

Four Times A Number Is, N, Added To 3 Is 47, How Do I Write An Equation To Use To Find The Number?

Four Times A Number Is, N, Added To 3 Is 47, How Do I Write An Equation To Use To Find The Number?

When tackling algebraic problems, it's essential to understand how to translate words into mathematical equations. The problem statement "Four times a number is, N, added to 3 is 47" provides a perfect opportunity to learn how to write an algebraic equation that can be solved to find the unknown number. In this article, we'll explore step-by-step how to interpret the problem, convert it into an algebraic equation, and solve for the unknown, ensuring you grasp the fundamental concepts of algebra and equation formulation.

Understanding the Problem Statement

Before jumping into writing an equation, it's crucial to understand what the problem is asking. Let's break down the sentence:

"Four times a number"

This phrase indicates multiplication. If the number is represented by a variable (commonly N or x), then "four times a number" translates to $4 \times N$ or $4N$.

"is, N, added to 3"

This phrase indicates addition. The phrase "N, added to 3" suggests we are adding 3 to the number N.

"is 47"

This indicates the total sum after the addition and multiplication operations.

Putting it all together, the phrase describes a relationship involving the number N that involves multiplication and addition equaling 47.

Step-by-Step Breakdown of the Word Problem

To accurately write an equation, follow these steps:

1. Identify the Unknown

- The unknown is the number we need to find, represented by a variable, usually N or x.
- For consistency, we'll use N in this explanation.

2. Translate "Four times a number"

- "Four times" means multiply the number N by 4.
- Algebraic form: $4N$

3. Translate "N, added to 3"

- This phrase indicates we are adding 3 directly to the number N.
- Algebraic form: $N + 3$

4. Combine the parts based on the sentence structure

- The phrase "Four times a number is, N, added to 3" suggests that the sum of "four times a number" and "3" equals 47.
- So, the total expression becomes: $(4N) + 3$

5. Write the equation

- Since this total equals 47, we set up the equation:

```
```plaintext
4N + 3 = 47
```
```

This is the algebraic equation representing the problem.

How to Formulate the Equation from the Word Problem

Formulating an algebraic equation from a word problem involves recognizing key phrases and translating them into mathematical operations. Here's a general approach:

Identify the key components:

- The unknown quantity (usually represented by a letter)
- Operations involved (multiplication, addition, subtraction, etc.)
- The total or result (the number the expression equals)

Translate each component:

- Words like "times" or "multiplied by" → multiplication
- Words like "plus," "added to," or "and" → addition
- Words like "minus" or "less than" → subtraction
- Words like "is," "equals," or "amount to" → equality (=)

Combine components to form an equation:

- Use the translated expressions to set up an equation that matches the given total or relationship.

Solving the Equation for the Unknown Number

Once the equation $4N + 3 = 47$ is established, the next step is solving for N.

Step-by-step solution:

1. Subtract 3 from both sides of the equation:

```
```plaintext
4N + 3 - 3 = 47 - 3
```
```

which simplifies to:

```
```plaintext
4N = 44
```
```

2. Divide both sides by 4 to isolate N:

```
```plaintext
N = 44 ÷ 4
```
```

which simplifies to:

```
```plaintext
N = 11
```
```

Thus, the number N is 11.

Verifying the Solution

Verification is an essential part of solving algebraic problems. It confirms whether the found value satisfies the original problem.

Original statement: "Four times a number, added to 3, is 47."

Substitute $N = 11$:

```
```plaintext
4 × 11 + 3 = 44 + 3 = 47
```
```

Since the left side equals the right side, the solution $N = 11$ is correct.

Additional Examples and Practice Problems

To deepen understanding, consider the following similar problems:

- **Example 1:** The sum of four times a number and 5 is 29. Find the number.
- **Example 2:** If three times a number, increased by 2, results in 20, what is the number?
- **Example 3:** A number doubled and then decreased by 4 equals 10. Find the number.

Solutions:

- Example 1:
 - Equation: $(4N + 5 = 29)$
 - Solution:
 - Subtract 5: $(4N = 24)$
 - Divide by 4: $(N = 6)$
- Example 2:
 - Equation: $(3N + 2 = 20)$
 - Solution:
 - Subtract 2: $(3N = 18)$
 - Divide by 3: $(N = 6)$
- Example 3:
 - Equation: $(2N - 4 = 10)$
 - Solution:
 - Add 4: $(2N = 14)$

- Divide by 2: $(N = 7 \div 2)$

Common Mistakes to Avoid in Writing and Solving Equations

When translating word problems into algebraic equations, watch out for these common pitfalls:

1. Misinterpreting the words

- Ensure you understand the meaning of phrases like "more than," "less than," "the sum of," etc.

2. Incorrectly translating operations

- Remember that "twice" means multiply by 2, "minus" means subtraction, etc.

3. Forgetting to set the equation equal to the total

- Always confirm the equation reflects the total or relationship described.

4. Ignoring the order of operations

- When solving, follow the proper order: parentheses, exponents, multiplication/division, addition/subtraction.

Conclusion: Mastering the Art of Writing Equations from Word Problems

Understanding how to convert a verbal problem like "Four times a number is, N , added to 3 is 47" into an algebraic equation is a fundamental skill in mathematics. It involves carefully interpreting the language, translating key phrases into mathematical operations, and then solving the resulting equation. With practice, this process becomes intuitive, enabling you to tackle various algebraic problems confidently. Remember to verify your solutions and practice with different types of word problems to strengthen your skills.

By mastering these steps, you'll be well-equipped to translate real-world scenarios into algebraic equations and find solutions efficiently, paving the way for success in algebra and beyond.

Frequently Asked Questions

What is the first step to write an equation for 'Four times a number, N, added to 3 equals 47'?

The first step is to translate the verbal statement into a mathematical expression: 4 times N plus 3 equals 47, which is written as $4N + 3 = 47$.

How do I set up the equation if 'Four times a number is N, added to 3, equals 47'?

You set up the equation as $4N + 3 = 47$, where $4N$ represents four times the number, and the plus 3 represents adding 3.

What does the phrase 'Four times a number' translate to in an equation?

It translates to 4 multiplied by N, written as $4N$.

How can I solve for N once I have the equation $4N + 3 = 47$?

Subtract 3 from both sides to get $4N = 44$, then divide both sides by 4 to find $N = 11$.

What is the importance of translating words into equations in math problems?

Translating words into equations helps to clearly define the problem mathematically, making it easier to solve systematically.

Can I write a different equation for the same problem? Why or why not?

No, because the original problem specifies 'Four times a number added to 3 equals 47,' which corresponds uniquely to the equation $4N + 3 = 47$.

What is the solution to the equation $4N + 3 = 47$?

The solution is $N = 11$ after subtracting 3 from both sides and dividing by 4.

How do I verify that my solution $N = 11$ is correct?

Substitute $N = 11$ back into the original equation: $4(11) + 3 = 44 + 3 = 47$, which confirms the solution is correct.

What does this problem teach about forming equations from word problems?

It teaches that identifying key phrases and translating them into mathematical expressions allows us to create equations that help find the unknown value.

Additional Resources

Mathematical Equations

When it comes to solving algebraic problems, translating word problems into equations is an essential skill that bridges everyday language with mathematical logic. In this article, we'll explore how to convert a specific problem—"Four times a number is, N , added to 3 is 47"—into an algebraic equation, understand the reasoning behind each step, and demonstrate how to find the unknown number. This approach not only clarifies the problem-solving process but also deepens your understanding of the fundamental principles of algebra.

Understanding the Problem Statement

Before we can write an equation, it is crucial to thoroughly understand what the problem is asking. Let's dissect the problem:

> "Four times a number is, N , added to 3 is 47."

This statement contains several key components:

- "Four times a number" implies multiplication of some unknown value by 4.
- "is, N " indicates that the result of this multiplication is represented by the variable N .
- "added to 3" suggests that after multiplying the number by 4, we add 3 to this product.
- "is 47" indicates that the sum of the above operation equals 47.

The core idea is to translate this natural language description into a formal mathematical expression that can be manipulated to find the value of N .

Breaking Down the Sentence: Step-by-Step Approach

To accurately convert the problem into an equation, let's analyze each part methodically.

1. Identifying the Unknown

The unknown number is represented by the variable N. The problem states that four times this number is N, which implies that:

- The expression for "Four times a number" is $4 \times N$ or $4N$.

2. Understanding the Relationship

The key phrase "is, N, added to 3" can be interpreted as:

- The phrase "added to 3" suggests an addition operation.
- The phrase "is" indicates equality, meaning the entire expression equals 47.

Putting this together, the phrase "Four times a number is, N, added to 3" suggests:

- The sum of $4N$ and 3 equals 47.

3. Formulating the Equation

Based on the understanding above, the complete statement translates into:

$4N + 3 = 47$

This is the algebraic equation representing the problem.

Constructing the Equation: A General Approach

The process described above can be generalized for solving similar word problems:

| Step | Description | Example |
|------|--|--|
| 1. | Identify the unknown | Assign a variable (usually x, N, or y) to the unknown quantity. Number = N |
| 2. | Translate phrases into mathematical operations | For example, "twice" = $\times 2$, "sum of" = +, "difference" = -, etc. "Four times" = $4 \times N$ |
| 3. | Recognize the structure of the sentence | Determine the relationship between the parts (e.g., equals, greater than). "is 47" = = 47 |
| 4. | Write the equation | Combine the parts according to the operations and relationships identified. $4N + 3 = 47$ |

This systematic approach ensures clarity and accuracy when translating words into equations.

Solving the Equation: Step-by-Step

Once the equation $4N + 3 = 47$ is established, the next step is to solve for N.

Step 1: Isolate the Variable Term

Subtract 3 from both sides to isolate the term containing N:

$$\begin{aligned} & \backslash[\\ & 4N + 3 - 3 = 47 - 3 \\ & \backslash] \end{aligned}$$

$$\begin{aligned} & \backslash[\\ & 4N = 44 \\ & \backslash] \end{aligned}$$

Step 2: Solve for N

Divide both sides by 4:

$$\begin{aligned} & \backslash[\\ & \frac{4N}{4} = \frac{44}{4} \\ & \backslash] \end{aligned}$$

$$\begin{aligned} & \backslash[\\ & N = 11 \\ & \backslash] \end{aligned}$$

Result: The value of the unknown number N is 11.

Verification: Confirming the Solution

It's always a good practice to verify your solution by substituting $N = 11$ back into the original problem statement.

Original statement:

> "Four times a number is, N, added to 3 is 47."

Substitute $N = 11$:

$$\begin{aligned} & 4 \times 11 + 3 = 44 + 3 = 47 \end{aligned}$$

Since the left side equals 47, which matches the given total, the solution $N = 11$ is correct.

Additional Tips for Translating Word Problems into Equations

To enhance your problem-solving skills, consider the following tips:

- Read carefully: Pay attention to keywords like "sum," "difference," "product," "quotient," "is," "equals," etc.
- Define variables clearly: Assign variables logically and consistently.
- Break down complex sentences: Divide long sentences into smaller parts and translate each part.
- Use diagrams if needed: Visual aids can sometimes clarify relationships.
- Check units and context: Ensure your equation makes sense within the problem's context.

Common Variations and How to Approach Them

Different word problems can have similar structures but different phrasing. Here's how to handle some common variations:

Variation 1: "The sum of a number and 3 is 47."

Equation: $N + 3 = 47$

Solution: $N = 44$

Variation 2: "Four times a number minus 3 equals 47."

Equation: $4N - 3 = 47$

Solution: Add 3 to both sides: $4N = 50$; then, $N = 12.5$

Variation 3: "Three added to four times a number equals 47."

Equation: $4N + 3 = 47$ (same as original)

Solution: $N = 11$

Variation 4: "The number, when multiplied by 4 and then increased by 3, gives 47."

Equation: $4N + 3 = 47$

Solution: $N = 11$

Understanding the structure and keywords helps in quickly formulating the correct equation.

Conclusion: From Words to Equations and Back

Transforming a verbal problem into a mathematical equation is a vital step in algebra. In our specific example, "Four times a number is, N, added to 3 is 47," the key steps involved recognizing the multiplication, the addition, and the equality, leading to the equation $4N + 3 = 47$. Solving this equation is straightforward once formulated, revealing that $N = 11$.

This process exemplifies how clear communication, careful analysis, and systematic problem-solving techniques can demystify even seemingly complex word problems. Whether you're a student learning algebra or a professional applying mathematical reasoning, mastering this skill enhances your ability to analyze, interpret, and solve real-world problems effectively.

Remember: The key to success lies in understanding the language, translating it accurately into equations, and then solving step by step with confidence.

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