

What Is Your Solution To This Equation? $2x + 10 - 6 = 2$ If You Can, Please Show Your Work ^.^

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Understanding how to solve linear equations is a fundamental skill in algebra, allowing us to find the value of an unknown variable, typically represented by a letter such as x . The given equation, although seemingly simple, offers an excellent opportunity to demonstrate the step-by-step process of isolating the variable and solving for its value. In this article, we will dissect the equation, explain each step in detail, and explore various methods to reach the solution. Whether you are a beginner or someone looking to reinforce your algebra skills, this comprehensive guide will help clarify the process and ensure you grasp the core concepts involved.

Deciphering the Equation: Breaking Down the Components

Before diving into the solution, it's essential to understand the structure and elements of the given equation.

Understanding the Equation Format

The equation provided is:

```plaintext

$$2x + 10 - 6 = 2$$

```

At first glance, it looks like a typical linear equation involving an unknown variable x . The goal is to determine the value of x that makes both sides of the equation equal.

Identifying the Components

- Term involving x : $2x$
- Constant terms: 10 and -6
- Right side of the equation: 2

The equation combines these components, and the task is to manipulate it algebraically to solve for x .

Step-by-Step Solution Process

To solve the equation systematically, follow these steps:

Step 1: Simplify Both Sides of the Equation

The left side contains constant terms that can be combined:

```plaintext

$$10 - 6 = 4$$

...

So, the equation simplifies to:

```plaintext

$$2x + 4 = 2$$

...

Step 2: Isolate the Term with the Variable

Subtract 4 from both sides to move constants to the right:

```plaintext

$$2x + 4 - 4 = 2 - 4$$

...

Simplifies to:

```plaintext

$$2x = -2$$

...

Step 3: Solve for x

Divide both sides by 2 to isolate x:

```plaintext

$$x = \frac{-2}{2}$$

...

Simplifies to:

```plaintext

$$x = -1$$

...

Verification of the Solution

It's always good practice to verify the solution by substituting x back into the original equation.

Substitute $x = -1$

Original equation:

``plaintext

$$2x + 10 - 6 = 2$$

...

Replace x with -1 :

``plaintext

$$2(-1) + 10 - 6 = 2$$

...

Calculate step-by-step:

``plaintext

$$-2 + 10 - 6 = 2$$

...

Simplify:

``plaintext

$$(8) - 6 = 2$$

...

Further:

```plaintext

$$2 = 2$$

```

Since both sides are equal, the solution $x = -1$ is verified as correct.

Alternative Methods to Solve the Equation

While the method above is straightforward, there are other approaches to solving linear equations, which can be useful in more complex scenarios.

Method 1: Using the Balance Method

- Think of the equation as a balanced scale.
- Perform the same operation on both sides to maintain balance.
- Follow the same steps: simplify, isolate the variable, and solve.

Method 2: Graphical Solution

- Graph the two sides of the equation as functions:
- $y = 2x + 4$
- $y = 2$
- Find the point where the graphs intersect; the x-coordinate of this point is the solution.
- This approach provides a visual understanding of the solution.

Method 3: Using Algebraic Properties

- Apply properties of equality and inverse operations systematically:
- Addition property: subtract constants
- Division property: divide coefficients of the variable

Common Mistakes to Avoid

When solving linear equations, certain errors can lead to incorrect solutions. Be mindful of the following:

1. **Not simplifying constants first:** Always combine like terms at the earliest opportunity.
2. **Forgetting to perform the same operation on both sides:** This maintains the equality of the equation.
3. **Dividing by zero:** Ensure the coefficient of the variable is not zero before dividing.
4. **Incorrect substitution during verification:** Carefully substitute the solution back into the original equation.

Extensions and Practice Problems

To reinforce your understanding, try solving similar equations:

1. $3x + 5 = 20$

2. $4x - 8 = 0$

3. $-2x + 10 = 4$

4. $5x/2 = 15$

Practice solving these to become more comfortable with the techniques.

Conclusion: Mastering Linear Equations

Solving the equation $2x + 10 - 6 = 2$ demonstrates the core principles of algebra: simplifying expressions, performing inverse operations, and verifying solutions. The solution $x = -1$ is obtained through logical, step-by-step manipulation, ensuring clarity and accuracy. Mastering such methods builds a solid foundation for tackling more complex algebraic problems, as the same principles extend to quadratic equations, systems of equations, and beyond. Remember, practice and careful attention to each step are key to becoming proficient in solving equations efficiently and correctly.

Summary of Key Points

- Simplify expressions early to make equations easier to handle.
- Perform the same operation on both sides of the equation to maintain equality.
- Always verify your solution by substituting back into the original equation.
- Practice with different types of linear equations to strengthen your skills.

By following these guidelines, you'll develop confidence in solving equations and understanding the underlying algebraic concepts.

Frequently Asked Questions

How do I solve the equation $2x + 10 - 6 = 2$?

First, simplify the left side: $10 - 6 = 4$, so the equation becomes $2x + 4 = 2$. Subtract 4 from both sides: $2x = 2 - 4$, which simplifies to $2x = -2$. Divide both sides by 2: $x = -2 / 2 = -1$. So, the solution is $x = -1$.

What is the value of x in the equation $2x + 10 - 6 = 2$?

Simplify the left side: $10 - 6 = 4$, so equation becomes $2x + 4 = 2$. Subtract 4 from both sides: $2x = -2$. Divide both sides by 2: $x = -1$. Therefore, x equals -1.

Can you explain step-by-step how to solve $2x + 10 - 6 = 2$?

Yes! Step 1: Simplify the constants on the left: $10 - 6 = 4$, so the equation becomes $2x + 4 = 2$. Step

2: Subtract 4 from both sides: $2x = 2 - 4$, which simplifies to $2x = -2$. Step 3: Divide both sides by 2: $x = -2 / 2 = -1$. The solution is $x = -1$.

What steps are involved in solving the equation $2x + 10 - 6 = 2$?

The steps are: 1) Simplify the left side to get $2x + 4 = 2$. 2) Subtract 4 from both sides: $2x = -2$. 3) Divide both sides by 2: $x = -1$. This gives the value of x .

Is the solution to $2x + 10 - 6 = 2$ equal to -1 ? How do I verify?

Yes, substituting $x = -1$ back into the original equation: $2(-1) + 10 - 6 = 2$. Calculate: $-2 + 10 - 6 = 2$, which simplifies to $2 = 2$. Since both sides are equal, $x = -1$ is correct.

Additional Resources

What Is Your Solution To This Equation? $2x + 10 - 6 = 2$ if You Can, Please Show Your Work ^.^ — this question serves as a perfect example of how algebraic problem-solving involves breaking down complex expressions into manageable steps. Whether you're a student brushing up on your skills or someone interested in understanding the logic behind solving equations, dissecting such problems helps build confidence and clarity. In this detailed guide, we'll walk through the process of solving the equation $2x + 10 - 6 = 2$, explaining each step thoroughly and providing tips along the way.

Understanding the Equation

Before diving into the solution, it's crucial to understand what the equation is asking us to find. The given equation is:

$$2x + 10 - 6 = 2$$

At first glance, it appears straightforward, but to solve for x , we need to isolate x on one side of the

equation. This involves performing inverse operations systematically.

Step 1: Simplify Both Sides of the Equation

The first step in solving any algebraic equation is to simplify both sides as much as possible.

Simplify the Left Side

Notice that $10 - 6$ can be combined:

$$- 10 - 6 = 4$$

This simplifies the equation to:

$$2x + 4 = 2$$

Now, the equation looks cleaner and easier to manipulate.

Step 2: Isolate the Term with the Variable

Our goal is to solve for x , so we need to get x alone on one side of the equation. To do this, we can start by eliminating the constant term on the left side.

Subtract 4 from both sides

To keep the equation balanced, whatever we do to one side, we must do to the other:

$$2x + 4 - 4 = 2 - 4$$

Simplifies to:

$$2x = -2$$

Now, x is multiplied by 2, and it's isolated on the left.

Step 3: Solve for x

Since 2x means 2 times x, the last step involves dividing both sides by 2:

$$x = -2 / 2$$

Calculating the division:

$$x = -1$$

Final Answer:

$$x = -1$$

This is the solution to the original equation.

Additional Tips and Considerations

While this particular problem was straightforward, real-world equations can be more complex. Here are some tips to approach similar problems:

1. Always Simplify First

- Combine like terms on both sides.
- Simplify constants to make the equation easier.

2. Use Inverse Operations

- Addition $\square$ Subtraction
- Multiplication $\square$ Division
- Apply these in reverse order to isolate the variable.

3. Maintain Balance

- Whatever operation you perform on one side, do the same on the other.

4. Check Your Solution

- Substitute your answer back into the original equation to verify correctness.

Practice Problems

To reinforce your understanding, try solving these similar equations:

1. $3x + 5 - 2 = 11$

2. $4x - 8 + 2 = 10$

3. $-2x + 6 = 0$

4. $(1/2)x + 3 = 4$

Step-by-Step Solutions for Practice Problems

1. $3x + 5 - 2 = 11$

- Simplify: $5 - 2 = 3$, so $3x + 3 = 11$
- Subtract 3: $3x = 8$
- Divide by 3: $x = 8 / 3$

2. $4x - 8 + 2 = 10$

- Simplify: $-8 + 2 = -6$, so $4x - 6 = 10$
- Add 6: $4x = 16$
- Divide by 4: $x = 4$

3. $-2x + 6 = 0$

- Subtract 6: $-2x = -6$
- Divide by -2: $x = -6 / -2 = 3$

4. $(1/2)x + 3 = 4$

- Subtract 3: $(1/2)x = 1$
- Multiply both sides by 2: $x = 2$

Conclusion

Solving equations like $2x + 10 - 6 = 2$ is fundamental in algebra, and mastering these steps builds a solid foundation for more advanced mathematics. Remember to simplify first, perform inverse operations carefully, and always check your work. With practice, you'll find that solving even more complex equations becomes intuitive and straightforward. Happy solving!

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