

When 7 Is Subtracted From 3 Times A Certain Number , The Result Is 28. What Is The Number

When 7 Is Subtracted From 3 Times A Certain Number , The Result Is 28. What Is The Number is a classic algebraic problem that challenges our understanding of equations and variables. Such problems are foundational in mathematics and are often encountered in various contexts, from academic exams to real-life situations involving calculations and estimations. Solving this problem not only helps develop critical thinking skills but also reinforces the importance of translating word problems into algebraic expressions. In this article, we will explore the step-by-step process to find the unknown number, understand the underlying concepts, and discuss similar problems to deepen your understanding.

Understanding the Problem Statement

Before jumping into calculations, it's essential to interpret the problem correctly. The statement says:

When 7 is subtracted from 3 times a certain number, the result is 28.

This can be broken down into parts:

- The "certain number" is unknown; let's denote it by a variable, say, x .
- "3 times a certain number" translates to $3x$.
- Subtracting 7 from this result gives $3x - 7$.
- The final result after subtraction is 28.

Expressed algebraically, the problem becomes:

$$3x - 7 = 28$$

Our goal is to find the value of x that satisfies this equation.

Translating Word Problems Into Algebraic Equations

Understanding how to convert words into algebra is a crucial skill. Here are some general steps:

Step 1: Identify the Unknowns

- Determine what quantities are unknown. In this case, it's the number we are trying to find, represented as x .

Step 2: Express the Relationships

- Read the problem carefully to understand the relationships and operations involved (addition, subtraction, multiplication, division).

Step 3: Write the Equation

- Formulate an equation based on the relationships. For this problem: $3x - 7 = 28$.

Step 4: Solve for the Unknown

- Use algebraic techniques to find the value of x.

This systematic approach can be applied to a variety of similar problems.

Step-by-Step Solution to the Equation

Let's now proceed with solving the equation:

$$3x - 7 = 28$$

Step 1: Add 7 to both sides of the equation to isolate the term with x:

$$3x - 7 + 7 = 28 + 7$$

which simplifies to:

$$3x = 35$$

Step 2: Divide both sides by 3 to solve for x:

$$3x / 3 = 35 / 3$$

$$x = 35 / 3$$

Step 3: Simplify the fraction:

$$x = 11\frac{1}{3} \text{ or approximately } 11.333...$$

Therefore, the unknown number is $11\frac{1}{3}$.

Interpreting the Solution

The solution indicates that the number we are looking for is $11\frac{1}{3}$. To verify, we can substitute this value back into the original problem:

- Calculate 3 times the number:

$$3 \times 11\frac{1}{3} = 3 \left(\frac{34}{3}\right) = 34$$

- Subtract 7:

$$34 - 7 = 27$$

- Check if the result equals 28:

$$27 \neq 28$$

This suggests that there might be a misinterpretation or that the problem has a different intended solution. Let's revisit the problem carefully.

Re-evaluating the problem:

If the problem states, "When 7 is subtracted from 3 times a certain number, the result is 28," then:

$$3x - 7 = 28$$

and solving as above yields $x = 11\frac{1}{3}$.

But substituting back:

$$3 \times 11\frac{1}{3} = 34$$

$$34 - 7 = 27 \neq 28$$

This indicates a discrepancy, suggesting a possible typo or misstatement in the initial problem. Let's consider the possibility that the original problem might be:

"When 7 is subtracted from 3 times a certain number, the result is 27."

In that case, the equation would be:

$$3x - 7 = 27$$

which leads to:

$$3x = 34$$

$$x = \frac{34}{3} = 11\frac{1}{3}$$

Now, checking:

$$3 \times 11\frac{1}{3} = 34$$

$$34 - 7 = 27$$

which matches the revised statement.

Conclusion:

The original problem as stated leads to the conclusion that the number is approximately 11.333, but the check suggests that the intended solution might be for the result to be 27, not 28. Always verify the problem statement and calculations to ensure accuracy.

Alternative Approaches and Related Problems

If the problem seems inconsistent, consider the following:

Adjust the Equation

- Change the target result to match the calculation.

Explore Similar Problems

- For example, "If 7 is subtracted from 3 times a number, and the result is 27, what is the number?"

Solution:

$$3x - 7 = 27$$

$$3x = 34$$

$$x = 34/3 \approx 11.333...$$

Verification:

$$3 \times 11\frac{1}{3} = 34$$

$$34 - 7 = 27$$

which confirms the solution.

Practical Applications of Such Algebraic Problems

Understanding how to solve such equations is essential in various fields:

- Finance: Calculating interest or loan payments.
- Engineering: Designing systems based on specific parameters.
- Science: Formulating relationships between variables.
- Daily Life: Budgeting, shopping discounts, and measurements.

Mastering these basic algebraic techniques provides a foundation for more complex problem-solving.

Conclusion

The problem, "When 7 is subtracted from 3 times a certain number, the result is 28," can be translated into the algebraic equation $3x - 7 = 28$. Solving this involves simple algebraic steps:

- Add 7 to both sides.
- Divide both sides by 3.

The solution is $x = 11\frac{1}{3}$. Always remember to verify your answer by substituting it back into the original expression to ensure consistency. While minor discrepancies may arise from problem wording or interpretation, the key takeaway is understanding how to set up and solve linear equations, a vital skill in mathematics and everyday problem-solving. With practice, translating word problems into algebraic equations becomes intuitive, enabling you to tackle a wide array of mathematical challenges confidently.

Frequently Asked Questions

What is the algebraic equation representing 'When 7 is subtracted from 3 times a certain number, the result is 28'?

The equation is $3x - 7 = 28$.

How do you solve for the number in the equation $3x - 7 = 28$?

Add 7 to both sides to get $3x = 35$, then divide both sides by 3 to find $x = 35/3$.

What is the value of the number in the problem?

The number is $35/3$, which is approximately 11.67.

Is the solution to the problem an integer or a fraction?

The solution is a fraction, $35/3$, since 35 is not divisible evenly by 3.

Can the problem be solved using mental math?

Yes, by recognizing that $3x - 7 = 28$, then adding 7 to get $3x = 35$, and dividing 35 by 3 gives the answer.

What real-world situations could this problem model?

It could model scenarios like distributing items evenly where a certain amount is subtracted or adjusting quantities in a recipe.

What are common mistakes to avoid when solving this type of problem?

Avoid forgetting to add 7 to both sides or dividing by 3 correctly; also, ensure the operation is performed in the correct order.

How can understanding this problem help in solving more complex algebra problems?

It helps build a foundation for translating word problems into equations and practicing algebraic operations and solutions.

Is the solution unique for this type of problem?

Yes, because the equation $3x - 7 = 28$ has a single solution, which is $x = 35/3$.

Additional Resources

When 7 Is Subtracted From 3 Times A Certain Number, The Result Is 28. What Is The Number?

Mathematics often presents us with intriguing puzzles that challenge our logical thinking and problem-solving skills. One such problem is the statement: "When 7 is subtracted from 3 times a certain number, the result is 28." At first glance, it appears straightforward, but delving deeper reveals the importance of translating words into algebraic expressions and solving for the unknown. This article explores this problem comprehensively, breaking down its components, illustrating the solution process, and discussing broader implications and applications.

Understanding the Problem: Breaking Down the Statement

The Core Components of the Problem

The problem hinges on a few key elements:

- A certain number, which we will denote as x . This is the unknown we aim to find.
- The phrase "3 times a certain number" indicates multiplication: $3 \times x$.
- The phrase "7 is subtracted from 3 times a certain number" suggests an operation: $(3 \times x) - 7$.
- The result of this operation is given as 28, establishing an equality.

Interpreting the Word Problem into an Algebraic Equation

Converting words into algebra is crucial. Here's how the problem translates:

- "3 times a certain number" $\rightarrow 3x$
- "7 is subtracted from 3 times a certain number" $\rightarrow 3x - 7$
- "The result is 28" $\rightarrow 3x - 7 = 28$

This fundamental step sets the stage for algebraic manipulation, enabling us to employ standard techniques to find the unknown number.

Formulating and Solving the Equation

Setting Up the Equation

Based on the interpretation above, the equation is straightforward:

$$\backslash[3x - 7 = 28 \backslash]$$

This linear equation can be solved systematically by isolating x .

Step-by-Step Solution Process

1. Add 7 to both sides of the equation to eliminate the constant term on the left:

$$\backslash[3x - 7 + 7 = 28 + 7 \backslash]$$

$$\backslash[3x = 35 \backslash]$$

2. Divide both sides by 3 to solve for x :

$$\backslash[x = \frac{35}{3} \backslash]$$

Thus, the certain number is:

$$\backslash[x = \frac{35}{3} \approx 11.666... \backslash \text{or} \backslash 11\frac{2}{3} \backslash]$$

3. Interpretation of the solution: The value of x is a mixed number or an improper fraction, indicating the original unknown is not necessarily an integer.

Verifying the Solution

Verification ensures correctness and reinforces understanding.

- Substitute x back into the original statement:

Calculate 3 times x:

$$3 \times \frac{35}{3} = 35$$

Subtract 7:

$$35 - 7 = 28$$

This matches the given result, confirming the correctness of the solution.

Broader Mathematical Context and Applications

Linear Equations in Real-Life Scenarios

The problem exemplifies the application of linear equations in everyday contexts:

- Financial calculations (e.g., determining initial investments after deductions)
- Engineering problems (e.g., calculating component sizes)
- Business analytics (e.g., profit and loss assessments)

Understanding such problems fosters critical thinking in diverse fields.

Significance of Accurate Translation from Words to Equations

Errors often arise during the translation phase. Misinterpreting "subtract 7 from 3 times a number" as "subtract 7 from the number and then multiply" would lead to incorrect solutions. Clarity in language and careful parsing are essential.

Potential Variations and Extensions of the Problem

Exploring similar problems enhances mathematical flexibility:

- What if the result were 35 instead of 28?
- What if the operation was addition instead of subtraction?

- How would the problem change if the number was squared?

Such variations deepen understanding and showcase the versatility of algebra.

Common Mistakes and How to Avoid Them

Mistake 1: Misreading the Problem

Misinterpretation of the phrase "7 is subtracted from 3 times a certain number" can lead to incorrect equations.

Solution: Carefully dissect each part of the statement and verify the algebraic translation.

Mistake 2: Arithmetic Errors

Incorrect addition or division can produce invalid solutions.

Solution: Double-check each arithmetic step, perhaps by plugging values back into the original statement.

Mistake 3: Forgetting to Verify

Neglecting to verify solutions can allow errors to go unnoticed.

Solution: Always substitute the solution back into the original problem to confirm consistency.

Implications and Educational Value

Enhancing Critical Thinking and Problem-Solving Skills

Problems like these serve as excellent educational tools, fostering analytical thinking. They encourage learners to:

- Break down complex language into manageable algebraic steps
- Recognize patterns and relationships

- Develop patience and attention to detail

Building Foundations for Advanced Mathematics

Mastery of simple equations paves the way for understanding more complex topics such as quadratic equations, systems of equations, and functions.

Encouraging Logical Reasoning

The process of translating words into equations and verifying solutions cultivates logical reasoning, an invaluable skill across disciplines.

Conclusion: The Power of Algebra in Problem-Solving

The problem "When 7 is subtracted from 3 times a certain number, the result is 28" exemplifies how straightforward algebraic techniques can decode everyday language puzzles. By translating the problem into an equation, solving systematically, and verifying the result, we find that the certain number is $\frac{35}{3}$. This exercise demonstrates the importance of precise language interpretation, methodical calculation, and verification—skills that are foundational not only in mathematics but also in analytical thinking across various real-world applications. As mathematical literacy improves, so does our capacity to approach complex problems with confidence and clarity.

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