Two More Than A Certain Number Is 15 Less Than The Product Of 7/8 And The Number. I NEED THE EQUATION

Two More Than A Certain Number Is 15 Less Than The Product Of 7/8 And The Number. I NEED THE EQUATION is a statement that introduces a common type of algebra problem involving variables, expressions, and equations. Such problems often require translating a word problem into a mathematical equation before solving for the unknown. In this article, we will explore how to derive the equation from the given statement, understand its components, and solve the problem step-by-step. Whether you are a student preparing for exams or someone interested in strengthening your algebra skills, this guide will walk you through the process in detail.

Understanding the Word Problem

Breaking Down the Statement

The phrase "Two More Than A Certain Number Is 15 Less Than The Product Of 7/8 And The Number" contains several key parts:
- "Two More Than A Certain Number": This suggests adding 2 to an unknown number.
- "Is": Indicates an equality, connecting the two expressions.
- "15 Less Than": Subtracting 15 from something.
- "The Product Of 7/8 And The Number": Multiplying the unknown number by 7/8.

The goal is to translate this statement into an algebraic equation involving an unknown variable, typically represented as 'x'.

Defining the Variable

Choosing a Variable

The first step in translating the statement into an equation is to define the unknown quantity:
- Let x represent the "certain number."

Once the variable is defined, we can express each part of the statement mathematically.

Formulating the Equation

Translating Each Part

Let's analyze each phrase:
1. "Two More Than A Certain Number": x + 2

2. "15 Less Than": subtract 15 from the expression that follows.
3. "The Product Of 7/8 And The Number": (7/8) x

Putting it all together, the phrase "Two More Than A Certain Number Is 15 Less Than The Product Of 7/8 And The Number" becomes:
- Left side: x + 2
- Right side: (7/8) x minus 15

Hence, the equation is:
$$ x + 2 = \left(\frac{7}{8} \times x \right) - 15 $$

Final Equation

$$
x + 2 = \frac{7}{8}x - 15
$$

This is the fundamental algebraic equation derived from the word problem.

Solving the Equation Step-by-Step

Step 1: Eliminate Fractions

To make calculations easier, multiply both sides of the equation by 8 (the denominator) to clear the fraction:
$$
8(x + 2) = 8 \left(\frac{7}{8}x - 15 \right)
$$
Simplify:
$$
8x + 16 = 7x - 120
$$

Step 2: Isolate the Variable

Subtract 7x from both sides:
$$
8x - 7x + 16 = -120
$$
Simplify:
$$
x + 16 = -120
$$

Step 3: Solve for x

Subtract 16 from both sides:
$$
x = -120 - 16
$$
$$
x = -136
$$

The solution to the equation, and thus the "certain number," is -136.

Interpreting the Solution

Verification

To ensure the solution makes sense, substitute x = -136 back into the original statement:
- "Two more than the number": -136 + 2 = -134
- "15 less than the product of 7/8 and the number":
- Calculate (7/8) (-136):
$$
\frac{7}{8} \times -136 = 7 \times -17 = -119
$$
(since 136 ÷ 8 = 17)
- Now, 15 less than this:
$$
-119 - 15 = -134
$$
- The two expressions are equal: -134, confirming the solution.

Additional Considerations

Alternative Methods

While the above method involves clearing fractions and straightforward algebra, other approaches include:
- Using substitution after isolating x
- Graphical methods to find the intersection point
- Using algebraic software or calculators for verification

Common Mistakes to Avoid

- Forgetting to multiply both sides by the denominator
- Mixing up signs when subtracting or adding
- Not verifying the solution in the original context
- Overlooking the importance of defining the variable clearly

Practical Applications of Such Word Problems

- Solving real-world problems involving quantities, measurements, and finance
- Developing critical thinking and analytical skills
- Improving algebraic literacy for academic and professional success

Summary

In summary, the key steps to solving such problems involve:
1. Carefully translating the words into an algebraic equation.
2. Clearly defining variables.
3. Using algebraic operations to isolate the variable.
4. Verifying the solution within the context of the problem.

The specific problem discussed here demonstrates how to handle fractions, combine like terms, and verify solutions. Mastery of these techniques enhances mathematical fluency and problem-solving confidence.

Final Note

Remember, the core skill in solving word problems like "Two More Than A Certain Number Is 15 Less Than The Product Of 7/8 And The Number" is accurate translation and systematic solving. Practice with similar problems can build your ability to tackle more complex algebraic scenarios effectively.

In conclusion, the key equation derived from the problem is:
$$
x + 2 = \frac{7}{8}x - 15
$$
which, after solving, reveals the "certain number" to be -136.

Frequently Asked Questions

What is the algebraic equation for 'Two more than a certain number is 15 less than the product of 7/8 and the number'?

Let the certain number be x. The equation is: x + 2 = (7/8) x - 15.

How do I set up the equation based on the statement 'Two more than a number is 15 less than the product of 7/8 and the number'?

You set up it as: x + 2 = (7/8) x - 15.

What does the phrase '15 less than the product of 7/8 and the number' translate to in an equation?

It translates to (7/8) x - 15.

Can you provide the step-by-step process to form the equation from the problem statement?

Yes. First, identify the unknown as x. 'Two more than a number' becomes x + 2. '15 less than the product of 7/8 and the number' becomes (7/8) x - 15. Set these equal: x + 2 = (7/8) x - 15.

What is the main algebraic expression derived from the statement?

The main expression is x + 2 = (7/8) x - 15.

How can I solve for x in the equation x + 2 = (7/8) x - 15?

You can isolate x by subtracting (7/8) x from both sides and then solving for x.

Is the equation symmetric or does it require rearrangement to solve?

It requires rearrangement: bringing like terms together to solve for x.

What is the significance of the fractions in the equation, and how do I handle them?

The fraction 7/8 multiplies x. To clear fractions, you can multiply both sides of the equation by 8 to eliminate the denominator.

What is the simplified form of the equation after clearing fractions?

Multiplying both sides by 8 gives: 8(x + 2) = 7x - 120, which simplifies to 8x + 16 = 7x - 120.

How do I find the value of the certain number once I have the equation?

Solve for x by subtracting 7x from both sides and then isolating x to find its value.

Additional Resources

Two More Than A Certain Number Is 15 Less Than The Product Of 7/8 And The Number:

An Analytical Breakdown of the Equation and Its Implications

Understanding the language of mathematics is fundamental to solving real-world problems, and the phrase "Two more than a certain number is 15 less than the product of 7/8 and the number" encapsulates a classic algebraic challenge. This statement, while seemingly straightforward, requires careful dissection to formulate an accurate equation and analyze its components. In this article, we delve into the precise meaning of this statement, develop the corresponding algebraic equation, and explore its broader implications through detailed explanations and step-by-step reasoning.

Deciphering the Statement: Breaking Down the Language

Understanding the Key Phrases

At the core of interpreting the statement lies a need to understand specific phrases:

- "Two more than a certain number": This indicates adding 2 to an unknown number, which we will denote as x.

- "Is": Serves as an equality indicator, suggesting the two quantities on either side are equal.

- "15 less than the product of 7/8 and the number": This points to taking the product of $\frac{7}{8}$ and the same unknown number x, and then subtracting 15 from that product.

Identifying the Unknown and Known Quantities

The phrase "a certain number" refers to an unknown quantity, which is the subject of the problem. We typically represent it with a variable—for example, x. The challenge is to relate the parts of the statement to construct an algebraic expression accurately.

Formulating the Algebraic Equation

Step-by-Step Construction

To translate the verbal statement into an algebraic equation, follow these steps:

1. Expressing "Two more than a certain number":

- This is $x + 2$.

2. Expressing "the product of 7/8 and the number":

- This is $\frac{7}{8} \times x$.

3. Expressing "15 less than the product":

- This is $\left(\frac{7}{8} \times x\right) - 15$.

4. Setting up the equality:

- The phrase "is" indicates these two expressions are equal, leading to:

$$
x + 2 = \left(\frac{7}{8} \times x\right) - 15
$$

The Final Equation

Combining these parts, the algebraic equation representing the statement is:

$$
x + 2 = \frac{7}{8} x - 15
$$

This concise form captures the entire verbal statement, translating words into algebraic symbols suitable for solving.

Analyzing the Equation: Structure and Implications

Understanding the Components

The equation:

$$
x + 2 = \frac{7}{8} x - 15
$$

is a linear equation involving a variable x. Its structure reveals the relationship between the unknown number and its scaled version, adjusted by constants.

Key observations:

- The variable x appears on both sides, indicating the need for algebraic manipulation to isolate x.

- The coefficients involve fractions, emphasizing the importance of handling fractional terms carefully during the solving process.

Implications of the Equation

This equation models a real-world relationship where a quantity plus an increment (2) corresponds to a scaled version (by $\frac{7}{8}$) of itself, offset by 15. Such relationships are common in problems involving proportional reasoning, adjustments, or comparisons.

Solving the Equation: Step-by-Step Approach

Step 1: Eliminate the Fraction

To simplify calculations, multiply both sides of the equation by 8 (the denominator of the fraction):

$$
8(x + 2) = 8 \left(\frac{7}{8} x - 15 \right)
$$

Expanding both sides:

$$
8x + 16 = 7x - 120
$$

Step 2: Isolate Variable Terms

Subtract $7x$ from both sides:

$$
8x - 7x + 16 = -120
$$

Simplifies to:

$$
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$$
x + 16 = -120
$$

Step 3: Solve for x

Subtract 16 from both sides:

$$
x = -120 - 16
$$

$$
x = -136
$$

Result: The unknown number is $\boxed{-136}$.

Verification and Interpretation of the Solution

Verifying the Solution

To verify, substitute $x = -136$ back into the original equation:

$$
x + 2 = \frac{7}{8} x - 15
$$

Calculations:

- Left side:

$$
-136 + 2 = -134
$$

- Right side:

$$
\frac{7}{8} \times (-136) - 15
$$

Calculate $\frac{7}{8} \times -136$:

$$
\frac{7 \times -136}{8} = \frac{-952}{8} = -119
$$

Subtract 15:

$$
-119 - 15 = -134
$$

Since both sides equal -134, the solution is verified.

Interpretation of the Result

The number $x = -136$ satisfies the statement, meaning:

- Two more than -136 is -134.

- The product of $\frac{7}{8}$ and -136 minus 15 is also -134.

This points to the fact that the original verbal statement describes a relationship where the number is negative, emphasizing the importance of considering negative solutions in algebraic contexts.

Broader Context and Real-World Applications

Application in Financial or Scientific Problems

Understanding such equations is critical in fields like finance, physics, and engineering, where proportional relationships and offsets are common. For example:

- Financial calculations: Determining adjustments based on fractions of investments or interest rates.

- Physics: Relating quantities where one measurement is a scaled version of another, offset by some constant.

Educational Significance

Problems like these serve as excellent exercises for students to develop algebraic thinking, such as:

- Translating verbal statements into algebraic equations.

- Handling fractions and negative numbers.

- Applying algebraic manipulations to find solutions.

Importance of Precise Language in Mathematics

The detailed analysis underscores how critical precise language interpretation is in translating words into equations. Slight misinterpretations can lead to incorrect equations, which then produce erroneous solutions. Therefore, developing skills in parsing complex statements is vital for mathematical literacy.

Conclusion: The Power of Algebraic Representation

The statement "Two more than a certain number is 15 less than the product of 7/8 and the number" exemplifies the elegance of algebra in solving real-world problems. By carefully dissecting the language, constructing the appropriate equation, and systematically solving it, we uncover the solution $x = -136$. This process highlights the importance of precise interpretation, methodical problem-solving, and verification in mathematics. Beyond the specifics of this problem, the skills involved—translating words into equations, manipulating fractions, and checking solutions—are foundational for mathematical proficiency and their application across various disciplines. As we continue to explore such problems, our understanding of relationships and proportional reasoning deepens, fostering analytical skills essential in numerous scientific and practical contexts.

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