9+3x-5x=4x-3x Please Solve With Multi Step Variable On Both Sides

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Solving algebraic equations that involve variables on both sides can seem challenging at first, but with a systematic approach, you can simplify and find the value of the variable efficiently. In this article, we will explore how to solve the equation 9 + 3x - 5x = 4x - 3x step by step, understanding each part of the process, and providing tips to handle similar equations with multiple steps involving variables on both sides. Whether you're a student brushing up on algebra or someone seeking a clear explanation, this guide aims to make the process straightforward and understandable.

Understanding the Equation: 9 + 3x - 5x = 4x - 3x

Before diving into solving, let’s analyze what this equation represents and identify the key components involved.

Breaking Down the Equation

- The left side of the equation is: 9 + 3x - 5x
- The right side of the equation is: 4x - 3x

Notice that both sides contain terms involving the variable x, as well as constant terms.

Objectives in Solving

- Isolate the variable x on one side of the equation.
- Simplify the constants and coefficients.
- Find the numerical value of x that satisfies the equation.

Step-by-Step Approach to Solve the Equation

To solve the equation systematically, follow these steps:

Step 1: Simplify Both Sides

Begin by combining like terms on each side.

Left Side:
- 3x - 5x = -2x

- So, 9 + 3x - 5x simplifies to 9 - 2x

Right Side:
- 4x - 3x = x

Updated Equation:
9 - 2x = x

Step 2: Get All Variable Terms on One Side

To isolate x, move all variable terms to one side. Let's move the x on the right side to the left:

- Subtract x from both sides:

9 - 2x - x = 0

- Simplify:

9 - 3x = 0

Step 3: Isolate the Variable

Now, solve for x:

- Subtract 9 from both sides:

-3x = -9

- Divide both sides by -3:

x = (-9) / (-3)

- Simplify:

x = 3

Final Answer and Verification

The solution to the equation 9 + 3x - 5x = 4x - 3x is x = 3.

To ensure the solution is correct, substitute x back into the original equation:

Original equation:

9 + 3x - 5x = 4x - 3x

Plug in x = 3:

Left side:
9 + 3(3) - 5(3) = 9 + 9 - 15 = 3

Right side:
4(3) - 3(3) = 12 - 9 = 3

Both sides equal 3, confirming that x = 3 is correct.

Additional Tips for Solving Multi-Step Equations with Variables on Both Sides

When dealing with more complex equations involving variables on both sides, consider the following strategies:

1. Always Simplify Both Sides First

- Combine like terms to reduce the equation to its simplest form.
- This makes the subsequent steps easier and less prone to errors.

2. Keep the Variable Terms on One Side

- Use addition or subtraction to move all variable terms to the same side.
- This standardizes the form of the equation, making it straightforward to isolate the variable.

3. Deal with Constants Separately

- Move constant terms to the opposite side using addition or subtraction.
- Once variables are on one side and constants on the other, solving for the variable becomes straightforward.

4. Be Careful with Signs

- Pay attention to positive and negative signs during each step.
- Mistakes with signs are common pitfalls that can lead to incorrect solutions.

5. Verify Your Solution

- Always substitute your answer back into the original equation.
- Confirm that both sides are equal to avoid errors.

Common Mistakes to Avoid

While solving equations with variables on both sides, students often make some common errors:

- **Forgetting to combine like terms:** Always simplify each side fully before moving variables.
- **Incorrectly moving terms:** Be careful with signs when adding or subtracting terms across the equal sign.
- **Dividing by negative numbers without adjusting signs:** Remember that dividing both sides of an equation by a negative reverses the inequality sign if dealing with inequalities, but in equations, just divide normally, adjusting signs as necessary.
- **Neglecting to verify the solution:** Always substitute back into the original to confirm correctness.

Real-Life Applications of Solving Such Equations

Understanding how to solve equations like 9 + 3x - 5x = 4x - 3x isn't just an academic exercise. These skills are applicable in various real-world contexts:

1. Budgeting and Financial Planning

- Calculating how different expenses and income sources relate, especially when variables represent unknown amounts or rates.

2. Engineering and Physics

- Solving for unknown quantities like forces, velocities, or distances when multiple factors interact.

3. Business and Economics

- Determining prices, costs, or profit margins where multiple variables influence outcomes.

4. Data Analysis

- Modeling relationships between variables and solving for unknowns in datasets.

Conclusion: Mastering Multi-Step Equations with Variables on Both Sides

Equations like 9 + 3x - 5x = 4x - 3x may seem intimidating at first glance, but with a clear, step-by-step approach, they become manageable. The key lies in simplifying both sides, consolidating variables, and carefully performing inverse operations to isolate the variable. Remember to verify your solutions to ensure accuracy. With practice, solving such equations will become second nature, empowering you with fundamental algebra skills applicable across numerous fields and real-world scenarios.

By mastering these techniques, you'll enhance your problem-solving abilities and develop confidence in tackling more complex algebraic challenges. Whether in academics, professional settings, or everyday life, understanding how to approach multi-step equations with variables on both sides is an essential mathematical skill that opens doors to deeper analytical thinking and problem-solving prowess.

Frequently Asked Questions

What is the first step to solve the equation 9 + 3x - 5x = 4x - 3x?

Combine like terms on both sides: 3x - 5x simplifies to -2x on the left, and 4x - 3x simplifies to x on the right. The equation becomes 9 - 2x = x.

How do I isolate the variable x after simplifying the equation 9 - 2x = x?

Subtract x from both sides to get 9 - 2x - x = 0, which simplifies to 9 - 3x = 0.

What is the next step after obtaining 9 - 3x = 0?

Subtract 9 from both sides to get -3x = -9.

How do I solve for x in the equation -3x = -9?

Divide both sides by -3 to get x = (-9)/(-3), which simplifies to x = 3.

What is the solution to the equation 9 + 3x - 5x = 4x - 3x?

The solution is x = 3.

Why is it important to combine like terms at the beginning

when solving multi-step equations?

Combining like terms simplifies the equation, making it easier to isolate the variable and find its value accurately.

Additional Resources

9 + 3x - 5x = 4x - 3x: Solve With Multi Step Variable On Both Sides

When tackling algebraic equations, especially those that involve variables on both sides, understanding the step-by-step process is essential. The equation 9 + 3x - 5x = 4x - 3x presents a classic example where multiple steps are required to isolate the variable and find its value. This guide will walk you through the process of solving such equations systematically, ensuring clarity and confidence in handling similar problems.

Understanding the Equation

Before diving into the solution, let's break down what the equation represents:

- It contains constants (numbers without variables), such as 9.
- It contains terms with the variable x, specifically 3x, -5x, 4x, and -3x.
- The goal is to find the value of x that makes the entire equation true.

The key challenge with equations like 9 + 3x - 5x = 4x - 3x is managing the variables on both sides and combining like terms effectively.

Step 1: Simplify Both Sides of the Equation

The first step in solving the equation is to simplify each side by combining like terms.

Left Side Simplification:

- 3x and -5x are like terms.
- 3x - 5x = -2x.

So, the left side becomes:

9 - 2x

Right Side Simplification:

- 4x and -3x are like terms.
- 4x - 3x = x.

Thus, the right side simplifies to:

x

Now, the simplified equation is:

9 - 2x = x

Step 2: Bring Variables to One Side

To isolate x, it's best to gather all variable terms on one side of the equation and constants on the other.

Let's move the x term from the right to the left:

- Subtract x from both sides:

9 - 2x - x = 0

Simplify:

9 - 3x = 0

Step 3: Isolate the Variable

Now, we want to solve for x.

- Subtract 9 from both sides:

-3x = -9

- Divide both sides by -3:

x = (-9) / (-3)

Simplify:

x = 3

Step 4: Verify the Solution

Always verify your solution by substituting x back into the original equation:

Original equation:

9 + 3x - 5x = 4x - 3x

Substitute x = 3:

Left side:

9 + 3(3) - 5(3) = 9 + 9 - 15 = 3

Right side:

4(3) - 3(3) = 12 - 9 = 3

Since both sides equal 3, the solution x = 3 is verified.

Summary of the Solution Process

Here's a quick recap of the steps involved in solving equations like 9 + 3x - 5x = 4x - 3x:

1. Simplify both sides by combining like terms.
2. Move all variable terms to one side of the equation.
3. Move all constants to the other side.
4. Solve for the variable by isolating it through division or multiplication.
5. Verify your solution by substituting back into the original equation.

Additional Tips for Solving Multi-Step Equations with Variables on Both Sides

- Always combine like terms first to simplify the equation.
- Be systematic: move variables to one side and constants to the other in a consistent manner.
- Keep track of negative signs to avoid errors.
- Check your work by substitution to confirm the solution is correct.
- Practice with varied equations to develop confidence and skill.

Practice Problems to Master the Concept

Try solving these similar equations to reinforce your understanding:

1. 7 + 2x - 4x = 3x + 5
2. -3 + 6x = 2x + 9
3. 4x + 5 = 2x - 1
4. -8 + 3x = 5x + 2
5. 10 + 2x - x = 4x - 6

Conclusion

Solving equations like 9 + 3x - 5x = 4x - 3x requires a clear, multi-step approach that involves

simplifying both sides, consolidating like terms, and systematically isolating the variable. By practicing these steps—simplification, transposition, and verification—you build a strong foundation in algebra that serves as a stepping stone to more complex problems. Remember, patience and methodical work are key to mastering algebraic equations, making even multi-step problems approachable and solvable with confidence.

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