

Your Assignment Is $X = 6$ A Solution To The Equation $5(x - 3) = X + 13$? Follow The Steps To Find Out. 1. Rewrite

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Introduction

When tackling algebraic equations, understanding the fundamental steps involved in solving for an unknown variable is crucial. One common type of problem involves linear equations, where the goal is to isolate the variable and determine its value. In this article, we will explore the equation:

$$5(x + 3) = x + 13$$

and examine whether $X = 6$ is a solution. To do so, we'll walk through each step meticulously, starting with rewriting the equation, simplifying it, and then checking the proposed solution.

Understanding the Equation

Before diving into solving, let's understand what the equation represents:

$$5(x + 3) = x + 13$$

- The left side involves distributing the 5 across the expression inside the parentheses.
- The right side is a simple linear expression.

The goal is to find the value of x that makes both sides equal, i.e., satisfies the equation.

Step 1: Rewrite the Equation

Rewriting the equation is the first crucial step in solving for x . This involves expanding and simplifying the expression to make solving more straightforward.

Distribute the 5 on the left side

Using the distributive property:

$$\backslash[5(x + 3) = 5 \times x + 5 \times 3 = 5x + 15 \backslash]$$

Rewrite the original equation

So, the equation now becomes:

$$\backslash[5x + 15 = x + 13 \backslash]$$

This rewritten form makes it easier to isolate (x) by combining like terms.

Step 2: Isolate the Variable (x)

The goal now is to get all terms containing (x) on one side and constant terms on the other.

Subtract (x) from both sides

$$\backslash[5x + 15 - x = x + 13 - x \backslash]$$

which simplifies to:

$$\backslash[(5x - x) + 15 = 13 \backslash]$$

$$\backslash[4x + 15 = 13 \backslash]$$

Subtract 15 from both sides

$$\backslash[4x + 15 - 15 = 13 - 15 \backslash]$$

$$\backslash[4x = -2 \backslash]$$

Divide both sides by 4

$$\backslash[x = \frac{-2}{4} = -\frac{1}{2} \backslash]$$

Final solution

$$\begin{aligned} & \backslash[\\ & x = -\frac{1}{2} \\ & \backslash] \end{aligned}$$

Step 3: Verify the Solution $\backslash(x = 6 \backslash)$

The question asks whether $X = 6$ is a solution to the given equation. To verify, substitute $\backslash(x = 6 \backslash)$ into the original equation:

$$\backslash[5(x + 3) = x + 13 \backslash]$$

Substitute $\backslash(x = 6 \backslash)$:

$$\backslash[5(6 + 3) = 6 + 13 \backslash]$$

Calculate each side:

- Left side:

$$\begin{aligned} & \backslash[\\ & 5 \times 9 = 45 \\ & \backslash] \end{aligned}$$

- Right side:

$$\begin{aligned} & \backslash[\\ & 6 + 13 = 19 \\ & \backslash] \end{aligned}$$

Since:

$$\begin{aligned} & \backslash[\\ & 45 \neq 19 \\ & \backslash] \end{aligned}$$

Conclusion: $\backslash(x = 6 \backslash)$ does not satisfy the equation.

Step 4: Summarize Findings

- The solution to the equation $\backslash(5(x + 3) = x + 13 \backslash)$ is $\backslash(x = -\frac{1}{2} \backslash)$.
- The proposed solution $\backslash(x = 6 \backslash)$ is incorrect because substituting it back into the original equation results in unequal sides.
- Therefore, $X = 6$ is not a solution for the equation.

Additional Tips for Solving Similar Equations

To enhance your algebraic problem-solving skills, keep these tips in mind:

1. Always Distribute Properly

When parentheses are involved, distribute coefficients evenly to eliminate parentheses.

2. Combine Like Terms

Gather all variables on one side and constants on the other to simplify the equation.

3. Check Your Solution

Substitute the found value of x back into the original equation to verify its correctness.

4. Be Careful with Fractions

When dividing, ensure to simplify fractions properly to avoid errors.

Conclusion

Solving algebraic equations involves a systematic process: rewriting the equation, simplifying, isolating the variable, and verifying solutions. In the case of the equation $5(x + 3) = x + 13$, the solution is $x = -\frac{1}{2}$, not $x = 6$. Understanding these steps thoroughly allows you to approach similar problems confidently and accurately.

FAQs

Q1: How do I know when I've solved an equation correctly?

A: When both sides of the equation are equal after substituting your solution back into the original equation, you've correctly solved it.

Q2: Can an equation have more than one solution?

A: Yes, some equations can have multiple solutions, especially quadratic or higher-degree equations. Linear equations like the one discussed typically have only one solution.

Q3: What should I do if I get a fraction as a solution?

A: Ensure to verify the solution by substitution. If it satisfies the

original equation, it is valid. Simplify fractions where possible for clarity.

By following these detailed steps and understanding the principles involved, you can confidently solve similar algebraic equations and determine whether a specific value is a solution.

Frequently Asked Questions

What is the first step to solve the equation $5(x - 3) = x + 13$?

The first step is to rewrite the equation to clarify the structure, which involves expanding or simplifying both sides as needed.

How do you expand the expression $5(x - 3)$ in the equation?

You distribute 5 across the parentheses: 5 times x gives $5x$, and 5 times -3 gives -15 , so the expanded form is $5x - 15$.

After rewriting and expanding the equation, what is the next step to solve for x ?

Next, you gather like terms and move all terms containing x to one side and constants to the other to isolate x .

How do you solve for x in the equation $5x - 15 = x + 13$?

Subtract x from both sides to get $4x - 15 = 13$, then add 15 to both sides resulting in $4x = 28$, and finally divide both sides by 4 to find $x = 7$.

What is the significance of following the steps like rewriting and expanding in solving equations?

Following these steps ensures clarity and accuracy, helping to systematically isolate the variable and find the correct solution.

Is the solution $x = 6$ correct for the original

equation $5(x - 3) = x + 13$?

No, the correct solution is $x = 7$; substituting $x = 6$ does not satisfy the original equation.

Can you verify the solution by substituting $x = 7$ back into the original equation?

Yes, substituting $x = 7$: $5(7 - 3) = 7 + 13 \rightarrow 5(4) = 20$, and $7 + 13 = 20$. Since both sides are equal, $x = 7$ is the correct solution.

Additional Resources

Your Assignment Is $X = 6$ A Solution To The Equation $5(x - 3) = X + 13$? Follow The Steps To Find Out. 1. Rewrite

In the world of algebra, solving equations is a fundamental skill that forms the backbone of many mathematical applications. Whether you're a student tackling homework or a professional working through complex calculations, understanding how to approach and solve equations systematically is crucial. Today, we delve into a specific problem: determining if $X = 6$ is a solution to the equation $5(x - 3) = X + 13$. To do this effectively, we'll walk through a structured process—starting with rewriting the equation for clarity, then methodically solving it step-by-step. This guide aims to demystify the process, providing a clear, detailed approach that anyone can follow.

Understanding the Equation and Its Components

Before jumping into solving, it's essential to interpret what the equation actually represents. The given equation is:

$$5(x - 3) = X + 13$$

At first glance, it appears that there might be a typographical or formatting issue, especially with " $x - 3$." Usually, in algebra, this notation could mean either multiplication or a variable with a coefficient. To proceed accurately, it's vital to clarify the expression.

Possible interpretations:

- If the expression is " $x - 3$," then the equation reads:

$$5(x - 3) = X + 13$$

- If " $x - 3$ " is intended as " x minus 3," then it would be:

$$5(x - 3) = X + 13$$

- Alternatively, if it's "x3," perhaps a variable named X multiplied by 3, but then the notation would differ.

Given typical algebraic notation and the context, the most logical interpretation is that the original problem involves the expression 5 times (x minus 3), i.e., $5(x - 3)$. This assumption aligns with standard algebraic conventions and makes the problem solvable.

Therefore, the equation can be rewritten as:

$$5(x - 3) = X + 13$$

with the goal of verifying if $X = 6$ satisfies this equation.

Step 1: Rewrite the Equation Clearly

Clarity is the foundation of solving any algebraic problem. The initial step involves rewriting the equation in a form that is straightforward and unambiguous.

Original (assumed) equation:

$$5(x - 3) = X + 13$$

Expressed explicitly:

- Left side: Multiply 5 by the quantity $(x - 3)$
- Right side: X plus 13

Note: Since the goal is to verify whether $X = 6$ is a solution, we can substitute X with 6 later, but first, we need an explicit relationship between x and X.

Step 2: Clarify Variable Relationships

In the original problem, there's a potential confusion between the variables x and X. To avoid ambiguity, let's establish:

- Is X meant to be the same as x?
- Or is X a different variable, and the problem wants us to check if $X=6$

satisfies the equation?

Given the context, it appears that the problem asks whether $X=6$ satisfies the equation involving x . To proceed logically, we can interpret X as a specific value assigned to the variable x , i.e., we're testing if $x = 6$ satisfies the equation.

Therefore, the task simplifies to:

- Replace x with 6 in the equation
- Check if the resulting statement holds true

Step 3: Substitute $X = 6$ into the Equation

Assuming the variable in the equation is x , and $X=6$ is the proposed solution, substitute $x=6$ into the equation.

Original equation:

$$5(x - 3) = X + 13$$

Substituting $x = 6$ and $X = 6$:

- Left side: $5(6 - 3) = 5 \cdot 3 = 15$
- Right side: $6 + 13 = 19$

Now, compare both sides:

- Left: 15
- Right: 19

Since $15 \neq 19$, $X=6$ does not satisfy the equation if interpreted as above.

But wait: The substitution involved both x and X . If the original problem intended to check whether $X=6$ makes the equation true, then perhaps the original equation was:

$$5(x - 3) = x + 13$$

and the question is: does $X=6$ satisfy this equation? Or perhaps the equation is:

$$5(X - 3) = X + 13$$

and we need to check whether $X=6$ is a solution.

Step 4: Clarify the Equation and Solution Goal

Given the ambiguity, let's analyze both possibilities:

Scenario A: The original equation is:

$$5(x - 3) = x + 13$$

and the problem asks: Is $X=6$ a solution?

- Here, X is x . The goal is to see if $x=6$ satisfies the equation.

Scenario B: The original equation is:

$$5(X - 3) = X + 13$$

and $X=6$ is a proposed solution.

In either case, the approach is similar.

Step 5: Solving the Equation for x (or X)

Let's proceed with the assumption that the equation is:

$$5(x - 3) = x + 13$$

and we are verifying if $x=6$ is a solution.

Step-by-step:

1. Substitute $x=6$ into the equation:

$$\text{Left: } 5(6 - 3) = 5 \cdot 3 = 15$$

$$\text{Right: } 6 + 13 = 19$$

2. Compare both sides:

$$15 \neq 19$$

Thus, $x=6$ does not satisfy the equation if the equation is $5(x - 3) = x + 13$.

Step 6: Solving the Equation to Find the Correct Solution

Since $x=6$ does not satisfy the equation, perhaps the goal is to find the value of x that does. Let's solve the equation:

$$5(x - 3) = x + 13$$

Step-by-step solution:

1. Distribute 5 on the left:

$$5x - 15 = x + 13$$

2. Bring all terms to one side:

$$5x - 15 - x - 13 = 0$$

Simplify:

$$(5x - x) + (-15 - 13) = 0$$

$$4x - 28 = 0$$

3. Solve for x :

$$4x = 28$$

$$x = 28 / 4$$

$$x = 7$$

Conclusion: The solution to the equation is $x = 7$.

Step 7: Verify the Solution

To verify that $x=7$ is the solution, substitute it back into the original equation:

$$\text{Left: } 5(7 - 3) = 5 \cdot 4 = 20$$

$$\text{Right: } 7 + 13 = 20$$

Both sides equal 20, confirming that $x=7$ satisfies the equation.

Summary: Is $X=6$ a Solution?

Based on the calculations:

- Substituting $x=6$ yields unequal sides, so $X=6$ is not a solution to the equation $5(x - 3) = x + 13$.
- The true solution, found through algebraic manipulation, is $x=7$.

Conclusion: If the problem was to verify whether $X=6$ satisfies the equation, the answer is no. The correct solution is $x=7$.

Final Thoughts and Tips for Solving Similar Equations

Solving algebraic equations involves a systematic approach:

- Clarify the equation: Ensure all expressions are correctly interpreted.
- Rewrite for clarity: Express the equation explicitly.
- Substitute known values: Test potential solutions by substitution.
- Solve algebraically: Use distribution, combining like terms, and isolating variables.
- Verify solutions: Substitute solutions back into the original equation for confirmation.

By following these steps, you can confidently tackle a variety of algebraic problems, whether verifying solutions or deriving unknown variables.

Remember: Practice makes perfect. The more you work through equations methodically, the more intuitive the process becomes. Keep practicing, stay precise, and you'll master algebraic problem-solving in no time!

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