

1. Four More Than Ten Times A Number Is Twenty-four. What Is The Number? 2. Four Less Than Eight Times

Introduction

Mathematics is a fascinating subject that combines logic, reasoning, and problem-solving skills. Many mathematical problems involve translating words into algebraic expressions and equations to find unknown values. In this article, we will explore two related problems that involve algebraic thinking: the first asks us to find a number based on a specific phrase involving multiplication and addition, and the second involves a similar phrase with subtraction and multiplication. We'll analyze each problem carefully, develop equations, and solve them step by step to understand the underlying concepts. By the end of this discussion, you'll be able to approach similar word problems confidently and apply the principles of algebra effectively.

Problem 1: Four More Than Ten Times A Number Is Twenty-four. What Is The Number?

Understanding the Problem

The problem states: "Four more than ten times a number is twenty-four." This sentence provides several clues:

- There is a number, which we will denote as x .
- Ten times this number can be written as $10x$.
- Adding four to this product gives twenty-four.

Expressed mathematically, this phrase translates to an algebraic equation. Our goal is to find the value of x .

Formulating the Equation

Based on the problem, the algebraic expression is:

- Ten times a number: $10x$

- Four more than this: $10x + 4$

Given that this equals twenty-four, the equation becomes:

$$10x + 4 = 24$$

Solving the Equation

To find x , we follow these steps:

1. Subtract 4 from both sides to isolate the term with x :

$$10x + 4 - 4 = 24 - 4$$

which simplifies to:

$$10x = 20$$

2. Divide both sides by 10 to solve for x :

$$10x / 10 = 20 / 10$$

which simplifies to:

$$x = 2$$

Conclusion for Problem 1

The value of the number x that satisfies the given condition is **2**. To verify:

- Ten times 2 is 20.
- Adding four gives 24.

Thus, the solution is correct.

Problem 2: Four Less Than Eight Times A Number

Understanding the Problem

The second problem appears incomplete in the prompt, but typically, such phrasing indicates a question like:

"Four less than eight times a number is some value," or "Find the number if eight times it is some value, and four less than that is another value."

For clarity, let's consider a common interpretation:

"Four less than eight times a number equals some value" and explore different possibilities.

Alternatively, if the problem is incomplete, a typical question might be:

"Four less than eight times a number equals 20." Let's proceed with this assumption to demonstrate the process.

Formulating the Equation

Based on the interpretation, "Four less than eight times a number" translates to:

1. Calculate eight times a number: $8x$
2. Subtract four: $8x - 4$

If the problem states this equals some number, say 20, then the equation is:

$$8x - 4 = 20$$

Alternatively, if the problem states "Four less than eight times a number is 24," the equation becomes:

$$8x - 4 = 24$$

Solving the Equation

Let's assume the right side is 20 for illustration. The steps are:

1. Add 4 to both sides:

$$8x - 4 + 4 = 20 + 4$$

which simplifies to:

$$8x = 24$$

2. Divide both sides by 8:

$$8x / 8 = 24 / 8$$

which simplifies to:

$$x = 3$$

Verification:

- Eight times 3 is 24.
- Four less than 24 is 20, which matches the assumed value.

Alternative Scenario

If the problem was "Four less than eight times a number is twenty-four," then:

$$8x - 4 = 24$$

which we've already solved, resulting in $x = 3$.

If the problem was to find the number when "Four less than eight times a number" equals some other value, the same steps apply, adjusting the right side accordingly.

Understanding the Underlying Concepts

Translating Word Problems into Equations

The key skill in solving such problems lies in accurately translating words into algebraic expressions. This involves identifying:

- Numbers and variables (e.g., the unknown number x).
- Operations indicated by words such as "more than," "less than," "times," "divided by," etc.
- The structure of the problem to set up proper equations.

Common Phrases and Their Algebraic Meaning

- "More than" indicates addition: *something* +

- "Less than" indicates subtraction: *something* -
- "Times" indicates multiplication: *number* $\times$
- "Divided by" indicates division: *number* /

Solving Linear Equations

Once the algebraic equation is formulated, solving it typically involves:

1. Using inverse operations to isolate the variable.
2. Performing addition/subtraction first, then multiplication/division.
3. Checking the solution by substituting back into the original expression.

Practical Applications and Tips

Tips for Solving Word Problems

- Read the problem carefully multiple times to understand what is being asked.
- Identify key phrases and translate them into algebraic operations.
- Define variables clearly before setting up equations.
- Simplify equations step-by-step, avoiding mistakes.
- Verify the solution by plugging it back into the original problem.

Common Mistakes to Avoid

- Mixing up the order of operations.
- Misinterpreting phrases like "more than" and "less than."
- Forgetting to apply inverse operations correctly.
- Not verifying the solution within the context of the problem.

Conclusion

Word problems involving algebra are fundamental in developing problem-solving skills and understanding the relationship between language and mathematical expressions. The first problem demonstrated how to translate "Four more than ten times a number is twenty-four" into an equation and solve for the unknown. The second problem, interpreted as "Four less than eight times a number," illustrated similar methods, emphasizing the importance of careful reading and translation. Mastering these skills enables students and learners to approach a wide variety of real-world problems confidently, laying a solid foundation for advanced mathematical concepts.

Frequently Asked Questions

What is the number if four more than ten times the number equals twenty-four?

The number is 2. Because 10 times 2 is 20, and 20 plus 4 equals 24.

How do you set up an equation for 'Four more than ten times a number is twenty-four'?

You set up the equation as $10x + 4 = 24$, where x is the number.

What is the solution to the equation $10x + 4 = 24$?

Subtract 4 from both sides: $10x = 20$, then divide by 10: $x = 2$.

What is the meaning of 'Four less than eight times a number'?

It means 8 times the number minus 4, which is expressed as $8x - 4$.

If 'Four less than eight times a number' equals zero, what is the number?

Set up the equation $8x - 4 = 0$. Add 4 to both sides: $8x = 4$, then divide by 8: $x = 0.5$.

How do you solve for the number in the phrase 'Four less than eight times a number'?

Express as $8x - 4$, then set equal to the given value, and solve for x accordingly.

What are common mistakes to avoid when solving these types of algebraic problems?

Avoid mixing up the operations, forgetting to isolate the variable properly, and misreading the problem's wording.

Can these problems be solved using mental math, and how?

Yes, especially when the numbers are simple. For example, for $10x + 4 = 24$, subtract 4 to get 20, then divide by 10 to find $x = 2$.

Additional Resources

1. Four More Than Ten Times A Number Is Twenty-four. What Is The Number? 2. Four Less Than Eight Times

In the realm of mathematics, word problems often serve as an engaging bridge between abstract numbers and real-world scenarios. They challenge us to translate everyday language into algebraic expressions, fostering critical thinking and problem-solving skills. Today, we delve into two intriguing problems that exemplify this process: the first involving an unknown number related to a simple algebraic equation, and the second examining a straightforward multiplication and subtraction scenario. Both problems, while seemingly simple, highlight the importance of understanding how to formulate equations, interpret them, and solve for unknowns with clarity.

Understanding the First Problem: "Four More Than Ten Times A Number Is Twenty-four. What Is The Number?"

Breaking Down the Statement

The first problem states: "Four more than ten times a number is twenty-four." At first glance, it appears straightforward, but parsing the statement carefully is crucial for setting up the correct mathematical model.

- "Ten times a number" indicates that the unknown number is multiplied by 10.
- "Four more than" suggests that after multiplying the number by 10, we add 4.
- The entire expression equals 24.

Expressed mathematically, this becomes:

$$10x + 4 = 24$$

where x is the unknown number.

Formulating the Equation

The key to solving this problem is translating the words into an algebraic equation:

- Multiply the unknown (x) by 10: $(10x)$.
- Add 4: $(10x + 4)$.
- Set equal to 24: $(10x + 4 = 24)$.

This step requires understanding the language and recognizing the operations involved.

Solving the Equation: Step-by-Step Approach

Once the equation is formulated, solving for (x) involves isolating the unknown on one side:

1. Subtract 4 from both sides:

$$\begin{aligned} & \{ \\ & 10x + 4 - 4 = 24 - 4 \\ & \} \\ & \{ \\ & 10x = 20 \\ & \} \end{aligned}$$

2. Divide both sides by 10 to solve for (x) :

$$\begin{aligned} & \{ \\ & x = \frac{20}{10} \\ & \} \\ & \{ \\ & x = 2 \\ & \} \end{aligned}$$

Answer: The number is 2.

Validating the Solution

Verifying the solution ensures correctness:

- Calculate "ten times the number": $(10 \times 2 = 20)$.
- Add 4: $(20 + 4 = 24)$.
- Since the result matches the problem statement, the solution is valid.

This confirms that the number is indeed 2.

Broader Application: Why Formulating Equations Matters

This problem exemplifies a vital skill in mathematics: translating words into algebraic equations. Such skills are foundational for tackling complex problems across various disciplines, including physics, engineering, economics, and computer science.

Key steps include:

- Reading carefully and identifying keywords: "more than," "times," "sum," "difference."
- Assigning variables to unknown quantities.
- Formulating the correct algebraic expression.
- Solving the equation systematically.

Exploring the Second Problem: "Four Less Than Eight Times"

The second problem, although incomplete in its phrasing, hints at a similar pattern: a multiplication combined with subtraction.

Interpreting the phrase:

- "Four less than" suggests subtraction: the quantity is decreased by 4.
- "Eight times" indicates multiplication by 8.
- The phrase likely refers to an expression such as: "Eight times a number, less four," which translates to:

$$\backslash[\\ 8x - 4 \\ \backslash]$$

Alternatively, if the problem states "Four less than eight times a number," it could be interpreted as:

$$\backslash[\\ 8x - 4 \\ \backslash]$$

or perhaps equates to a certain value, which would be specified in a complete problem.

Constructing a Complete Scenario for the Second Problem

Suppose the full problem is: "Four less than eight times a number equals 20. What is the number?"

This provides a concrete question and allows us to demonstrate solving such an equation.

Formulated as:

$$\backslash[\\ 8x - 4 = 20 \\ \backslash]$$

Solution steps:

1. Add 4 to both sides:

$$\begin{aligned} &\backslash \\ &8x = 24 \\ &\backslash \end{aligned}$$

2. Divide both sides by 8:

$$\begin{aligned} &\backslash \\ &x = \frac{24}{8} = 3 \\ &\backslash \end{aligned}$$

Answer: The number is 3.

Implications of the Problem

Understanding how to interpret phrases like "less than" and "times" is crucial in translating word problems into equations. This process requires:

- Recognizing the operation indicated by the language.
- Carefully ordering operations, especially when multiple steps are involved.
- Validating solutions through substitution.

Broader Significance and Applications

Mathematical word problems like these are not merely academic exercises; they mirror real-world situations where quantities are related through proportionalities, differences, and sums. For example:

- Calculating discounts and markups in commerce.
- Determining dosage in medicine based on weight.
- Analyzing financial scenarios involving interest and payments.

Mastering the skill of translating words into equations enhances problem-solving efficiency and accuracy across diverse fields.

Tips for Tackling Similar Problems

1. Identify keywords: Words like "more than," "less than," "times," "divided by," "sum," and "difference" serve as clues for operations.
2. Define variables clearly: Assign a letter to the unknown quantity and keep track of it.
3. Translate carefully: Write the algebraic expression step-by-step, ensuring it matches the problem statement.
4. Solve systematically: Use inverse operations—addition/subtraction, multiplication/division—to

isolate the variable.

5. Check your work: Substitute the solution back into the original equation to verify correctness.

Conclusion

Mathematics often begins with understanding language and translating it into equations. The problems discussed—"Four more than ten times a number is twenty-four" and "Four less than eight times"—serve as excellent examples of this process. By carefully parsing the statements, formulating accurate equations, and solving step-by-step, learners develop essential skills that extend beyond the classroom into everyday reasoning and professional problem-solving. Whether dealing with simple unknowns or complex systems, the foundational principles remain the same: clarity in interpretation and precision in execution. As you encounter similar problems, remember that the key lies in understanding the language, setting up the correct equations, and approaching solutions methodically.

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