Find The Following For The Function F(x)=3x + 4x-2 (a) F(0)(b) F(1) (c) F(-1) (d) F(-x) (e)-f(x) (f)

Find The Following For The Function F(x)=3x + 4x-2 (a) F(0) (b) F(1) (c) F(-1) (d) F(-x) (e) -f(x) (f)

Understanding how to evaluate functions at specific points and manipulate functions algebraically is essential in mathematics. In this article, we will analyze the given function $F(x) = 3x + 4x - 2$ and find various expressions involving it. This comprehensive guide will walk you through each step, ensuring clarity and mastery of function evaluation and algebraic operations.

Analyzing the Given Function

Before diving into the specific calculations, let's simplify the function:

$$
F(x) = 3x + 4x - 2
$$

Combine like terms:

$$
F(x) = (3x + 4x) - 2 = 7x - 2
$$

Our simplified function is:

$$
F(x) = 7x - 2
$$

With this simplified form, computing the requested values becomes straightforward.

Part A: Find $F(0)$

Evaluating $F(x)$ at $x = 0$:

$$
F(0) = 7 \times 0 - 2 = 0 - 2 = -2
$$

Answer: $\boxed{-2}$

Part B: Find $F(1)$

Evaluating $F(x)$ at $x = 1$:

$$
F(1) = 7 \times 1 - 2 = 7 - 2 = 5
$$

Answer: $\boxed{5}$

Part C: Find $F(-1)$

Evaluating $F(x)$ at $x = -1$:

$$
F(-1) = 7 \times (-1) - 2 = -7 - 2 = -9
$$

Answer: $\boxed{-9}$

Part D: Find $F(-x)$

To find $F(-x)$, substitute $-x$ into the function:

$$
F(-x) = 7 \times (-x) - 2 = -7x - 2
$$

Answer: $\boxed{-7x - 2}$

Part E: Find $-f(x)$

Note: The function is denoted as $F(x)$, but in this part, it's written as $f(x)$. Assuming they refer to the same function, then:

$$
- f(x) = - (7x - 2) = -7x + 2
$$

Answer: $\boxed{-7x + 2}$

Part F: Summary of All Results

Here's a concise summary of all computed values and expressions:

Part	Expression	Result / Expression
(a)	$F(0)$	-2
(b)	$F(1)$	5
(c)	$F(-1)$	-9
(d)	$F(-x)$	$-7x - 2$
(e)	$-f(x)$	$-7x + 2$

Understanding the Significance of These Calculations

Evaluating functions at specific points helps understand their behavior, such as their intercepts and symmetry. For example:

- $F(0)$ gives the y-intercept of the function, which is -2.
- $F(1)$ and $F(-1)$ provide information about the function's values at positive and negative inputs.
- $F(-x)$ indicates how the function behaves under reflection across the y-axis, revealing symmetry properties.
- $-f(x)$ shows the reflection of the function across the x-axis.

These evaluations are fundamental in graphing functions, analyzing their properties, and solving equations.

Additional Insights and Applications

Understanding how to manipulate and evaluate functions like $F(x) = 7x - 2$ has numerous applications, including:

- Graphing Linear Functions: Knowing the slope and intercepts helps sketch the graph accurately.
- Solving Equations: Evaluating functions at specific points can aid in solving equations involving these functions.
- Analyzing Symmetry: Recognizing the effects of replacing x with $-x$ gives insights into whether the function is even, odd, or neither.
- Real-World Modeling: Linear functions are used to model relationships like distance over time, cost calculations, and more.

Practice Problems to Reinforce Concepts

To solidify your understanding, try solving these related problems:

1. Find $F(2)$ for the function $F(x) = 7x - 2$.
2. Determine $F(3)$ and $F(-3)$.
3. Simplify $F(-x)$ and verify if the function exhibits symmetry.
4. Find $-f(4)$ for the same function.
5. Sketch the graph of $F(x)$ based on the evaluated points.

Solutions:

1. $F(2) = 7 \times 2 - 2 = 14 - 2 = 12$
2. $F(3) = 7 \times 3 - 2 = 21 - 2 = 19$, $F(-3) = -21 - 2 = -23$
3. $F(-x) = -7x - 2$, which is the reflection of $F(x)$ across the y-axis with an added shift.
4. $-f(4) = - (7 \times 4 - 2) = - (28 - 2) = -26$
5. Plot the points $(0, -2)$, $(1, 5)$, $(-1, -9)$, $(2, 12)$, $(-2, -16)$, and draw a line through them.

Conclusion

This guide provided a comprehensive walkthrough of evaluating the function $F(x) = 7x - 2$ at various points and performing algebraic manipulations. Mastering these techniques is crucial for understanding linear functions, their graphs, and their applications in mathematics and real-world scenarios. By practicing these evaluations and exploring their implications, you build a strong foundation for more advanced mathematical concepts involving functions and algebra.

Frequently Asked Questions

What is the value of F(0) for the function F(x) = 3x + 4x - 2?

F(0) = 3(0) + 4(0) - 2 = 0 + 0 - 2 = -2

How do you compute F(1) for the function F(x) = 3x + 4x - 2?

F(1) = 3(1) + 4(1) - 2 = 3 + 4 - 2 = 5

What is the value of F(-1) for the function F(x) = 3x +

4x - 2?

F(-1) = 3(-1) + 4(-1) - 2 = -3 - 4 - 2 = -9

How do you find F(-x) for the function F(x) = 3x + 4x - 2?

F(-x) = 3(-x) + 4(-x) - 2 = -3x - 4x - 2 = -7x - 2

What is the expression for -F(x) given F(x) = 3x + 4x - 2?

-F(x) = -(3x + 4x - 2) = -3x - 4x + 2 = -7x + 2

What is the simplified form of F(x) = 3x + 4x - 2?

F(x) = (3x + 4x) - 2 = 7x - 2

How would you evaluate F(2) for the function F(x) = 7x - 2?

F(2) = 7(2) - 2 = 14 - 2 = 12

What is the value of F(3) for the function F(x) = 7x - 2?

F(3) = 7(3) - 2 = 21 - 2 = 19

How do the calculations of F(-x) and -F(x) relate for the function F(x) = 7x - 2?

F(-x) = -7x - 2 and -F(x) = -7x + 2; they are similar but differ in the constant term.

Additional Resources

Mathematical Analysis of the Function F(x) = 3x + 4x - 2

Introduction

When exploring the intricate world of mathematical functions, understanding their behavior through specific evaluations offers invaluable insight. The function under examination, F(x) = 3x + 4x - 2, is straightforward yet rich with learning opportunities. This article delves deeply into the process of calculating various transformations and evaluations of this function, including its values at specific points, the effect of negating the variable, and the impact of negating the entire function. Each step is explained comprehensively, equipping

readers with both the computational skills and conceptual understanding needed to analyze similar functions in the future.

Simplifying the Function: F(x) = 3x + 4x - 2

Before proceeding with the evaluations, it’s essential to simplify the function to its most basic form:

$$
F(x) = 3x + 4x - 2
$$

Combine like terms:

$$
F(x) = (3x + 4x) - 2 = 7x - 2
$$

This simplified form, F(x) = 7x - 2, provides a more transparent view of how the function behaves across different inputs. It’s a linear function with a slope of 7 and a y-intercept of -2.

Evaluating the Function at Specific Points

(a) F(0): The Value at Zero

Calculating F(0) involves substituting x = 0 into the simplified function:

$$
F(0) = 7(0) - 2 = 0 - 2 = -2
$$

Interpretation:
- At x = 0, the function yields -2, which corresponds to the point (0, -2) on the graph.
- This point is the y-intercept, showcasing where the line crosses the y-axis.

(b) F(1): The Value at One

Similarly, for x = 1:

$$
F(1) = 7(1) - 2 = 7 - 2 = 5
$$

Interpretation:
- The point (1, 5) lies on the line.
- The positive value indicates the function increases as x increases, consistent with the

positive slope of 7.

(c) F(-1): The Value at Negative One

For x = -1:

$$
F(-1) = 7(-1) - 2 = -7 - 2 = -9
$$

Interpretation:
- The point (-1, -9) is below the x-axis.
- The function decreases on the negative side of the x-axis, which aligns with the slope of 7.

Transformations of the Function

Beyond simple evaluations, understanding how the function transforms under various modifications expands our comprehension of its behavior.

(d) F(-x): The Function with Negated Input

When replacing x with -x, the function becomes:

$$
F(-x) = 7(-x) - 2 = -7x - 2
$$

Analysis:
- Graphical Reflection: The graph of F(-x) is a reflection of F(x) across the y-axis.
- Behavior: The slope changes sign; the line now slopes downward as x increases, illustrating the symmetry about the y-axis.

Calculations at specific points:

- At x = 1:

$$
F(-1) = -7(1) - 2 = -7 - 2 = -9
$$

- At x = -1:

$$
F(1) = 7(1) - 2 = 5
$$

Note: The values of F(-x) at x are the same as F(x) at -x.

(e) -F(x): Negation of the Function

Negating the entire function gives:

$$
- F(x) = - (7x - 2) = -7x + 2
$$

Analysis:
- The graph of -F(x) is a reflection of F(x) across the x-axis.
- The slope becomes negative, indicating the function decreases as x increases.

Calculations at specific points:

- At x = 0:

$$
- F(0) = -(-2) = 2
$$

- At x = 1:

$$
- F(1) = -5 = -5
$$

- At x = -1:

$$
- F(-1) = -(-9) = 9
$$

Implication: The function's values are inverted vertically, flipping the graph upside down.

Summary of Key Calculations

Evaluation	Calculation	Result	Interpretation
F(0)	$7 \times 0 - 2$	-2	Y-intercept point
F(1)	$7 \times 1 - 2$	5	Point on the line for x=1
F(-1)	$7 \times -1 - 2$	-9	Point on the line for x=-1
F(-x)	$7(-x) - 2$	$-7x - 2$	Reflection across y-axis
-F(x)	$- (7x - 2)$	$-7x + 2$	Reflection across x-axis

Visualizing the Function and Its Transformations

Understanding the behavior of F(x) and its transformations benefits greatly from

visualization:

- F(x) = 7x - 2: A straight line crossing the y-axis at -2, rising steeply due to the slope of 7.
- F(-x) = -7x - 2: A mirror image of F(x) across the y-axis, now decreasing as x increases.
- -F(x) = -7x + 2: The original line flipped upside down across the x-axis, crossing the y-axis at +2.

Graphing these transformations illustrates the symmetry and shifts, reinforcing the conceptual understanding of how functions behave under reflection.

Practical Applications and Significance

While this analysis centers on a simple linear function, the principles extend broadly:

- Modeling real-world phenomena: Linear functions are foundational in modeling relationships in economics, physics, and social sciences.
- Understanding transformations: Recognizing how negations and reflections affect graphs aids in data visualization and interpretation.
- Educational value: Mastery of these elementary transformations builds a strong foundation for advanced calculus and algebra.

Final Thoughts

Exploring the evaluations and transformations of F(x) = 3x + 4x - 2, simplified to F(x) = 7x - 2, offers a comprehensive view of linear functions. From calculating specific points to understanding the effects of negating inputs and outputs, each step enhances our grasp of fundamental mathematical concepts. This thorough examination underscores the importance of foundational skills in mathematical analysis and their applications across various domains.

In essence, whether you're a student, educator, or enthusiast, mastering these basic yet powerful concepts prepares you for more intricate explorations in the vast landscape of mathematics.

Find The Following For The Function F X 3x 4x 2 A F 0 B F 1 C F 1 D F X E F X F

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