

Find The Number, If...3/8 Of It Is 24.

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Understanding how to find an unknown number when given a fractional part of it is an essential skill in mathematics. This type of problem is common in algebra and helps develop logical thinking and problem-solving abilities. In this article, we will explore the question: "Find the number if 3/8 of it is 24," in detail. We will break down the problem, explain the concepts involved, and provide step-by-step solutions to ensure clarity. Whether you are a student preparing for exams or someone interested in improving your math skills, this comprehensive guide will help you grasp the concept thoroughly.

Understanding the Problem

Before jumping into the solution, it is crucial to understand what the problem is asking. The question states:

"Find the number, if 3/8 of it is 24."

This sentence conveys that a certain unknown number, which we will denote as x , has a part of it—specifically, three-eighths of it—that equals 24.

In algebraic terms, this translates to:

$$\frac{3}{8} \times x = 24$$

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

Breaking Down the Problem

Let's dissect the problem into manageable parts:

1. Identify the known and unknown quantities:

- Known: $\frac{3}{8} \times x = 24$

- Unknown: x

2. Understand the fractional part:

- The fraction $\frac{3}{8}$ represents three parts out of eight equal parts of the number.

3. Goal:

- Find the total number (x) when three-eighths of it is known to be 24.

Mathematical Approach to the Problem

To solve for (x) , we need to reverse the operation of multiplying by $(\frac{3}{8})$. This involves:

- Isolating (x) : Since $(\frac{3}{8} \times x = 24)$, then:

$$x = \frac{24}{\frac{3}{8}}$$

- Dividing by a fraction: Dividing by a fraction is equivalent to multiplying by its reciprocal.

$$x = 24 \times \frac{8}{3}$$

This step simplifies the problem to a straightforward multiplication.

Step-by-Step Solution

Let's go through the process step-by-step:

Step 1: Write the initial equation

$$\frac{3}{8} \times x = 24$$

Step 2: Solve for (x) by dividing both sides by $(\frac{3}{8})$

$$x = \frac{24}{\frac{3}{8}}$$

Step 3: Convert division of fractions into multiplication by the reciprocal

$$x = 24 \times \frac{8}{3}$$

\]

Step 4: Simplify the multiplication

- Multiply 24 by 8:

\[

$$24 \times 8 = 192$$

\]

- Divide the result by 3:

\[

$$192 \div 3 = 64$$

\]

Therefore, the unknown number $(x = 64)$.

Verification of the Solution

It's always good practice to verify the solution:

- Calculate $(\frac{3}{8})$ of $(x = 64)$:

\[

$$\frac{3}{8} \times 64 = 3 \times \frac{64}{8} = 3 \times 8 = 24$$

\]

- The calculation confirms that $(\frac{3}{8})$ of 64 is indeed 24, matching the original condition.

Hence, the solution $(x = 64)$ is correct.

Additional Examples and Practice Problems

To strengthen understanding, here are some similar problems:

1. Find the number if $(\frac{5}{6})$ of it is 50.
2. Determine the number if $(\frac{2}{5})$ of it equals 18.
3. What number has $(\frac{7}{10})$ equal to 49?

Solutions:

1. $\left(\frac{5}{6}\right) \times x = 50$

$$\begin{aligned} x &= 50 \times \frac{6}{5} = 50 \times \frac{6}{5} = (50 \div 5) \times 6 = 10 \times 6 = 60 \end{aligned}$$

2. $\left(\frac{2}{5}\right) \times x = 18$

$$\begin{aligned} x &= 18 \times \frac{5}{2} = 18 \times 2.5 = 45 \end{aligned}$$

3. $\left(\frac{7}{10}\right) \times x = 49$

$$\begin{aligned} x &= 49 \times \frac{10}{7} = 49 \times \frac{10}{7} = (49 \div 7) \times 10 = 7 \times 10 = 70 \end{aligned}$$

Common Mistakes to Avoid

While solving such problems, be cautious of the following errors:

- Incorrect division of fractions: Remember that dividing by a fraction is the same as multiplying by its reciprocal.
- Misreading the problem: Ensure you understand which part of the number is given and what you need to find.
- Arithmetic errors: Double-check your multiplication and division calculations, as small mistakes can lead to wrong answers.
- Forgetting to verify: Always verify your solution by plugging the value back into the original expression.

Practical Applications of Fractional Problems

Understanding how to find the total when given a fractional part has real-world applications, such as:

- Financial calculations: Determining total costs when a certain percentage or fraction of it is known.

- Cooking and recipes: Adjusting ingredient quantities based on fractional requirements.
- Engineering and construction: Calculating total material quantities based on fractional measurements.
- Statistics and data analysis: Working with proportions and fractions of data sets.

Conclusion

Finding an unknown number when a fractional part of it is known involves a clear understanding of fractions and algebraic manipulations. The key steps include:

- Setting up the equation based on the problem.
- Isolating the unknown variable.
- Using reciprocal multiplication to solve.
- Verifying the result.

In the specific problem "Find the number if $\frac{3}{8}$ of it is 24," the solution is 64. This process reinforces important mathematical skills that are applicable across various contexts. Practice with similar problems will enhance your confidence and proficiency in handling fractional equations.

Summary of Key Points

- Express the problem mathematically: $\frac{3}{8} \times x = 24$.
- Solve for x : $x = 24 \times \frac{8}{3}$.
- Simplify to find $x = 64$.
- Always verify your answer by substituting back into the original equation.
- Practice with additional problems to strengthen understanding.

By mastering these techniques, you'll be better equipped to tackle a wide range of fractional and algebraic problems confidently.

Ready to practice? Try solving similar problems on your own, and remember to check your work carefully!

Frequently Asked Questions

Find the number if three-eighths of it is 24.

The number is 64.

How do you calculate the number when 3/8 of it equals 24?

Divide 24 by $(3/8)$, which is equivalent to multiplying 24 by the reciprocal of $3/8$, so the number is $24 \times 8/3 = 64$.

What is the process to find the total number if a fraction of it is given?

You set up an equation based on the fraction, then solve for the total number; in this case, $\text{total} = (\text{given part}) \div (\text{fraction})$.

Can you verify the answer for 'Find the number if 3/8 of it is 24'?

Yes. Calculate $3/8$ of 64: $(3/8) \times 64 = 24$, confirming that the number is 64.

What is the general formula to find a number when a fraction of it is known?

$\text{Number} = (\text{Known part}) \div (\text{Fraction})$, where the fraction is expressed as a decimal or numerator/denominator.

Is the answer to '3/8 of a number is 24' unique?

Yes, the number is uniquely determined as 64 in this case.

What real-life scenarios could involve finding a number from a fractional part?

Examples include calculating total costs, determining full quantities from partial measurements, or distributing resources evenly.

Additional Resources

Find The Number, If...3/8 Of It Is 24

Introduction

Mathematics often presents us with intriguing problems that challenge our understanding

of basic arithmetic principles and problem-solving strategies. One such problem is: Find the number if $\frac{3}{8}$ of it is 24. While seemingly straightforward, this question encapsulates fundamental concepts of fractions, algebra, and logical reasoning. Its simplicity lends itself well to educational purposes, yet it also opens the door to deeper explorations of proportional relationships and algebraic techniques. This article aims to dissect this problem thoroughly, providing a comprehensive understanding suitable for educators, students, and enthusiasts alike.

Understanding the Problem

At its core, the problem asks us to find an unknown number, which we'll denote as x , given a specific fractional part of it: $\frac{3}{8}$ of x equals 24.

Expressed mathematically, this is:

$$\frac{3}{8} \times x = 24$$

The question is: What is the value of x ?

Before solving, it's essential to interpret what the problem entails:

- " $\frac{3}{8}$ of it" refers to a fractional part of the unknown number.
- The equality equals 24 provides a concrete value that the fractional part corresponds to.
- The goal is to find the entire number x based on this information.

Step-by-Step Solution Approach

1. Restating the Equation

The initial step involves translating the problem statement into a solvable algebraic equation:

$$\frac{3}{8}x = 24$$

2. Isolating the Variable

To find x , we need to isolate it on one side of the equation. Since x is multiplied by $\frac{3}{8}$, we can do this by multiplying both sides of the equation by the reciprocal of $\frac{3}{8}$, which is $\frac{8}{3}$:

$$x = 24 \times \frac{8}{3}$$

3. Calculating the Value

Performing the multiplication:

$$x = 24 \times \frac{8}{3}$$

Simplify numerator and denominator:

$$x = \frac{24 \times 8}{3}$$

Calculate numerator:

$$24 \times 8 = 192$$

Now divide by 3:

$$x = \frac{192}{3} = 64$$

Therefore, the number is 64.

Validating the Solution

To confirm the accuracy, substitute $x = 64$ back into the original condition:

$$\frac{3}{8} \times 64 = ?$$

Calculate:

$$\frac{3}{8} \times 64 = 3 \times \frac{64}{8} = 3 \times 8 = 24$$

Since the result matches the given value, the solution $x = 64$ is correct.

Deeper Dive: Conceptual Understanding

The Role of Fractions in Problem Solving

Fractions are a fundamental component of mathematical literacy, representing parts of a

whole. This problem highlights how understanding fractions enables us to translate real-world relationships into algebraic expressions.

Algebraic Manipulation

The process demonstrates the importance of reciprocal operations—multiplying by the reciprocal of a fraction to isolate the variable. This skill is crucial in solving linear equations across various contexts.

Broader Applications and Related Problems

The problem type presented here is a specific case of proportion problems, which are widely applicable in fields like:

- Finance: Calculating interest or discounts.
- Science: Converting units or understanding ratios.
- Statistics: Interpreting fractional data.

Below are examples of similar problems:

Problem Description	Mathematical Expression	Solution
Find a number if 2/5 of it is 30	$\frac{2}{5}x = 30$	$x = 30 \times \frac{5}{2} = 75$
Find the total if 5/9 of it is 45	$\frac{5}{9}x = 45$	$x = 45 \times \frac{9}{5} = 81$
Find the number if 7/10 of it is 70	$\frac{7}{10}x = 70$	$x = 70 \times \frac{10}{7} = 100$

Understanding these types of problems enhances problem-solving flexibility and mathematical fluency.

Common Misconceptions and Pitfalls

1. Misinterpreting the Fraction: Some might incorrectly think they need to multiply or divide differently; emphasizing the importance of understanding the fraction as a part of the whole helps avoid errors.
2. Neglecting the Reciprocal Step: Forgetting to multiply both sides by the reciprocal of the fraction can lead to incorrect answers.
3. Assuming the Fraction is the Whole: The problem states a part of the number, not the entire number, which can lead to confusion if not carefully read.

Educational Strategies for Teaching Such Problems

- Use Visual Aids: Pie charts or bar models can help illustrate what a fractional part of a whole looks like.
- Step-by-Step Practice: Break down similar problems into smaller, manageable steps.
- Real-World Contexts: Incorporate real-life scenarios to make the problems more engaging.
- Interactive Activities: Use manipulatives or digital tools to explore fractions and algebra interactively.

Conclusion

The seemingly simple problem Find the number if $\frac{3}{8}$ of it is 24 encapsulates the core principles of algebra and fractions. Its resolution demonstrates the importance of understanding reciprocal operations and algebraic manipulation in problem-solving. Moreover, it serves as an educational gateway to more complex proportional reasoning and algebraic expressions. Recognizing the fundamental nature of such problems and mastering their solutions is essential for developing strong mathematical literacy, applicable across academic disciplines and real-world scenarios.

In the broader context, problems like these reinforce the significance of foundational mathematical concepts, fostering critical thinking and analytical skills vital for academic success and everyday decision-making. Whether used as a teaching tool or self-study exercise, mastering this type of problem cultivates confidence and competence in mathematical reasoning.

References

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This article aims to provide a comprehensive understanding of the problem "Find The Number, If... $\frac{3}{8}$ Of It Is 24," serving as a valuable resource for learners and educators seeking to deepen their grasp of algebraic problem-solving techniques.

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