The Steps Taken To Correctly Solve An Equation Are Shown Below, But One Step Is Missing. -2(x-3)=-6(x

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When tackling algebraic equations, it’s essential to follow a systematic process to arrive at the correct solution. Sometimes, however, a step might be overlooked or omitted, leading to confusion or incorrect answers. In this article, we will explore the process of solving the equation **-2(x-3) = -6(x)**, identify the missing step, and understand how to approach similar problems accurately. Whether you’re a student brushing up on algebra or someone looking to strengthen your problem-solving skills, this guide provides a comprehensive walkthrough.

Understanding the Given Equation

The Equation in Focus

The equation provided is:

- **-2(x - 3) = -6(x)**

Our goal is to find the value of *x* that satisfies this equation. The process involves expanding, simplifying, and solving for *x*.

Why Is It Important to Follow Proper Steps?

In algebra, each step builds upon the previous one. Missing a step can lead to errors or an incorrect solution. The key steps generally include:

- Distributing multiplication over parentheses
- Combining like terms
- Isolating the variable
- Solving for the variable
- Checking the solution

Step-by-Step Solution with a Missing Step

Step 1: Distribute the Coefficients

Distribute *-2* over the parentheses on the left side:

- $-2(x - 3) = -2\,x + (-2)\,(-3) = -2x + 6$

So, the equation becomes:

- $\mathbf{-2x + 6 = -6x}$

Step 2: Move all Variable Terms to One Side

Add *6x* to both sides to gather the variable terms on one side:

- $-2x + 6 + 6x = -6x + 6x$

Simplify both sides:

- $4x + 6 = 0$

Step 3: Isolate the Variable Term

Subtract 6 from both sides to isolate the term with *x*:

- $4x + 6 - 6 = 0 - 6$

Simplify:

- $4x = -6$

Step 4: Solve for *x*

Divide both sides by 4:

- **x = -6 / 4**

Simplify the fraction:

- x = -3/2

The Missing Step: Recognizing the Error or Omission

In the above steps, a common mistake or omitted step might occur during the distribution or the combination of like terms. For example, some students might forget to distribute correctly or skip combining like terms, leading to an incorrect or incomplete solution.

Common Mistakes and How to Avoid Them

Mistake 1: Not Distributing Properly

- Incorrect: -2(x - 3) = -2x - 3
- Correct: -2x + 6

Always remember to multiply each term inside the parentheses by the coefficient outside.

Mistake 2: Skipping the Combining Like Terms Step

- Example of mistake: Moving directly to solving without combining -2x and 6

Ensure you combine like terms carefully before isolating the variable.

Mistake 3: Forgetting to Divide When Solving for *x*

- Remember: After isolating the term with *x*, divide both sides by the coefficient of *x*.

How To Correctly Solve the Equation: A Full Breakdown

Step 1: Expand Both Sides

- Distribute coefficients:
  - $-2(x - 3) \rightarrow -2x + 6$

Step 2: Write the Simplified Equation

- $-2x + 6 = -6x$

Step 3: Move All Variable Terms to One Side

- Add 6x to both sides:
  - $-2x + 6 + 6x = -6x + 6x$
- Simplify:
  - $4x + 6 = 0$

Step 4: Isolate the Variable Term

- Subtract 6 from both sides:
  - $4x = -6$

Step 5: Solve for *x*

- Divide both sides by 4:
  - x = -6 / 4 = -3/2

Step 6: Check the Solution

- Substitute *x = -3/2* back into the original equation to verify correctness.

Verifying the Solution: Why It Matters

Substitute the Found Value of *x*

Original equation: -2(x - 3) = -6(x)

Substitute *x = -3/2*:

- -2((-3/2) - 3) = -6(-3/2)

Calculate Each Side

- Left Side:
  - -2((-3/2) - 3) = -2((-3/2) - (6/2)) = -2((-3/2) - (6/2)) = -2((-3 - 6)/2) = -2(-9/2) = (-2) (-9/2) = 9
- Right Side:
  - -6(-3/2) = 9

Both sides are equal (9 = 9), confirming that *x* = *-3/2* is the correct solution.

Summary: Effective Strategies for Solving Equations Correctly

- **Distribute carefully:** Always multiply each term inside parentheses by the outside coefficient.
- **Combine like terms:** Simplify your expressions before moving on to solving for the variable.
- **Maintain balance:** Whatever operation you perform on one side of the equation, do it to the other side as well.
- **Divide correctly:** When isolating the variable, divide by the coefficient of the variable.
- **Verify your solution:** Substitute your answer back into the original equation to ensure correctness.

Conclusion

Solving algebraic equations like **-2(x-3)=-6(x)** requires attention to detail and a clear understanding of each step. Recognizing the missing step—such as failing to distribute properly or skip combining like terms—is crucial for arriving at the correct solution. By following a systematic approach, double-checking your work, and understanding the purpose of each step, you can confidently solve similar equations and avoid common pitfalls. Remember, practice makes perfect, and mastering these foundational skills sets the stage for tackling more complex algebraic problems with ease.

Frequently Asked Questions

What is the first step to solve the equation -2(x - 3) = -6(x)?

Distribute the -2 on the left side: -2 x + 2 3 = -6x, which simplifies to -2x + 6 = -6x.

How do you combine like terms after distributing in the equation -2(x - 3) = -6(x)?

After distributing, the equation becomes -2x + 6 = -6x; these are already like terms on both sides, so the next step is to collect all variable terms on one side.

What is the missing step between distributing and isolating the variable in this equation?

Adding 6x to both sides to move all x terms to one side: -2x + 6 + 6x = -6x + 6x, resulting in 4x + 6 = 0.

How do you solve for x after combining like terms in the equation?

Subtract 6 from both sides: 4x + 6 - 6 = 0 - 6, simplifying to 4x = -6.

What is the final step to find the value of x in the equation?

Divide both sides by 4: x = -6 / 4, which simplifies to x = -3/2.

Why is distributing -2 over (x - 3) an important step when solving the equation?

Distributing helps eliminate parentheses, making it easier to combine like terms and isolate the variable.

What common mistake should be avoided when solving this type of equation?

Failing to correctly distribute the negative sign or forgetting to perform an operation on both sides, such as adding or subtracting the same term.

How can understanding the missing step help in solving similar algebraic equations more effectively?

It reinforces the importance of systematically distributing, combining like terms, and performing inverse operations to isolate the variable accurately.

What is the overall strategy to systematically solve linear equations like -2(x - 3) = -6(x)?

Distribute, move all variable terms to one side by addition or subtraction, combine like terms, and then isolate the variable by division or multiplication.

Additional Resources

The Steps Taken To Correctly Solve An Equation Are Shown Below, But One Step Is Missing. -2(x-3)=-6(x

When working through algebraic equations, it’s crucial to follow a systematic approach to arrive at the correct solution. The steps taken to correctly solve an equation are shown below, but one step is missing—highlighting how important each step is in maintaining the integrity of the solution process. In this guide, we'll analyze the given equation, identify the missing step, and walk through a comprehensive process to solve it correctly, emphasizing the importance of each step along the way.

Understanding the Equation

Before diving into the solution process, let's clearly understand the given equation:

$-2(x - 3) = -6(x)$

This is a linear equation involving parentheses and variables, which requires us to expand and simplify both sides before isolating the variable.

Step-by-Step Breakdown of Solving the Equation

Step 1: Distribute the coefficients on both sides

The first step in solving the equation involves applying the distributive property to eliminate parentheses.

- For the left side:
$-2(x - 3)$ becomes $-2 x + (-2) (-3) = -2x + 6$

- For the right side:
$-6(x)$ remains as $-6x$

Result after distribution:
$-2x + 6 = -6x$

Step 2: Simplify both sides

Now, the equation is simplified to:

$-2x + 6 = -6x$

This step involves ensuring the equation is in a standard linear form, making it easier to isolate the variable.

Step 3: Move all variable terms to one side

To solve for x, we need to get all x terms on one side of the equation.

- Add 6x to both sides to eliminate the x term on the right:

$-2x + 6 + 6x = -6x + 6x$

Simplifies to:
$(-2x + 6x) + 6 = 0 + 0$
which simplifies further to:
$4x + 6 = 0$

Note: At this point, the missing step could be the explicit addition of 6x to both sides, which is crucial for moving all x terms to one side.

Step 4: Isolate the variable term

Subtract 6 from both sides to move the constant term to the right:

$4x + 6 - 6 = 0 - 6$

Simplifies to:
$4x = -6$

Step 5: Solve for x

Divide both sides by 4 to isolate x:

$x = (-6) / 4$

Simplify the fraction:

$x = -3/2$

Identifying the Missing Step

In the outlined process, the critical missing step is the algebraic operation used to move all the variable terms to one side of the equation, specifically adding 6x to both sides after the distribution step.

Without this step, the equation remains:

$-2x + 6 = -6x$

And attempts to solve for x directly without consolidating like terms would lead to confusion or errors.

The missing step is:

> Add 6x to both sides of the equation.

This step is essential because it consolidates all x terms on one side, simplifying the process of isolating x.

Why is the Missing Step Critical?

Understanding why this step is vital helps reinforce the logical flow of algebraic solving:

- Maintains balance of the equation:
Every operation performed on one side must be performed on the other to keep the equation balanced.

- Simplifies the variable terms:
Combining like terms reduces the equation to a simpler form, which directly leads to solving for x.

- Prevents errors:
Skipping the step can lead to incorrect conclusions or complex algebra that isn’t straightforward to resolve.

Additional Tips for Correctly Solving Equations

To ensure every step in solving equations is correctly performed, consider these helpful tips:

1. Distribute carefully

Always double-check the distribution of coefficients over parentheses to avoid sign errors.

2. Simplify before moving terms

Combine like terms immediately after distribution to reduce complexity.

3. Perform inverse operations systematically

Use addition/subtraction and multiplication/division in a logical order to isolate the variable.

4. Keep the equation balanced

Remember, whatever you do to one side, do to the other—this is fundamental to maintaining equality.

5. Check your solution

Plug your answer back into the original equation to verify correctness.

Summary

Solving algebraic equations like -2(x - 3) = -6(x) requires a clear, step-by-step approach:

- Distribute coefficients over parentheses
- Simplify expressions
- Move all variable terms to one side (the missing step in the original process)
- Isolate the variable

- Solve for the variable

Recognizing the missing step—adding 6x to both sides—is crucial for arriving at the correct solution. By following this methodical approach, students and learners can confidently solve similar equations and develop a deeper understanding of algebraic principles.

Final Thoughts

Mastering the steps to solve equations is foundational in algebra. Missing even a single step can lead to incorrect results, so attention to detail and systematic procedures are essential. Remember, each step builds upon the previous one, and understanding the purpose behind every operation ensures not just correct answers but also a solid grasp of algebraic reasoning.

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