

Elise Says, If You Subtract 11 From My Number And Multiply The Difference By -4, The Result Is -48 What

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Introduction to the Problem

In the realm of algebraic word problems, one of the most common and effective methods to develop problem-solving skills is to translate a verbal statement into an algebraic expression or equation. The statement presented by Elise is a perfect example of such a problem, where understanding the language and carefully translating it into a mathematical form is the key to finding the unknown number. This problem not only tests basic algebra skills but also encourages logical thinking and attention to detail.

Understanding the Language of the Problem

Breaking Down the Statement

The statement given by Elise is:

> "If you subtract 11 from my number and multiply the difference by -4, the result is -48."

To solve this problem, we need to interpret each part of the statement carefully:

- "My number" refers to an unknown number, which we can denote with a variable, commonly (x) .
- "Subtract 11 from my number" suggests the operation: $(x - 11)$.
- "Multiply the difference by -4" indicates the multiplication of the previous result by (-4) : $(-4 \times (x - 11))$.
- "The result is -48" tells us the entire expression equals (-48) .

Forming the Equation

Based on this interpretation, the algebraic equation becomes:

$$\begin{aligned} & -4(x - 11) = -48 \end{aligned}$$

This equation encapsulates the entire statement and is the starting point for solving for (x) .

Step-by-Step Solution Process

Step 1: Write the Equation

From the problem statement, the initial algebraic expression is:

$$\begin{aligned} & -4(x - 11) = -48 \end{aligned}$$

Step 2: Simplify the Equation

Distribute (-4) across the parentheses:

$$\begin{aligned} & -4 \times x + (-4) \times (-11) = -48 \end{aligned}$$

Calculating:

$$\begin{aligned} & -4x + 44 = -48 \end{aligned}$$

Step 3: Isolate the Variable

Subtract 44 from both sides to move constants to one side:

$$\begin{aligned} & -4x + 44 - 44 = -48 - 44 \end{aligned}$$

Simplifies to:

$$\begin{aligned} & \end{aligned}$$

$$-4x = -92$$

\]

Step 4: Solve for (x)

Divide both sides by (-4) :

\[

$$x = \frac{-92}{-4}$$

\]

Simplify:

\[

$$x = 23$$

\]

Therefore, the unknown number is 23.

Verification of the Solution

Verifying the solution helps ensure the correctness of the answer.

Substitute $(x = 23)$ into the original statement:

- Subtract 11:

\[

$$23 - 11 = 12$$

\]

- Multiply the difference by (-4) :

\[

$$-4 \times 12 = -48$$

\]

Result: (-48) , which matches the problem statement exactly.

Since the verification confirms the correctness, $(x = 23)$ is the solution.

Understanding the Key Concepts

Variables and Expressions

This problem demonstrates the importance of assigning variables to unknown quantities and translating verbal statements into algebraic expressions.

Solve Equations Step-by-Step

Breaking down the problem into manageable steps—distributing, combining like terms, isolating the variable—is essential for clarity and accuracy.

Verification

Always substitute the found value back into the original statement to verify the solution.

Common Mistakes to Avoid

Ignoring Negative Signs

Mismanaging negative signs during distribution or division can lead to incorrect answers.

Incorrect Distribution

Ensure to apply the distributive property correctly: multiply each term inside parentheses by the factor outside.

Arithmetic Errors

Careful calculation of division and multiplication is essential, especially with negative numbers.

Misinterpretation of the Word Problem

Always read the problem carefully to understand what operation is being described before forming the equation.

Practical Applications of Such Problems

Real-World Scenarios

Problems like this are foundational in fields such as finance, engineering, and data analysis, where translating verbal or written descriptions into mathematical models is routine.

Educational Significance

Solving algebraic word problems enhances critical thinking and prepares students for more complex mathematical concepts.

Conclusion

The problem posed by Elise is a classic example of translating a verbal statement into an algebraic equation, solving for the unknown, and verifying the solution. Through careful interpretation, distribution, and arithmetic, we find that the number Elise refers to is 23. This process underscores essential algebra skills and highlights the importance of methodical problem-solving approaches. Mastery of such problems builds a strong foundation for tackling more advanced mathematical challenges and promotes logical reasoning that is valuable across numerous disciplines.

Frequently Asked Questions

What is the original number in the problem where subtracting 11 and multiplying the difference by -4 equals -48?

The original number is 17.

How do you set up an equation based on 'Elise Says, If You Subtract 11 From My Number And Multiply The Difference By -4, The Result Is -48'?

Let the number be x . Then, $(x - 11) \cdot -4 = -48$.

What is the step-by-step solution to find Elise's number in the problem?

First, divide both sides by -4 : $(x - 11) = -48 / -4 = 12$. Then, add 11 to both sides: $x = 12 + 11 = 23$.

Is there a mistake in the initial interpretation of the problem where the answer was 17?

Yes, the correct answer is 23, not 17. The initial calculation was incorrect.

What is the correct value of Elise's number based on the given problem?

Elise's number is 23.

How can I verify the solution to the problem?

Substitute $x = 23$ into the original expression: $(23 - 11) \cdot -4 = 12 \cdot -4 = -48$, which matches the given result.

What common mistakes should be avoided when solving this type of algebra problem?

Avoid misapplying operations, such as forgetting to divide both sides by -4 or mixing up signs during the calculation.

Can this problem be generalized to similar problems involving subtraction and multiplication?

Yes, similar problems can be solved by setting up equations and solving for the unknown, applying inverse operations carefully.

Why is understanding the order of operations important in solving this problem?

Because applying operations in the correct order ensures an accurate solution, especially when dealing with multiple steps involving subtraction and multiplication.

Additional Resources

Elise Says, If You Subtract 11 From My Number And Multiply The Difference By -4, The Result Is -48: A Step-by-Step Mathematical Breakdown

Mathematics often presents intriguing puzzles that challenge our reasoning and problem-solving skills. One such problem, titled "Elise Says, If You Subtract 11 From My Number And Multiply The Difference By -4, The Result Is -48," invites us to uncover the mystery behind the numbers involved. This type of problem is a classic example of algebraic reasoning, where a simple statement leads us to formulate an equation and solve for an unknown variable. In this comprehensive guide, we will dissect this problem, explain the underlying principles, and walk through the solution process in detail, making it accessible even to those new to algebra.

Understanding the Problem Statement

Before diving into the solution, let's interpret the problem carefully:

> Elise says, "If you subtract 11 from my number and multiply the difference by -4, the result is -48."

This statement contains key information:

- There is an unknown number which we can denote as x .
- We subtract 11 from x .
- The difference $(x - 11)$ is then multiplied by -4.
- The final result of this operation is -48.

Our goal is to find the value of x .

Framing the Problem as an Equation

Breaking down the problem into an algebraic expression:

1. Identify the unknown: Let x be the number in question.
2. Subtract 11 from x : This gives us $(x - 11)$.
3. Multiply the difference by -4: This leads to $-4(x - 11)$.
4. Set the expression equal to -48: Because the problem states the result is -48, the equation becomes:

$$-4(x - 11) = -48$$

Step-by-Step Solution Process

Step 1: Write the algebraic equation

From the problem, we have:

$$-4(x - 11) = -48$$

Step 2: Simplify the equation

Distribute the -4 across the parenthesis:

$$-4x + (-4)(-11) = -48$$

Recall that multiplying two negatives yields a positive:

$$-4x + 44 = -48$$

Step 3: Isolate the variable term

Subtract 44 from both sides to move constants to one side:

$$-4x + 44 - 44 = -48 - 44$$

Simplifies to:

$$-4x = -92$$

Step 4: Solve for x

Divide both sides by -4:

$$x = \left(\frac{-92}{-4}\right)$$

Dividing two negatives yields a positive:

$$x = 23$$

Final Answer

The number x that satisfies the given condition is 23.

Elise Says, If You Subtract 11 From 23, and Multiply The Difference By -4, The Result Is -48

Indeed, verifying:

$$\text{- Subtract 11 from 23: } 23 - 11 = 12$$

$$\text{- Multiply by -4: } 12 \cdot -4 = -48$$

The calculation confirms our solution.

Additional Insights and Tips for Solving Similar Problems

Understanding the Language

Real-world problems often use words to describe algebraic operations. Key phrases to watch for include:

- "Subtract" indicates a subtraction operation.
- "Multiply" indicates multiplication.
- "The result is" suggests an equation where the expression equals a certain value.

Translating Words into Equations

- Identify the unknowns and assign variables.
- Break down the sentence into smaller parts.
- Convert each part into algebraic expressions.
- Combine to form a complete equation.

Common Mistakes to Avoid

- Forgetting to distribute multiplication across parentheses.
- Sign errors, especially when multiplying or dividing negatives.
- Misreading the problem and setting up the wrong equation.

Practice Problems

To improve algebraic reasoning, try solving similar problems:

1. If y minus 7, multiplied by 3, equals 18, what is y ?
2. A number z doubled and then decreased by 10 equals 20. Find z .
3. Five times a number n , increased by 4, results in 29. What is n ?

Summary

The problem "Elise Says, If You Subtract 11 From My Number And Multiply The Difference By -4, The Result Is -48" offers a classic example of translating a word problem into an algebraic equation and solving for an unknown. By carefully interpreting the language, setting up the equation, and systematically solving, we find the solution $x = 23$. This process highlights the importance of clarity in problem-solving, the utility of algebra in everyday puzzles, and the value of methodical reasoning.

Remember, the key steps are:

- Properly interpret the problem statement.
- Translate words into an equation.
- Simplify and solve step-by-step.
- Verify the solution by substituting back into the original statement.

Mastering these skills not only helps in solving similar algebraic problems but also enhances logical thinking and analytical skills essential across numerous fields.

Happy solving!

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