Find The Function Values For F(-3). If F(x)=-5x-4 Find The Function Values For F(-8). If F(x)=|x-2|

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Understanding how to evaluate functions at specific points is fundamental in algebra and calculus. The process involves substituting the given value into the function and simplifying to find the corresponding output. In this article, we will analyze two different functions: a linear function $F(x) = -5x - 4$ and an absolute value function $F(x) = |x - 2|$. We will demonstrate how to compute their values at specific inputs, namely $x = -3$ and $x = -8$, and explore the properties of these functions along the way.

Evaluating the Linear Function $F(x) = -5x - 4$

Understanding the Function

The linear function $F(x) = -5x - 4$ is a straight-line function characterized by its slope and y-intercept.

- Slope: -5, indicating the rate of change of the function.
- Y-intercept: -4, the point where the line crosses the y-axis when $x = 0$.

This function is continuous and defined for all real numbers, making it straightforward to evaluate at any given point.

Calculating $F(-3)$

To find $F(-3)$:

1. Substitute $x = -3$ into the function:
$$
F(-3) = -5 \times (-3) - 4
$$

2. Simplify the multiplication:
$$
F(-3) = 15 - 4
$$
3. Finish with the subtraction:
$$
F(-3) = 11
$$

Result: $F(-3) = 11$

Calculating $F(-8)$

Similarly, to find $F(-8)$:

1. Substitute $x = -8$:
$$
F(-8) = -5 \times (-8) - 4
$$
2. Simplify:
$$
F(-8) = 40 - 4
$$
3. Final result:
$$
F(-8) = 36
$$

Result: $F(-8) = 36$

Summary of Linear Function Evaluations

Input x	Function $F(x) = -5x - 4$	Computation	Result
-3	$-5 \times -3 - 4$	$15 - 4$	11
-8	$-5 \times -8 - 4$	$40 - 4$	36

Evaluating the Absolute Value Function $F(x) = |x - 2|$

Understanding the Function

The absolute value function $F(x) = |x - 2|$ measures the distance of x from 2 on the real number line. Its key properties include:

- Non-negativity: $F(x) \geq 0$ for all real x.
- V-shaped graph: The graph is symmetric around the vertical line $x = 2$.
- Piecewise definition:

$$
F(x) =
\begin{cases}
x - 2, & \text{if } x \geq 2 \\
2 - x, & \text{if } x < 2
\end{cases}
$$

This piecewise nature simplifies evaluation at specific points.

Calculating $F(-3)$

Since $-3 < 2$, we use the second part of the piecewise definition:

$$
F(-3) = 2 - (-3) = 2 + 3 = 5
$$

Result: $F(-3) = 5$

Calculating $F(-8)$

Again, $-8 < 2$, so:

$$
F(-8) = 2 - (-8) = 2 + 8 = 10
$$

Result: $F(-8) = 10$

Summary of Absolute Value Function Evaluations

Input x	Function $F(x) = \|x - 2\|$	Computation	Result
-3	$\| -3 - 2 \|$	$\| -5 \|$	5

| -8 | \(| -8 - 2 | \) | \(| -10 | \) | 10 |

Comparison and Analysis of the Functions

Linear Function \(F(x) = -5x - 4 \)

- Behavior: As \(x \) increases, \(F(x) \) decreases because of the negative slope.
- Evaluations at negative inputs: The function yields positive values for large negative \(x \) due to the multiplication by \(-5\).
- Graph characteristics: A straight line crossing the y-axis at \(-4\), decreasing as \(x \) increases.

Absolute Value Function \(F(x) = |x - 2| \)

- Behavior: The graph forms a "V" shape with its vertex at \(x = 2 \), where \(F(2) = 0 \).
- Evaluations at negative inputs: The function outputs positive values, representing the distance from 2.
- Symmetry: The function is symmetric around \(x = 2 \).

Key Points to Remember When Evaluating Functions

- Always substitute the specific \(x \) value carefully into the function.
- For piecewise functions, identify which part of the definition applies based on the \(x \)-value.
- Simplify step-by-step to avoid errors.
- Understand the graph's shape to predict the function's behavior at different points.

Conclusion

Evaluating functions at specific points is a core skill that helps in understanding their behavior. For the linear function \(F(x) = -5x - 4 \), evaluating at \(x = -3 \) and \(x = -8 \) reveals how the function responds to negative inputs, producing positive outputs due to the negative slope. Meanwhile, the absolute value function \(F(x) = |x - 2| \) measures the distance from 2, giving positive results for all inputs and highlighting its symmetric, V-shaped graph.

Through these calculations, it becomes clear that the nature of a function—linear or absolute value—dictates how its values change with x. Mastery of such evaluations provides a foundation for more advanced topics in mathematics, including calculus, transformations, and optimization problems. Remember to always analyze the function's form before plugging in numbers, and to consider the function's behavior to anticipate the results accurately.

Frequently Asked Questions

What is the value of F(-3) when F(x) = -5x - 4?

F(-3) = -5(-3) - 4 = 15 - 4 = 11.

How do you find F(-8) if F(x) = |x - 2|?

F(-8) = |-8 - 2| = |-10| = 10.

What is the difference between the two functions given?

The first function is linear, F(x) = -5x - 4, while the second is an absolute value function, F(x) = |x - 2|.

Calculate F(-3) for the function F(x) = -5x - 4.

F(-3) = 11.

Calculate F(-8) for the function F(x) = |x - 2|.

F(-8) = 10.

Are the function values F(-3) and F(-8) from different types of functions?

Yes, F(-3) is from a linear function, and F(-8) is from an absolute value function.

Additional Resources

Find The Function Values For F(-3): An In-Depth Exploration of Function Evaluation

When delving into the fundamentals of algebra and functions, understanding how to evaluate a function at specific points is essential. In particular,

the phrase Find The Function Values For F(-3) introduces us to the process of substituting particular inputs into a given function to determine its output. This process not only enhances comprehension of functions but also lays the groundwork for more complex mathematical concepts such as graphing, transformations, and calculus. In this article, we will explore the steps involved in finding function values for two different functions: a linear function $F(x) = -5x - 4$ and an absolute value function $F(x) = |x - 2|$. We will analyze each case thoroughly, providing detailed calculations, explanations, and insights into the properties of these functions.

Understanding the Concept of Function Evaluation

Before diving into specific examples, it's crucial to understand what it means to evaluate a function at a certain point. A function, denoted as $F(x)$, is a rule that assigns to each input x a unique output $F(x)$. To find the function value at a particular input, such as $x = -3$, you substitute that value into the function and perform the calculations accordingly.

Key steps in evaluating a function:
1. Identify the function's rule.
2. Substitute the given input into the rule.
3. Simplify the expression to find the output.

This process is straightforward but requires attention to detail, especially with more complex functions like those involving absolute values or piecewise definitions.

Evaluating the Linear Function $F(x) = -5x - 4$ at $x = -3$

Step-by-step Calculation

Given the function:
$$
F(x) = -5x - 4
$$

To find $F(-3)$:
1. Substitute $x = -3$:
$$
F(-3) = -5 \times (-3) - 4
$$
2. Perform multiplication:
$$
-5 \times (-3) = 15
$$
3. Complete the calculation:
$$
15 - 4 = 11
$$

Result:
$$
F(-3) = 11
$$

Interpretation and Features

- The linear function has a slope of -5, indicating it decreases rapidly as x increases.
- The y-intercept is -4, meaning the graph crosses the y-axis at -4.
- For $x = -3$, the output is positive, which aligns with the negative slope and the position of the input.

Pros and Cons of Linear Functions

Pros:
- Simple to evaluate and interpret.
- Graphs are straight lines, making visualization easy.
- Useful for modeling constant rates of change.

Cons:
- Limited in modeling complex, nonlinear phenomena.
- Can be too simplistic for real-world situations requiring curvature.

Evaluating the Absolute Value Function $F(x) = |x - 2|$ at $x = -8$

Understanding Absolute Value Functions

The absolute value function $|x - 2|$ measures the distance of x from 2 on the number line. The output is always non-negative, regardless of whether $x - 2$ is positive or negative.

Key characteristics:
- The function is symmetric about the vertical line $x = 2$.
- It creates a "V" shape when graphed.
- It models scenarios involving distance or magnitude.

Step-by-step Calculation

Given:
$$
F(x) = |x - 2|
$$

Find $F(-8)$:
1. Substitute $x = -8$:
$$
F(-8) = |-8 - 2|
$$
2. Simplify inside the absolute value:
$$
-8 - 2 = -10
$$
3. Take the absolute value:
$$
|-10| = 10
$$

Result:
$$
F(-8) = 10
$$

Interpretation and Features

- The value $F(-8) = 10$ indicates that the point -8 is 10 units away from the point 2 on the number line.
- The absolute value function is always non-negative and symmetric about the line $x = 2$.
- For $x = -8$, the large positive output reflects the significant distance from 2.

Pros and Cons of Absolute Value Functions

Pros:
- Useful in distance and error measurement.
- Creates simple, symmetric graphs.
- Easy to evaluate and interpret.

Cons:
- Not differentiable at the vertex (here, $x = 2$), which can complicate calculus.
- Can be less flexible in modeling phenomena that involve smooth changes.

Comparative Analysis of Both Functions

Understanding how to evaluate different types of functions at specific points reveals their unique properties and applications.

Feature	Linear Function $F(x) = -5x - 4$	Absolute Value Function $F(x) = \|x - 2\|$
Nature	Continuous, straight line	Continuous, V-shaped graph
Domain	All real numbers	All real numbers
Range	All real numbers	$y \geq 0$
Symmetry	No symmetry	Symmetric about $x=2$
Evaluation at $x = -3$	11	$\|-8 - 2\| = 10$
Evaluation at $x = -8$	$44 - 4 = 40$ (for illustration)	10 (as calculated)

(Note: The last row for the linear function at $x = -8$ is additional for comparative purposes.)

Applications and Real-World Relevance

Understanding how to compute these function values is fundamental in numerous fields:

- Linear functions are used in economics for modeling constant rates, such as profit or cost functions.
- Absolute value functions are crucial in areas requiring distance measurement, such as in physics, engineering, and statistics.

Knowing how to evaluate functions at specific points allows professionals to

make predictions, optimize solutions, and understand the behavior of models in practical scenarios.

Conclusion

The process of finding function values at given points is a core skill in mathematics that supports deeper understanding of function behavior. Whether dealing with a simple linear function like $F(x) = -5x - 4$ or a more complex absolute value function $F(x) = |x - 2|$, the approach remains consistent: substitute the input, perform the calculations, and interpret the results. Mastery of this skill enhances problem-solving capabilities and provides a foundation for exploring more advanced mathematical concepts. By carefully analyzing each step, recognizing the properties of the functions involved, and appreciating their applications, learners develop a solid mathematical intuition that extends beyond mere computation.

In summary:
- To find $F(-3)$ for $F(x) = -5x - 4$, substitute -3 and simplify to get 11.
- To find $F(-8)$ for $F(x) = |x - 2|$, substitute -8, simplify inside the absolute value to -10, and take the absolute value to get 10.

These evaluations exemplify key techniques in algebra and serve as building blocks for more advanced mathematical and real-world problem-solving endeavors.

Find The Function Values For F 3 If F X 5x 4 Find The Function Values For F 8 If F X X 2

Find The Function Values For F 3 If F X 5x 4 Find The Function Values For F 8 If F X X 2

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