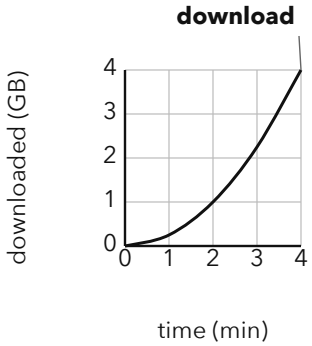
APPLY IT Show your work

1 The graph shows an e-scooter's battery level. As time approaches 40 minutes, what percent does the battery level approach?



ANSWER _____

2 The graph shows a game's download progress. As time approaches 2 minutes, how many gigabytes have downloaded?



ANSWER _____

CHALLENGE One step up

For f(x) = |x|/x, find the limits from the left and right as x approaches 0. Does the two-sided limit exist? Explain.

WORK SPACE AND ANSWER

ANSWER KEY

Where Graphs Go

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the limit of $(x^2 - 1)/(x - 1)$ as x approaches 1.	**2**
2	Find the limit of $x^2 + 1$ as x approaches -2.	**5**
3	Find the limit of $(5x + 1)/(x + 4)$ as x approaches infinity.	**5**
4	For $f(x) = x + 4$ when $x < 0$ and $f(x) = x - 1$ when $x >= 0$, find the limit from the left as x approaches 0.	**4**

PART 2 · APPLY IT

1. **20%** At 40 minutes, x approaches 4. The graph's y-value approaches 2 units of 10%, or 20%.
2. **1 GB** From both sides of 2 minutes, the graph approaches 1 GB.

CHALLENGE

The left-hand limit is -1, and the right-hand limit is 1. The two-sided limit does not exist because the one-sided limits differ.

Accept DNE for a limit that does not exist. In the challenge, require both one-sided limits and a statement that they differ.