

Jorge Solves The Equation $4x - (x + 2) + 6 = 2(3x + 8)$ Using The Steps Below. Step 1: $4x$ Minus

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Understanding how to solve algebraic equations is an essential skill for students and anyone interested in mathematics. Equations like " $4x - (x + 2) + 6 = 2(3x + 8)$ " may seem complex at first glance, but by breaking them down into manageable steps, solving becomes straightforward. This article provides a comprehensive, step-by-step guide to solving this specific equation, with a focus on the initial step: " $4x$ minus." We will explore the underlying principles, the correct methods to manipulate the equation, and how to proceed systematically. Whether you're a student preparing for exams or someone eager to improve your algebra skills, this detailed guide will help you understand each part of the process.

Introduction to the Equation

Before diving into the steps, let's understand the structure of the equation:

$$4x - (x + 2) + 6 = 2(3x + 8)$$

This is a linear algebraic equation involving variables, coefficients, parentheses, and basic arithmetic operations. The goal is to isolate the variable x on one side of the equation to find its value.

The equation contains several key components:

- Term 1: $4x$ – a coefficient multiplied by the variable.
- Term 2: $-(x + 2)$ – a subtraction of a binomial.
- Term 3: $+6$ – a constant.
- Term 4: $2(3x + 8)$ – a multiplication of a binomial by 2.

The primary challenge is to simplify both sides, eliminate parentheses, and combine like terms to solve for x .

Step 1: Focus on the " $4x$ minus" Part of the Equation

The initial step in solving any algebraic equation involves simplifying

expressions, especially those involving addition, subtraction, and parentheses. The phrase "4x minus" hints at the need to carefully handle the term $(4x)$ and the subsequent subtraction of the expression $((x + 2))$.

This first step is crucial because it sets the foundation for all further manipulations. Properly addressing the "4x minus" means recognizing that this term involves both a coefficient and an operation that affects the entire expression following it.

Understanding the "4x minus" Concept

In the context of the equation, "4x minus" pertains to the term $(4x - (x + 2))$. Here, the key is to understand that:

- The $(4x)$ is a term that will be combined with other terms after simplification.
- The minus sign indicates that the entire quantity $((x + 2))$ will be subtracted from $(4x)$.

This understanding guides us to distribute the minus sign across the parentheses, which is essential for simplifying the expression.

Applying the Distributive Property

The distributive property states that:

$$[a - (b + c) = a - b - c]$$

Applying this to our expression:

$$[4x - (x + 2) = 4x - x - 2]$$

This is the first critical step in simplifying the left side of the equation.

Breaking Down the Simplification

Let's analyze this step carefully:

1. Identify the terms:

- $(4x)$
- $(-(x + 2))$

2. Distribute the minus sign:

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

3. Combine like terms:

$$- \backslash(4x - x = 3x\backslash)$$

Resulting in:

$$\backslash[3x - 2 \backslash]$$

This simplification transforms the complex expression into a much more manageable form.

Importance of this Step

Handling the "4x minus" part correctly is vital because:

- It reduces the complexity of the left side.
- It prepares the equation for further simplification, including combining constants and variables.
- It avoids common mistakes such as forgetting to distribute the minus sign, which can lead to incorrect solutions.

Step-by-Step Process Summary

Here's a concise outline of what we've accomplished so far:

1. Identify the expression involving "4x minus":

$$\backslash[4x - (x + 2) \backslash]$$

2. Apply the distributive property:

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

3. Combine like terms:

$$\backslash[3x - 2 \backslash]$$

4. Rewrite the original equation with this simplified expression:

$$\backslash[3x - 2 + 6 = 2(3x + 8) \backslash]$$

This sets the stage for the next steps, which involve further simplification and solving for $\backslash(x\backslash)$.

Next Steps in Solving the Equation

While the focus of this article is on the initial "4x minus" step, understanding its execution is essential because it directly influences subsequent calculations. After simplifying the left side, the subsequent steps typically include:

- Combining constants on the left side.
- Expanding the right side of the equation.
- Moving all variable terms to one side.
- Moving constants to the other side.
- Solving for x .

In our specific example, once we've simplified to:

$$3x + 4 = 2(3x + 8)$$

we can proceed to expand the right side, combine like terms, and isolate the variable.

Conclusion

Mastering each step in solving algebraic equations ensures accuracy and confidence. The initial focus on handling "4x minus" by distributing the negative sign across parentheses is fundamental. Recognizing how to simplify complex expressions into manageable parts forms the backbone of successful problem-solving.

By understanding and applying the distributive property correctly, you set a solid foundation for solving even more challenging equations. Whether you're a student preparing for tests or an enthusiast refining your skills, mastering these initial steps paves the way toward solving equations efficiently and correctly.

Remember, every algebraic equation is like a puzzle – approach each part systematically, and you'll find the solution with clarity.

Frequently Asked Questions

What is the first step to solve the equation $4x - (x + 2) + 6 = 2(3x + 8)$?

The first step is to simplify the equation by distributing and combining like terms. Start with Step 1: 4x minus $(x + 2)$.

How do you distribute in the equation $4x - (x + 2) + 6 = 2(3x + 8)$?

Distribute the negative sign across $(x + 2)$, resulting in $4x - x - 2 + 6 = 2(3x + 8)$.

What is the simplified form after distributing in the equation?

The simplified form is $4x - x - 2 + 6 = 2(3x + 8)$.

What is the next step after simplifying the left side of the equation?

Combine like terms on the left side: $4x - x = 3x$, and $-2 + 6 = 4$, so the equation becomes $3x + 4 = 2(3x + 8)$.

How do you expand the right side of the equation?

Distribute 2 across $(3x + 8)$: $2 \cdot 3x = 6x$, and $2 \cdot 8 = 16$, resulting in $6x + 16$.

What is the equation after expanding both sides?

The equation becomes $3x + 4 = 6x + 16$.

How do you isolate x to solve for its value?

Subtract $3x$ from both sides: $4 = 3x + 16$, then subtract 16 from both sides: $4 - 16 = 3x$, resulting in $-12 = 3x$.

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

Divide both sides by 3: $x = -12 / 3$, so $x = -4$.

Additional Resources

Jorge Solves The Equation $4x - (x + 2) + 6 = 2(3x + 8)$: An In-Depth Step-by-Step Breakdown

Mathematics, especially algebra, can sometimes seem daunting, but with a systematic approach, solving equations becomes straightforward and even satisfying. Today, we will explore a detailed, step-by-step solution to a specific algebraic equation:

$$4x - (x + 2) + 6 = 2(3x + 8)$$

Presented as an expert's guide, this analysis will not only solve the

equation but also serve as a comprehensive tutorial to understand each step, ensuring clarity for learners and enthusiasts alike.

Understanding the Equation: The Foundation of Solution

Before diving into the steps, it's crucial to understand the structure and components of the equation.

The equation:

$$4x - (x + 2) + 6 = 2(3x + 8)$$

contains several algebraic expressions, including:

- Multiple terms with the variable x .
- Parentheses, indicating the order of operations.
- Constants (numbers without variables).

This equation is linear, involving only first-degree terms of x . Our goal is to find the value of x that makes both sides equal, satisfying the equation.

Step 1: Simplify Both Sides of the Equation

The first fundamental step in solving any algebraic equation is to simplify both sides as much as possible. Simplification involves removing parentheses and combining like terms.

Substep 1.1: Expand Parentheses

- Left Side:

The left side is $4x - (x + 2) + 6$

The parentheses $(x + 2)$ are preceded by a minus sign, so we need to distribute the minus:

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

Therefore, the left side becomes:

$$4x - x - 2 + 6$$

- Right Side:

The right side is $2(3x + 8)$

Distribute the 2:

$$2 \cdot 3x = 6x$$

$$2 \cdot 8 = 16$$

So, the right side becomes:

$$6x + 16$$

Substep 1.2: Rewrite the Equation with Expanded Terms

Now, the equation looks like:

$$4x - x - 2 + 6 = 6x + 16$$

Step 2: Combine Like Terms on Both Sides

Combining like terms simplifies the equation further, making it easier to isolate the variable.

Left Side:

- **Combine $4x - x$:**

$$4x - x = 3x$$

- **Combine constants $-2 + 6$:**

$$-2 + 6 = 4$$

So, the left side simplifies to:

$$3x + 4$$

The entire simplified equation:

$$3x + 4 = 6x + 16$$

Step 3: Isolate the Variable Term

The goal here is to gather all terms containing x on one side and constants on the other.

Substep 3.1: Subtract 3x from both sides

Subtracting 3x from both sides:

$$3x + 4 - 3x = 6x + 16 - 3x$$

Simplifies to:

$$4 = 3x + 16$$

Substep 3.2: Subtract 16 from both sides

To isolate the term with x, subtract 16:

$$4 - 16 = 3x + 16 - 16$$

Simplifies to:

$$-12 = 3x$$

Step 4: Solve for x

Now, the equation is straightforward:

$$-12 = 3x$$

To find x, divide both sides by 3:

$$x = -12 / 3$$

Calculating the division:

$$x = -4$$

Step 5: Verify the Solution

Verifying the solution helps ensure that no mistakes

were made during the process.

Substitute $x = -4$ back into the original equation:

Original equation:

$$4x - (x + 2) + 6 = 2(3x + 8)$$

Substituting $x = -4$:

- Left Side:

$$4(-4) - (-4 + 2) + 6$$

Compute step-by-step:

$$-16 - (-2) + 6$$

$$-16 + 2 + 6 = -8$$

- Right Side:

$$2(3 - 4 + 8)$$

Compute inside parentheses:

$$3 - 4 = -1$$

$$-12 + 8 = -4$$

Now multiply:

$$2 - 4 = -8$$

Since both sides are -8, the solution $x = -4$ is verified.

Summary of the Process: A Quick Recap

1. Expand parentheses to eliminate brackets.
2. Combine like terms on both sides.
3. Isolate the variable term by moving all x's to one side.
4. Solve for x by dividing both sides appropriately.
5. Verify the solution by substituting it back into the original equation.

Conclusion: Why This Method Matters

This detailed walkthrough exemplifies a fundamental approach to solving linear equations. By breaking down each step—expanding, combining, isolating, and verifying—you develop a robust problem-solving strategy that applies broadly across algebraic challenges.

Whether you're a student aiming to master algebra or

a teacher seeking clear explanations for your students, understanding each phase of the solution process is crucial. The elegance of algebra lies in its logical structure, and mastering this sequence ensures confidence in tackling even more complex equations.

Jorge's approach to solving the equation demonstrates that with patience and systematic steps, algebra transforms from an intimidating subject into an accessible and rewarding puzzle. Keep practicing these steps, and algebra will become an intuitive part of your mathematical toolkit.

In essence, solving $4x - (x + 2) + 6 = 2(3x + 8)$ reveals the power of methodical problem-solving, leading to the clear answer: $x = -4$.

[Jorge Solves The Equation \$4x - \(x + 2\) + 6 = 2\(3x + 8\)\$ Using The Steps Below Step 1 \$4x -\$](#)

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