

Solve The Equation, And Check The Solution. $W/3 = 0.9$ (The W Is A Variable For The Fraction)

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Understanding how to solve equations and verify their solutions is a fundamental skill in mathematics. In this article, we will explore the process of solving the equation $W/3 = 0.9$, where W is a variable representing an unknown quantity, and demonstrate how to check the correctness of the solution. This comprehensive guide aims to improve your problem-solving skills, enhance your understanding of algebra, and prepare you for more complex equations.

Introduction to Algebraic Equations

Algebra involves working with symbols and variables to represent numbers and quantities. Equations are statements that show the equality of two expressions, often containing variables that need to be solved for.

For example, the equation $W/3 = 0.9$ involves a variable W and a constant number 0.9. The goal is to find the value of W that makes the equation true.

Understanding the Equation $W/3 = 0.9$

Before solving, let's analyze the components:

- W: a variable representing an unknown value.
- /3: indicates division by 3.
- 0.9: a decimal number, representing nine-tenths.

The equation states that when W is divided by 3, the result should be 0.9.

Step-by-Step Solution of $W/3 = 0.9$

To find the value of W, follow these steps:

Step 1: Write the Equation Clearly

$$W / 3 = 0.9$$

This is already in a simple form, showing W divided by 3 equals 0.9.

Step 2: Isolate the Variable W

To find W, we need to undo division by 3. The inverse operation of division is multiplication. Multiply both sides of the equation by 3:

$$(W / 3) \cdot 3 = 0.9 \cdot 3$$

This simplifies to:

$$W = 0.9 \cdot 3$$

Step 3: Perform the Multiplication

Calculate 0.9 multiplied by 3:

$$0.9 \cdot 3 = 2.7$$

Therefore, the solution is:

$$W = 2.7$$

Verifying the Solution

After finding $W = 2.7$, it's essential to verify whether this value satisfies the original equation.

Step 1: Substitute the Value Back into the Equation

Replace W with 2.7:

$$(2.7) / 3 = ?$$

Step 2: Perform the Division

Calculate:

$$2.7 / 3 = 0.9$$

Since the result matches the original right-hand side of the equation, $W = 2.7$ is indeed the correct solution.

Conclusion of Verification

The solution $W = 2.7$ satisfies the equation $W/3 = 0.9$, confirming its correctness.

Additional Tips for Solving Similar Equations

When solving algebraic equations involving fractions or decimals, keep in mind the following strategies:

- **Always perform inverse operations:** To isolate the variable, undo operations step-by-step, such as addition/subtraction or multiplication/division.
- **Maintain balance:** Whatever you do to one side of the equation, do to the other side.
- **Check your solution:** Substitute the found value back into the original equation to verify correctness.
- **Work systematically:** Write each step clearly to avoid mistakes.

Common Mistakes to Avoid

While solving equations, be cautious of the following common errors:

1. **Incorrectly applying inverse operations:** For example, dividing both sides instead of multiplying when isolating the variable.
2. **Forgetting to check the solution:** Always substitute back to verify the answer.
3. **Misreading decimal placements:** Ensure accurate calculations with decimals to avoid errors.
4. **Overlooking the domain:** For some equations, certain solutions may not be valid in specific contexts.

Practical Applications of Solving Equations

Solving equations like $W/3 = 0.9$ is not just an academic exercise; it has real-world applications, including:

- **Financial calculations:** Determining amounts when given ratios or proportions.
- **Engineering:** Calculating measurements and tolerances.
- **Science:** Solving for unknown quantities in formulas.
- **Statistics:** Working with averages or proportions.

Understanding how to manipulate and solve equations enables professionals and students to analyze data, optimize processes, and make informed decisions.

Practice Problems for Mastery

To reinforce your understanding, try solving these similar equations:

1. Solve for W: $W/5 = 1.2$
2. Find X: $2X = 7.4$
3. Determine Y: $Y/4 = 0.75$
4. Solve for Z: $3Z + 2 = 11$
5. Find T: $T/2.5 = 3.6$

Remember to follow the steps of isolating the variable, performing inverse operations, and verifying your solutions.

Summary

In this article, we explored how to solve the equation $W/3 = 0.9$, where W is a variable representing an unknown quantity. The key steps involved multiplying both sides by 3 to isolate W, calculating the multiplication, and verifying the solution by substitution. The final answer, $W = 2.7$, was confirmed to satisfy the original equation.

Mastering such fundamental algebraic techniques is essential for progressing in mathematics and applying these skills across various fields. Practice regularly, double-check your work, and always verify your solutions to ensure accuracy.

Final Thoughts

Solving algebraic equations is a vital skill that enhances logical thinking and problem-solving abilities. By understanding the process, applying inverse operations correctly, and verifying solutions, students and professionals can confidently tackle more complex mathematical challenges. Keep practicing with different types of equations, and you'll continue to build a strong foundation in algebra.

Remember: the key to mastering equations is patience and attention to detail. Happy solving!

Frequently Asked Questions

What is the equation to solve when given $W/3 = 0.9$?

The equation is W divided by 3 equals 0.9, written as $W/3 = 0.9$.

How do you solve for W in the equation $W/3 = 0.9$?

Multiply both sides of the equation by 3 to isolate W : $W = 0.9 \times 3$.

What is the value of W after solving the equation $W/3 = 0.9$?

$W = 0.9 \times 3 = 2.7$.

How do you check if $W = 2.7$ is the correct solution?

Substitute $W = 2.7$ back into the original equation: $2.7/3$. If the result equals 0.9, then the solution is correct.

What is the result when checking the solution $W = 2.7$ in the original equation?

2.7 divided by 3 equals 0.9, confirming the solution is correct, since $2.7/3 = 0.9$.

Why is it important to check the solution in an equation like $W/3 = 0.9$?

Checking ensures that the solution satisfies the original equation and confirms its correctness.

Can the solution to $W/3 = 0.9$ be used in other similar equations?

Yes, the method of multiplying both sides by 3 to solve for W can be applied to similar equations involving division by a constant.

Additional Resources

Solve The Equation, And Check The Solution. $W/3 = 0.9$ (The W Is A Variable For The Fraction)

In the realm of algebra and mathematical problem-solving, equations serve as the foundational tools that allow us to understand relationships between variables. Among these, linear equations are often the first step in developing a solid grasp of algebraic manipulation. Today, we delve into a particular problem involving a simple yet instructive equation: $W/3 = 0.9$. This problem not only tests our ability to manipulate variables but also emphasizes the importance of verifying solutions for accuracy.

This comprehensive article explores the process of solving this equation, understanding the underlying principles, and rigorously checking the solution. By examining this problem through multiple lenses—algebraic techniques, conceptual understanding, and practical implications—we aim to provide a thorough analysis suitable for both students and educators seeking deeper insights into equation solving.

Understanding the Equation: $W/3 = 0.9$

Before diving into solving, it's important to interpret the equation properly. Here, W is a variable representing a fraction, and the equation states that this fraction divided by 3 equals 0.9.

Key points to consider:

- W is an unknown quantity we need to find.
- The division indicates a proportional relationship.
- The right side, 0.9, is a decimal, which can also be expressed as a fraction (specifically, $9/10$).

Mathematical Foundations: Basic Principles in Solving Linear Equations

Solving equations like $W/3 = 0.9$ involves fundamental algebraic principles:

- Isolation of the Variable: The goal is to get W alone on one side of the equation.
- Inverse Operations: To undo division by 3, multiplication by 3 is used.
- Maintaining Equality: Whatever operation is performed on one side must be performed on the other to preserve the equality.

In the given equation:

1. The variable W is divided by 3.
2. To solve for W , multiply both sides by 3 to cancel out the denominator.

Step-by-Step Solution Process

Let's walk through the process meticulously.

Step 1: Write down the original equation

$$W/3 = 0.9$$

Step 2: Isolate W by performing inverse operations

Since W is divided by 3, multiply both sides by 3:

$$(W/3) \cdot 3 = 0.9 \cdot 3$$

Simplifying:

$$W = 2.7$$

Step 3: Confirm the solution

The calculated W is 2.7. To verify, substitute this value back into the original equation:

$$(2.7) / 3 = ?$$

Calculating:

$$2.7 / 3 = 0.9$$

Since the left side equals the right side, the solution is consistent.

Interpreting the Solution: W = 2.7

The variable W equals 2.7. Given that W represents a fraction, the interpretation of this result is crucial:

- As a decimal: W is 2.7.
- As a fraction: 2.7 can be expressed as 27/10.
- Implication: The value of W is greater than 1, which is acceptable unless the context specifies otherwise.

This solution aligns precisely with the initial equation, confirming its correctness.

Check the Solution: Validating the Result

Verification is a fundamental step to ensure no errors occurred during algebraic manipulation.

Method 1: Substitution

Substitute $W = 2.7$ into the original equation:

$$(2.7) / 3 = 0.9$$

Calculations:

- 2.7 divided by 3 equals 0.9.
- The equality holds true, confirming the solution's validity.

Method 2: Cross-multiplication

Original equation:

$$W/3 = 0.9$$

Cross-multiplied:

$$W = 0.9 \cdot 3 = 2.7$$

Again, the solution matches the previous calculation, confirming consistency.

Deeper Insights and Potential Variations

While this problem appears straightforward, it opens avenues for exploring more complex or related equations.

1. Expressing W as a Fraction

Given $W = 2.7$, express as a fraction:

$$- 2.7 = 27/10$$

Rearranged:

- The original equation becomes:

$$(27/10) / 3 = 0.9$$

- Simplify:

$$(27/10) \cdot (1/3) = 0.9$$

- Calculations:

$$(27/10) \cdot (1/3) = 27/30 = 9/10 = 0.9$$

This confirms the fractional form aligns with the decimal value.

2. Solving Variations of the Equation

- If $W/3 = 1.2$, then $W = 1.2 \cdot 3 = 3.6$.

- If $W/5 = 0.4$, then $W = 0.4 \times 5 = 2$.
- These variations highlight the importance of inverse operations.

3. Considering Constraints and Contexts

In practical contexts, the value of W might be constrained:

- If W represents a proportion, fraction, or percentage, the interpretation may differ.
- For example, if W is a part of a larger system, understanding its magnitude is essential.

Common Pitfalls and Error Prevention

While solving such equations is straightforward, several common errors can occur:

1. Forgetting to perform the inverse operation on both sides:
Always apply the same operation to both sides to maintain equality.
2. Misapplying algebraic rules:
Ensure correct handling of fractions and decimals.
3. Overlooking the domain of the variable:
If the context requires W to be positive or within a certain range, verify the solution adheres to those constraints.
4. Arithmetic errors:
Double-check calculations, especially when converting between decimal and fractional forms.

Practical Applications and Significance

Understanding how to solve and verify simple equations like $W/3 = 0.9$ has broad implications:

- Educational Foundation:
Mastering these steps builds confidence for tackling more complex algebraic problems.
- Real-world Problem Solving:
Equations are used in finance, engineering, sciences, and everyday decision-making.
- Data Analysis and Modelling:
Quantitative reasoning often involves solving for unknowns to model systems accurately.

Conclusion: The Value of Rigorous Solution and Verification

In this detailed exploration, we've demonstrated how to solve the equation $W/3 = 0.9$ thoroughly, emphasizing the importance of methodical algebraic manipulation and verification. The solution $W = 2.7$ is validated through substitution and cross-multiplication, illustrating the reliability of fundamental algebraic principles.

This process underscores a broader lesson: precise problem-solving requires not only arriving at a solution but also verifying its correctness. Whether in academic settings or practical applications, such diligence ensures the integrity of mathematical reasoning and enhances our ability to interpret and utilize quantitative data effectively.

By mastering this fundamental skill, learners and professionals alike can confidently approach more complex equations and mathematical challenges, reinforcing the critical role of accuracy and verification in all analytical endeavors.

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