Solve The Linear Equation For X.-4.8(6.3x-4.18)=58.56

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Understanding how to solve linear equations is an essential skill in mathematics that lays the foundation for more advanced algebraic concepts. In this article, we will delve into solving the specific linear equation: -4.8(6.3x - 4.18) = 58.56. We will explore the step-by-step process, concepts involved, common pitfalls, and tips to master solving similar equations efficiently. Whether you're a student preparing for exams or someone looking to strengthen your algebra skills, this comprehensive guide will walk you through the entire solution process.

Understanding the Equation: Breaking Down the Components

Before diving into solving the equation, it's crucial to understand what the equation represents and the components involved.

The Equation at a Glance:

- Equation: -4.8(6.3x - 4.18) = 58.56

Components Breakdown:

- Coefficient: -4.8, which multiplies the entire expression inside the parentheses.
- Expression inside parentheses: (6.3x - 4.18).
- Constant on the right side: 58.56.

What is a Linear Equation?

A linear equation is an algebraic equation in which the highest power of the variable (here, x) is 1. The general form is:

a x + b = c

In our case, after expanding and simplifying, the equation will also be in a linear form.

Step-by-Step Guide to Solving the Equation

The goal is to find the value of x that satisfies the equation. Here’s the systematic approach:

Step 1: Eliminate the Parentheses

Since the parentheses are multiplied by -4.8, we distribute the coefficient across the terms inside:

-4.8 6.3x - (-4.8) 4.18 = 58.56

Note: Because of the negative sign in front of 4.8, distributing will involve careful attention to signs.

Step 2: Perform the Multiplication

Calculate each term:

- -4.8 6.3x:
First, compute 4.8 6.3:

4.8 6.3 = (4.8 6) + (4.8 0.3) = (28.8) + (1.44) = 30.24

Since the original coefficient is negative:

-4.8 6.3x = -30.24x

- -4.8 -4.18:
Multiplying two negatives gives a positive:

4.8 4.18:

4.8 4.18 = (4.8 4) + (4.8 0.18) = 19.2 + 0.864 = 20.064

Because of the negative sign outside, the product becomes:

-4.8 -4.18 = +20.064

Step 3: Rewrite the Equation

Now, the original equation transforms into:

-30.24x + 20.064 = 58.56

Solving for x: Isolating the Variable

The next step involves isolating x on one side of the equation to find its value.

Step 4: Move Constants to the Other Side

Subtract 20.064 from both sides to isolate the term with x:

-30.24x + 20.064 - 20.064 = 58.56 - 20.064

Simplifies to:

-30.24x = 38.496

Step 5: Divide to Solve for x

Divide both sides of the equation by -30.24 to find x:

x = 38.496 / -30.24

Now, perform the division:

- 38.496 / 30.24 ≈ 1.272

Since the denominator is negative:

x ≈ -1.272

Final Answer and Verification

The solution:

x ≈ -1.272

Verifying the Solution:

It’s good practice to verify the solution by substituting x ≈ -1.272 back into the original equation:

-4.8(6.3x - 4.18) □ 58.56

First, compute 6.3x - 4.18:

6.3 (-1.272) ≈ -8.0176

Then:

6.3x - 4.18 ≈ -8.0176 - 4.18 = -12.1976

Next, multiply by -4.8:

-4.8 (-12.1976) ≈ 58.545

This is very close to 58.56, considering rounding errors, confirming that x ≈ -1.272 is a valid solution.

Tips for Solving Similar Linear Equations

To efficiently solve linear equations like the one discussed, keep these tips in mind:

- Always distribute carefully: Pay attention to signs during distribution.
- Simplify step-by-step: Break down complex expressions into manageable parts.
- Keep track of signs: Negative signs can often lead to mistakes if overlooked.
- Use calculator for complex multiplications: Especially with decimals.
- Verify your solutions: Substitute the solution back into the original equation for confirmation.
- Practice with different equations: The more you practice, the more intuitive solving becomes.

Common Mistakes to Avoid

Understanding common pitfalls can help prevent errors:

- Forgetting to distribute the negative sign: This can lead to incorrect signs in the expanded form.
- Mixing up operations: Ensure multiplication precedes addition/subtraction.
- Neglecting to simplify fully: Always combine like terms before solving for the variable.
- Incorrect division: Be cautious with signs and ensure accurate division.
- Not verifying the solution: Always substitute back to confirm correctness.

Conclusion: Mastering Linear Equations

Solving the linear equation -4.8(6.3x - 4.18) = 58.56 involves understanding the distribution property, combining like terms, and isolating the variable through inverse operations. With careful calculation and attention to detail, the solution x ≈ -1.272

emerges confidently. Mastering these steps enhances your algebra skills, enabling you to tackle more complex equations and mathematical problems with ease.

Remember, practice is key. Work through different types of linear equations, verify solutions, and keep these strategies in mind. With dedication and systematic approach, solving linear equations becomes an intuitive and essential skill in your mathematical toolkit.

Frequently Asked Questions

How do I solve the linear equation -4.8(6.3x - 4.18) = 58.56 for x?

First, distribute -4.8 across the parentheses: -4.8 6.3x + (-4.8) (-4.18) = 58.56. Simplify to get -30.24x + 20.064 = 58.56. Then, subtract 20.064 from both sides: -30.24x = 58.56 - 20.064. Simplify: -30.24x = 38.496. Finally, divide both sides by -30.24: x = 38.496 / -30.24, which gives x ≈ -1.272.

What is the first step in solving the equation -4.8(6.3x - 4.18) = 58.56?

The first step is to distribute -4.8 across the terms inside the parentheses to eliminate the parentheses, resulting in -4.8 6.3x and -4.8 -4.18.

How do I isolate x after distributing in the equation -4.8(6.3x - 4.18) = 58.56?

After distributing, combine like terms and then move the constant term to the other side by subtracting. Then, divide both sides by the coefficient of x to solve for x.

Can I check my solution for x in the equation -4.8(6.3x - 4.18) = 58.56?

Yes, you can substitute your found value of x back into the original equation to verify if both sides are equal. If they are, your solution is correct.

What is the approximate solution for x in the equation -4.8(6.3x - 4.18) = 58.56?

The approximate solution is x ≈ -1.272 after performing all the steps of distribution, simplification, and division.

Additional Resources

Solve The Linear Equation For X.-4.8(6.3x-4.18)=58.56

When approaching the problem Solve The Linear Equation For X.-4.8(6.3x-4.18)=58.56, it’s essential to understand the fundamental concepts of linear equations and the algebraic methods used to isolate the variable. This problem provides a great opportunity to explore the step-by-step process of solving linear equations, the importance of understanding distributive properties, and the significance of maintaining algebraic balance throughout the process. In this article, we will analyze the problem comprehensively, break down the solution into manageable steps, and discuss the key features, pros, and cons of the methods used.

Understanding the Equation

Before jumping into solving, it’s crucial to understand the structure of the given equation:

$-4.8(6.3x - 4.18) = 58.56$

This is a linear equation in one variable, x. The equation involves:

- A coefficient multiplied by a binomial expression, $-4.8(6.3x - 4.18)$
- A constant on the right side, 58.56

The goal is to find the value of x that makes this equation true.

Breaking Down the Problem

To solve this, we typically follow these key steps:

1. Distribute the coefficient across the parentheses.
2. Combine like terms if necessary.
3. Isolate the term with x on one side of the equation.
4. Solve for x by dividing both sides appropriately.

Let’s go through each step in detail.

Step 1: Distribute the Coefficient

Using the distributive property, we expand -4.8(6.3x - 4.18):

- Multiply -4.8 by 6.3x
- Multiply -4.8 by -4.18

Calculations:

- -4.8 6.3x = -30.24x
- -4.8 -4.18 = +20.064

So, the expanded form becomes:

-30.24x + 20.064 = 58.56

Step 2: Isolate the Term with Variable x

To isolate x, first subtract 20.064 from both sides:

-30.24x + 20.064 - 20.064 = 58.56 - 20.064

Simplifies to:

-30.24x = 38.496

Step 3: Solve for x

Divide both sides by -30.24:

x = 38.496 / -30.24

Calculating the division:

x ≈ -1.272

Thus, the solution is approximately:

x ≈ -1.272

Verification of the Solution

It’s good practice to verify the solution by substituting $x \approx -1.272$ back into the original equation.

Original equation:

$-4.8(6.3x - 4.18) = 58.56$

Substitute $x \approx -1.272$:

Calculate inside the parentheses:

$6.3 (-1.272) \approx -8.0256$

Then:

$6.3x - 4.18 \approx -8.0256 - 4.18 \approx -12.2056$

Multiply by -4.8:

$-4.8 -12.2056 \approx 58.58$

This is very close to 58.56, with minor differences due to rounding. Therefore, $x \approx -1.272$ is a valid solution.

Key Features and Insights

The process of solving this linear equation highlights several important features:

- Distributive Property: Essential for expanding expressions and simplifying equations.
- Linear Equation Structure: Solutions involve straightforward algebraic manipulations without complex quadratic or higher-order terms.
- Step-by-step Approach: Breaking the problem down makes it manageable and reduces errors.
- Verification: Always verify solutions to ensure accuracy, especially when rounding.

Pros and Cons of the Method Used

Pros:

- Systematic and Clear: The step-by-step approach makes the process transparent.
- Generalizable: The same method applies to a wide range of linear equations.
- Educational: Reinforces fundamental algebraic properties.

Cons:

- Rounding Errors: When dealing with decimals, rounding can introduce slight inaccuracies.
- Complexity with Larger Equations: More complex equations may require additional techniques like substitution or elimination.
- Potential for Mistakes: Distributing or dividing incorrectly can lead to wrong solutions.

Features of Solving Linear Equations

- Simplicity: Linear equations are among the simplest algebraic equations to solve.
- Applicability: Used in various fields like physics, economics, engineering, and everyday problem-solving.
- Foundation: Serves as a foundation for understanding more complex algebraic concepts such as systems of equations, inequalities, and quadratic equations.

Additional Tips for Solving Similar Equations

- Always check for distributive properties before combining like terms.
- Keep track of negative signs to prevent sign errors.
- Simplify step-by-step rather than rushing through the calculations.
- Use a calculator for complex decimal multiplications and divisions to improve accuracy.
- Verify your solutions by substituting back into the original equation.

Conclusion

Solving the linear equation -4.8(6.3x - 4.18) = 58.56 exemplifies core algebraic techniques that are fundamental to mathematics. The process involves distributing, isolating the variable, and verifying the solution, reinforcing essential skills such as handling decimals, managing negative numbers, and maintaining algebraic balance. With practice, these steps become intuitive, allowing one to efficiently solve similar equations in academic, professional, or everyday contexts. Understanding the features, pros, and cons of the methods used not only enhances problem-solving skills but also deepens comprehension of algebra's foundational role in mathematics.

Solve The Linear Equation For X 4 8 6 3x 4 18 58 56

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