

Solve For X: (1 Point) Negative 7 Over 6, Multiplied By X Minus 6 Equals Negative 48

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Understanding how to solve for an unknown variable in algebraic equations is a fundamental skill in mathematics. The problem titled "Solve For X: (1 Point) Negative 7 Over 6, Multiplied By X Minus 6 Equals Negative 48" presents a classic linear equation that requires isolation of the variable to find its value. Whether you're a student brushing up on algebra or someone seeking to improve problem-solving skills, mastering this type of equation is essential. In this article, we'll walk through the step-by-step process of solving this specific problem, explore related concepts, and provide tips to enhance your algebraic reasoning.

Breaking Down the Equation

The given problem states:

Negative 7 Over 6, Multiplied By X Minus 6 Equals Negative 48

This can be written as the algebraic equation:

$$(-7/6)(X - 6) = -48$$

Understanding each component is key:

- The fraction $-7/6$ acts as a coefficient multiplying the binomial $(X - 6)$.
- The right side, -48 , is a constant.

The goal is to find the value of X that satisfies this equation.

Step-by-Step Solution Process

To solve for X , we'll use algebraic operations to isolate the variable. Here's a detailed breakdown:

Step 1: Eliminate the Fraction Coefficient

Since the coefficient of $(X - 6)$ is $-7/6$, the first step is to get rid of this fraction by multiplying both sides of the equation by the reciprocal of $-7/6$, which is $-6/7$.

Mathematically:

$$(-6/7) [(-7/6) (X - 6)] = (-6/7) (-48)$$

This simplifies the left side because:

$$(-6/7) (-7/6) = 1$$

So, the equation reduces to:

$$X - 6 = (-6/7) (-48)$$

Calculating the right side:

$$(-6/7) (-48) = (6/7) 48$$

Since multiplying two negatives yields a positive, and:

$$(6/7) 48 = 6 \cdot 48 / 7 = (288) / 7$$

Therefore,

$$X - 6 = 288/7$$

Step 2: Isolate X

Add 6 to both sides to solve for X:

$$X = 288/7 + 6$$

Express 6 as a fraction with denominator 7:

$$6 = 42/7$$

Now,

$$X = 288/7 + 42/7 = (288 + 42) / 7 = 330/7$$

Final answer:

$$X = 330/7$$

Or, as a mixed number:

$$X = 47 \frac{1}{7}$$

Summary of the Solution

- Original equation: $(-7/6)(X - 6) = -48$
- Step 1: Multiply both sides by the reciprocal of $-7/6$, which is $-6/7$
- Step 2: Simplify to find $X - 6 = 288/7$
- Step 3: Add 6 (or $42/7$) to both sides to get $X = 330/7$
- Result: $X = 330/7 \approx 47.14$

Additional Tips for Solving Similar Algebraic Equations

Understanding the approach to this problem can help you tackle a variety of similar equations. Here are some useful tips:

1. Always Perform Inverse Operations

To isolate the variable, perform inverse operations in reverse order of the operations applied. For multiplication, use division; for addition, use subtraction.

2. Clear Fractions Early

Multiplying both sides by the least common denominator (LCD) can simplify the equation by removing fractions.

3. Check Your Work

Always substitute your solution back into the original equation to verify correctness.

4. Practice with Variations

Try solving equations with different coefficients and constants to build confidence.

Practice Problems to Reinforce Learning

Engage with these practice problems to enhance your algebra skills:

1. Solve for X: $\frac{3}{4} (2X + 8) = 12$

2. Find X: $\frac{-5}{2} (X - 4) = 15$

3. Determine X: $\frac{2}{3} (X + 9) = -6$

Solutions:

1. Multiply both sides by $\frac{4}{3}$ to eliminate the fraction, then proceed to isolate X.

2. Multiply both sides by $-\frac{2}{5}$, then solve for X.

3. Multiply both sides by $\frac{3}{2}$, then solve for X.

Practicing these problems will deepen your understanding of solving equations involving fractions.

Common Mistakes to Avoid

While solving for X, watch out for these common errors:

- Forgetting to apply the same operation to both sides: Always perform inverse operations equally on both sides.
- Mismanaging negative signs: Be cautious with negative coefficients and constants.
- Incorrectly simplifying fractions: Simplify fractions properly to avoid calculation errors.
- Skipping steps: Document each step to ensure accuracy and clarity.

Conclusion: Mastering the Art of Solving for X

The problem "Solve For X: (1 Point) Negative 7 Over 6, Multiplied By X Minus 6 Equals Negative 48" exemplifies fundamental algebraic techniques used widely in mathematics. By systematically eliminating fractions, performing inverse operations, and carefully simplifying, you can solve such equations efficiently. Mastery of these steps not only helps in academic settings but also enhances critical thinking skills applicable in real-world problem-solving.

Remember, practice makes perfect. Regularly working through similar problems, understanding the underlying principles, and avoiding common pitfalls will build your confidence and proficiency in algebra. Whether you're preparing for exams or just seeking to strengthen your mathematical foundation, mastering equations like these is a crucial step toward becoming a skilled problem solver.

Frequently Asked Questions

What is the equation to solve for X in the problem:

$$(-7/6)(X - 6) = -48?$$

The equation is $(-7/6)(X - 6) = -48$.

What is the first step to isolate X in the equation

$$(-7/6)(X - 6) = -48?$$

Multiply both sides of the equation by $6/(-7)$ to eliminate the fraction.

What is the simplified form after multiplying both sides by $6/(-7)$?

$X - 6 = (-48) (6/(-7))$ which simplifies to $X - 6 = -48 \cdot 6 / -7$.

How do you simplify the right side of the equation $X - 6 = (-48/6) / -7$?

Calculate $-48/6 = -288$, then divide by -7 : $-288 / -7 = 288/7$.

What is the value of X after solving $X - 6 = 288/7$?

$X = 288/7 + 6$.

How do you combine $288/7$ and 6 to find the value of X ?

Express 6 as a fraction with denominator 7 : $6 = 42/7$, then add: $288/7 + 42/7 = 330/7$.

What is the final value of X in simplified form?

$X = 330/7$, which is approximately 47.14 .

What is the key step in solving for X in the equation $(-7/6)(X - 6) = -48$?

Multiplying both sides by the reciprocal of $-7/6$, which is $-6/7$, to isolate $X - 6$.

Additional Resources

Solve For X: Negative 7 Over 6, Multiplied By X Minus 6 Equals Negative 48

Mathematics often presents students and enthusiasts with intriguing problems that challenge their understanding of algebraic principles. Among these, linear equations stand as fundamental building blocks, enabling us to interpret and solve real-world problems with mathematical precision. One such problem, expressed as "Negative 7 over 6, multiplied by X minus 6 equals negative 48," exemplifies the core process of algebraic manipulation, offering a rich ground for analysis, explanation, and comprehension. This article aims to dissect this problem thoroughly, providing insights into the methodology of solving linear equations, exploring the underlying concepts, and demonstrating the importance of these skills in broader contexts.

Understanding the Equation: A Breakdown of Its

Components

Before diving into the solution, it is essential to understand the structure of the given equation. The problem can be expressed as:

$$\left(-\frac{7}{6}\right) \times (X - 6) = -48$$

This equation involves several key components:

- Fractional coefficient: $\left(-\frac{7}{6}\right)$ acts as a scalar multiple affecting the expression $(X - 6)$.
- Expression involving X: $(X - 6)$ indicates a linear relationship involving the variable (X) .
- Equality to a constant: The entire expression equals (-48) .

In essence, this is a linear equation with one variable, which we aim to isolate and solve for to find the value of (X) .

Step-by-Step Approach to Solving the Equation

Solving the equation involves systematic steps grounded in algebraic principles. Each step simplifies the equation, gradually revealing the value of (X) .

1. Recognize the Structure of the Equation

The equation:

$$\left(-\frac{7}{6}\right) \times (X - 6) = -48$$

can be viewed as a linear equation in one variable, where the fractional coefficient multiplies a binomial involving (X) .

2. Eliminate the Fraction to Simplify Calculation

To make calculations more manageable, it's often advantageous to clear fractions. Multiplying both sides of the equation by the denominator of the fractional coefficient (which is 6) removes the fraction:

$$6 \times \left(-\frac{7}{6}\right) \times (X - 6) = 6 \times (-48)$$

Simplifying:

$$\begin{aligned} & -7(X - 6) = -288 \end{aligned}$$

This step simplifies the algebraic manipulation by eliminating the fraction altogether.

3. Distribute the Coefficient and Expand

Next, distribute (-7) across the parenthesis:

$$\begin{aligned} & -7X + (-7)(-6) = -288 \end{aligned}$$

which simplifies to:

$$\begin{aligned} & -7X + 42 = -288 \end{aligned}$$

This expansion is crucial as it transforms the equation into a straightforward linear form.

4. Isolate the Variable Term

Subtract 42 from both sides to isolate the term containing (X) :

$$\begin{aligned} & -7X + 42 - 42 = -288 - 42 \\ & -7X = -330 \end{aligned}$$

5. Solve for (X)

Divide both sides by (-7) to solve for (X) :

$$\begin{aligned} & X = \frac{-330}{-7} \end{aligned}$$

Simplify the fraction:

```
\[
X = \frac{330}{7}
\]
```

or as a decimal:

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\[
X \approx 47.14
\]
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Interpreting the Solution: Insights and Implications

The solution $(X = \frac{330}{7})$ (approximately 47.14) is the exact value satisfying the original equation. This result underscores several important aspects of algebra:

- The power of clearing fractions: Multiplying through by 6 simplified the fractional coefficient, making the algebra more straightforward.
- Distributive property: Distributing (-7) across the parentheses clarified the linear relationship.
- Stepwise isolation: Carefully subtracting and dividing allowed for precise isolation of the variable.

Furthermore, understanding how to manipulate such equations is vital in various fields—engineering, computer science, economics, and natural sciences—where modeling relationships often involves solving for unknowns.

Broader Context and Practical Applications

While the problem may seem purely academic, its principles have real-world relevance:

- Financial calculations: Determining unknown interest rates or investment returns often involves similar algebraic manipulations.
- Engineering design: Calculating unknown parameters in physical systems relies on solving equations akin to this.
- Data analysis: Regression models and predictive algorithms frequently require solving for variables in equations with fractional coefficients.
- Educational development: Mastery of such problems equips students with

critical thinking skills necessary for advanced mathematics and science disciplines.

Common Mistakes and Tips for Success

In solving equations like this, learners often encounter pitfalls. Recognizing these common errors can enhance problem-solving skills:

- Ignoring the order of operations: Ensure distribution and multiplication are performed correctly.
- Incorrectly handling negative signs: Be meticulous with signs, especially when multiplying or dividing by negatives.
- Forgetting to perform inverse operations: Always perform the inverse operation to isolate the variable.
- Fraction mishandling: When clearing fractions, multiply both sides by the denominator, not just one side, to maintain equality.

Tips for success:

- Write each step clearly, verifying calculations.
- Check your solution by substituting the value of (X) back into the original equation.
- Practice similar problems to develop fluency and confidence.

Conclusion: The Significance of Algebraic Problem-Solving

Solving for (X) in the equation $\left(-\frac{7}{6}\right) \times (X - 6) = -48$ exemplifies fundamental algebraic techniques—distributive property, fraction clearing, and inverse operations—that are cornerstones of mathematical literacy. The precise process demonstrates how complex-looking problems can be unraveled through systematic steps, fostering critical thinking and analytical skills. Beyond academics, such problem-solving strategies are instrumental across numerous domains, enabling professionals and students alike to interpret data, optimize solutions, and develop innovative approaches to real-world challenges. Mastery of these algebraic methods not only unlocks mathematical understanding but also cultivates a mindset adaptable to diverse problem-solving scenarios—a vital competence in today's data-driven and technologically advanced society.

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