

For $F(x) = 2x - 3x$, Evaluate $F(-3)$. A. -33 B. 33 C. -21 D. 6

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Understanding the Function $F(x) = 2x - 3x$

Before diving into the calculation of $F(-3)$, it is essential to understand the structure of the function itself. The function $F(x) = 2x - 3x$ is a simple linear function, but its simplicity can sometimes lead to confusion if not carefully analyzed. This section explains the nature of the function, how to interpret it, and what makes it straightforward to evaluate at any given point.

Breaking Down the Function

The function $F(x) = 2x - 3x$ combines two terms that are both linear in x . When combined, they simplify to a single term:

- The first term: $2x$
- The second term: $-3x$

Since both terms are multiples of x , they can be combined through basic algebraic addition.

Why Simplification Matters

Simplifying the function is crucial because it reduces potential errors during evaluation. Instead of working with two terms, recognizing that:

$$F(x) = 2x - 3x = (2 - 3) x = -1 x = -x$$

allows for quicker and more straightforward calculations. This process exemplifies the importance of algebraic simplification in solving functions efficiently.

Evaluating $F(x)$ at a Specific Point: $F(-3)$

With the simplified form of the function, evaluating $F(-3)$ becomes straightforward. Let's explore the step-by-step process to compute this value accurately.

Step 1: Simplify the Function

As established earlier:

$$F(x) = -x$$

This is the simplified form, and it makes the evaluation easier.

Step 2: Substitute x with -3

Replace x with -3 in the simplified function:

$$F(-3) = -(-3)$$

Step 3: Simplify the Expression

Calculate the double negative:

$$F(-3) = 3$$

This indicates that when x is -3 , the value of $F(x)$ is 3 .

Understanding the Multiple-Choice Options

Given the options:

- A. -33
- B. 33
- C. -21
- D. 6

It is evident that the correct value from our calculation is 3 , which is not directly listed among the options. This discrepancy suggests that there may be a typo or oversight in the options provided, or perhaps the initial function or options need reassessment.

Reevaluating the Options in Context

Since the calculated value is 3, and none of the options match this, let's explore whether the original function was misinterpreted or if alternative interpretations could lead to different values.

However, based on the given function, $F(x) = 2x - 3x$, the only logical evaluation yields 3 when $x = -3$.

General Principles in Evaluating Functions

Understanding how to evaluate functions at specific points is fundamental in algebra and calculus. This section discusses the core principles that ensure accurate calculations.

Key Steps in Function Evaluation

When asked to evaluate a function at a particular x -value, follow these steps:

1. **Identify the function's expression:** Know the formula or rule defining $F(x)$.
2. **Simplify if possible:** Reduce the function to its simplest form to facilitate calculation.
3. **Substitute the given x -value:** Replace every instance of x with the specified value.
4. **Perform arithmetic operations:** Calculate the resulting expression carefully, respecting order of operations.
5. **Verify your answer:** Double-check calculations for accuracy.

Common Mistakes to Avoid

While evaluating functions, students often make typical errors, which include:

- Misinterpreting the function notation or formula.
- Forgetting to simplify the function before substitution.
- Incorrectly substituting x-values, such as mistaking negative signs or missing parentheses.
- Making arithmetic errors during computation.

Additional Resources for Mastering Function Evaluation

Understanding how to evaluate functions is foundational in algebra, and mastering it opens doors to more advanced topics like calculus, algebraic functions, and mathematical modeling. Here are some recommended resources:

Online Tutorials and Videos

- Khan Academy's Algebra Course: Offers comprehensive videos on functions and evaluation techniques.
- PatrickJMT's YouTube Channel: Clear explanations with step-by-step problem solving.

Practice Problems

- Use online platforms like IXL or Brilliant.org to find practice exercises.
- Create your own practice problems by choosing different functions and x-values.

Textbooks and Workbooks

- "Algebra and Trigonometry" by Robert F. Blitzer provides detailed explanations and practice problems.
- "Elementary Algebra" by Harold R. Jacobs offers foundational concepts suitable for beginners.

Conclusion: Clarifying the Evaluation of $F(-3)$

In conclusion, evaluating the function $F(x) = 2x - 3x$ at $x = -3$ involves

straightforward algebraic steps:

1. Simplify the function to $F(x) = -x$.
2. Substitute $x = -3$.
3. Calculate the value: $F(-3) = -(-3) = 3$.

Despite the multiple-choice options provided, the correct calculated value is 3, which is not explicitly listed. This suggests a possible typo or misprint in the options, or perhaps a different intended function. Always double-check the function and calculations when faced with multiple-choice questions.

Final note: Mastering the process of simplifying and evaluating functions not only helps in solving algebraic problems but also builds a strong foundation for understanding more complex mathematical concepts. Whether you're preparing for exams or applying math in real-world situations, accurate function evaluation is a vital skill to develop.

Remember: Always analyze the function carefully, simplify where possible, and substitute values precisely to arrive at correct solutions.

Frequently Asked Questions

What is the simplified form of the function $F(x) = 2x - 3x$?

$F(x) = -x$

How do you evaluate $F(-3)$ for the function $F(x) = 2x - 3x$?

Substitute $x = -3$ into $F(x)$: $F(-3) = 2(-3) - 3(-3) = -6 + 9 = 3$

What is the correct answer to evaluate $F(-3)$ in the given options?

The correct answer is B. 33

Is there an error in the provided options for $F(-3)$?

Yes, based on the calculation, $F(-3)$ equals 3, which is not among the options; the options seem incorrect or mismatched.

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

$$F(-3) = 3$$

How can we verify the evaluation of $F(-3)$?

By substituting -3 into the simplified form $F(x) = -x$, we get $F(-3) = -(-3) = 3$, confirming the result.

Why do the options A and C not match the evaluated result of $F(-3)$?

Because the calculated value is 3 , which does not match options A (-33) or C (-21), indicating a possible mistake in the options.

What is the importance of simplifying the function before evaluating it?

Simplifying the function makes substitution easier and reduces chances of calculation errors, leading to accurate evaluation.

Additional Resources

For $F(x) = 2x - 3x$, Evaluate $F(-3)$

Introduction

Mathematics, often regarded as the language of logic and structure, forms an essential part of education and scientific inquiry. Central to this domain is the concept of functions—mathematical relationships that associate each input with exactly one output. Among the foundational skills in algebra is the ability to evaluate functions at specific points, which tests comprehension of function definitions and algebraic manipulation.

In this context, the problem "For $F(x) = 2x - 3x$, evaluate $F(-3)$ " offers an excellent case study to explore these fundamental concepts. This article aims to dissect this problem comprehensively, covering the structure of the function, the process of evaluation, and the implications of the solution. Through detailed reasoning and methodical analysis, we will clarify the steps needed to arrive at the correct answer and discuss the broader significance of such exercises in mathematical literacy.

Understanding the Function: $F(x) = 2x - 3x$

The Nature of the Function

The function in question, $F(x) = 2x - 3x$, is a linear algebraic expression involving the variable x . At first glance, it appears straightforward, but a deeper understanding requires examining its structure:

- Linear combination: The function combines two terms involving x , with coefficients 2 and -3.
- Simplification potential: Since the terms are like terms (both involve x), they can be combined algebraically to simplify the function.

Simplification of $F(x)$

Let's analyze the expression:

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

Applying the distributive property of algebra:

- Combine like terms: $2x$ and $-3x$
- Sum of coefficients: $2 + (-3) = -1$

Thus, the simplified form of the function is:

$$F(x) = -1x, \text{ or simply } F(x) = -x$$

This simplification is crucial because it transforms the original function into a much more manageable form, enabling easier evaluation at specific points.

The Process of Evaluation at a Given Point: $F(-3)$

Step 1: Recognize the Simplified Form

From the previous section, we established that:

$$F(x) = -x$$

Therefore, to evaluate $F(-3)$, we substitute $x = -3$ into this simplified function.

Step 2: Substitute the Value

$$F(-3) = -(-3)$$

Applying basic algebra, the negative sign outside the parentheses negates the value inside:

$$F(-3) = 3$$

This straightforward substitution underscores the importance of simplifying functions before evaluation; it reduces potential errors and clarifies the calculation.

Step 3: Confirm the Calculation

To ensure accuracy, verify the process:

- Original function: $F(x) = 2x - 3x$
- At $x = -3$: $F(-3) = 2(-3) - 3(-3)$
- Calculations:
 - $2(-3) = -6$
 - $-3(-3) = +9$
- Sum: $-6 + 9 = 3$

This confirms that the simplified form yields the same result as the direct substitution into the original expression, reinforcing that the simplified function $F(x) = -x$ is correct and valid.

Interpreting the Results

With the evaluation complete, we compare the result to the provided multiple-choice options:

- A. -33
- B. 33
- C. -21
- D. 6

Our calculation indicates that $F(-3) = 3$, which does not match any of the options given. This discrepancy suggests a potential error in the problem statement or the options listed.

Possible explanations include:

- A typo in the options, perhaps meant to include the correct answer.
- An intended trick question emphasizing understanding of algebraic simplification.
- A misprint in the original formulation of the function.

Given the straightforward evaluation, the correct answer based on the problem as posed is 3, which is not among the options.

Broader Implications and Educational Significance

The Importance of Simplification

This exercise underscores the value of simplifying algebraic expressions before evaluation. Simplification reduces complexity and minimizes computational errors—a fundamental principle in algebra and higher mathematics.

Evaluating Functions at Specific Points

Evaluating functions at particular points is essential for understanding their behavior, graphing, and applications in real-world contexts such as physics, economics, and engineering.

Critical Thinking and Error Detection

Encountering discrepancies between computed answers and multiple-choice options encourages critical thinking. Students learn to:

- Verify calculations through multiple methods.
- Recognize potential errors or ambiguities in problem statements.
- Understand the importance of precise communication in mathematics.

Conclusion

The problem "For $F(x) = 2x - 3x$, evaluate $F(-3)$ " serves as a compelling example of fundamental algebraic principles. By recognizing the algebraic structure, simplifying the function, and carefully substituting the value, the evaluation reveals that $F(-3) = 3$. While this answer does not correspond to any of the provided options, the exercise highlights critical mathematical skills such as simplification, substitution, and verification.

In the broader scope of mathematical literacy, mastering these skills equips learners to approach more complex problems with confidence and clarity. Whether in academic testing, applied sciences, or everyday problem-solving, the ability to evaluate functions accurately remains a cornerstone of quantitative reasoning.

References

- Stewart, J. (2015). Precalculus: Mathematics for Calculus. Cengage Learning.
- Larson, R., & Edwards, B. H. (2017). Precalculus with Limits. Cengage Learning.
- Blitzer, R. (2011). Algebra and Trigonometry. Pearson.

Final Note

This detailed exploration demonstrates that even a seemingly simple algebraic problem can reveal deeper insights into mathematical processes. It emphasizes the importance of understanding function properties, algebraic manipulation, and critical evaluation—skills that form the bedrock of advanced mathematical reasoning.

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