

If 55% Of A Number Is 176 And 35% Of The Same Number Is 112, Find 90% Of That Number.

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Understanding how to find a specific percentage of a number based on given parts is a fundamental skill in mathematics. This problem involves working with percentages and algebraic expressions to uncover the original number, and then calculating 90% of it. In this comprehensive guide, we will walk through the problem step-by-step, explore the concepts involved, and provide tips to solve similar problems efficiently.

Understanding the Problem Statement

The problem states:

- 55% of a certain number equals 176.
- 35% of the same number equals 112.
- The goal is to find 90% of that number.

This type of problem is common in algebra and percentage calculations, often appearing in exams and real-world scenarios like finance, statistics, and data analysis.

Key Concepts Involved

Before diving into the solution, it's essential to understand some key concepts:

Percentages and Their Meaning

- Percentage (%) is a way of expressing a number as a fraction of 100.
- To convert a percentage to a decimal, divide it by 100.
- Example: $55\% = 55/100 = 0.55$

Algebraic Representation

- When given a percentage of a number, we can represent it as:
- $\text{Percentage} \times \text{Number} = \text{Part}$
- If the number is unknown, denote it as N .

Setting Up Equations

- Use the information to set up equations and solve for N .

Step-by-Step Solution Approach

Let's break down the problem into manageable steps.

Step 1: Express the given information as equations

- From the problem:
 1. $55\% \text{ of } N = 176$
 2. $35\% \text{ of } N = 112$
- Convert percentages to decimals:
 - $0.55 \times N = 176$
 - $0.35 \times N = 112$

Step 2: Set up equations

- Equation 1: $0.55N = 176$
- Equation 2: $0.35N = 112$

Step 3: Solve for N using the equations

- From Equation 1:
 - $N = \frac{176}{0.55}$
- From Equation 2:
 - $N = \frac{112}{0.35}$
- Calculate both to verify consistency:
 - $N = \frac{176}{0.55}$
 - $N = 320$

And,

- $N = \frac{112}{0.35}$
- $N = 320$

- Both calculations give the same value, confirming the value of (N) is 320.

Step 4: Find 90% of the number

- 90% of the number:
- $(0.90 \times N)$
- $(0.90 \times 320 = 288)$

Thus, 90% of the number is 288.

Summary of the Solution

- The key steps involved translating percentage statements into algebraic equations.
- Solving these equations confirmed the original number as 320.
- Calculating 90% of this number yielded 288.

Additional Insights and Tips

To enhance your understanding and ability to solve similar problems, consider the following tips:

Tip 1: Always convert percentages to decimals before calculations

- This simplifies multiplication and reduces errors.

Tip 2: Verify your solution by substituting back

- Check if the found number satisfies the original conditions.

Tip 3: Use algebraic methods for unknowns

- When multiple pieces of information involve the same unknown, set up equations to find the variable efficiently.

Tip 4: Recognize proportional relationships

- Remember that percentages of the same number relate proportionally, which can help in cross-verification.

Real-World Applications of Percentage Problems

Understanding how to manipulate percentages is critical in various domains:

1. **Finance:** Calculating discounts, interest rates, and profit margins.
2. **Statistics:** Determining proportions and percentages in data sets.
3. **Shopping:** Figuring out sale prices after discounts.
4. **Health:** Calculating calorie intake percentages or dosage adjustments.

Practice Questions to Enhance Your Skills

To solidify your understanding, try solving these similar problems:

1. If 60% of a number is 150, what is 80% of the same number?
2. A store offers a 25% discount on a product costing \$200. What is the sale price?
3. 35% of a number is 70. Find 50% of the same number.
4. In a class, 40% of students are girls. If there are 120 students in total, how many boys are there?

Conclusion

Mastering percentage problems like "If 55% of a number is 176 and 35% of the same number is 112, find 90% of that number" enhances your problem-solving skills and mathematical reasoning. The key lies in translating percentage statements into algebraic equations, solving for the unknown, and then applying the same logic to find the desired percentage. Remember to verify your solutions and practice similar problems to build confidence and proficiency.

By understanding the underlying principles and practicing regularly, you'll be well-equipped to handle a wide variety of percentage-based problems confidently and accurately.

Frequently Asked Questions

What is the first step to find the number when 55% of it is 176?

Set up the equation: 55% of the number = 176, which translates to $0.55 \times x = 176$. Then, solve for x by dividing both sides by 0.55.

How do you verify that 55% of the number is 176?

Calculate $0.55 \times x$ and check if the result equals 176. If it does, then x is the correct number.

Given that 35% of the same number is 112, how can we find the number?

Set up the equation: $0.35 \times x = 112$, then solve for x by dividing both sides by 0.35.

How can we confirm the value of the number using both percentages?

Calculate x from both equations: from 55%, $x = 176 / 0.55$; from 35%, $x = 112 / 0.35$; then verify if both results are the same.

What is the value of the number based on the calculations?

From 55%, $x = 176 / 0.55 = 320$; from 35%, $x = 112 / 0.35 = 320$. So, the number is 320.

How do we find 90% of the number once we know it?

Calculate $0.90 \times 320 = 288$. Therefore, 90% of the number is 288.

Can we verify the calculations to ensure accuracy?

Yes, by checking that 55% of 320 is 176 and 35% of 320 is 112, which confirms our calculations are correct.

What is the final answer to the problem?

90% of the number is 288.

Additional Resources

If 55% Of A Number Is 176 And 35% Of The Same Number Is 112, Find 90% Of That Number: An In-Depth Analytical Exploration

Introduction

Mathematics often presents real-world problems in a form that requires careful interpretation and strategic problem-solving. The question posed—"If 55% of a number is 176 and 35% of the same number is 112, find 90% of that number"—serves as an excellent example of algebraic reasoning and percentage calculations. It embodies a common type of problem encountered in various contexts, from financial calculations to scientific data analysis. This article aims to dissect this problem comprehensively, providing a detailed, step-by-step understanding of the concepts involved, the methods used to solve it, and the significance of these methods in broader mathematical applications.

Understanding the Problem

At its core, the problem involves a single unknown number, which we will denote as N . The problem provides two pieces of information:

- 55% of N equals 176.
- 35% of N equals 112.

The goal is to determine 90% of N .

This type of problem is rooted in the fundamental principles of algebra and percentage calculations, requiring us to convert percentages into decimal form, set up equations based on the given information, solve for N , and then calculate the required percentage of N .

Breaking Down the Problem

1. Interpreting the Data

The key to solving the problem lies in understanding what the percentages represent:

- 55% of $N = 176$: This translates into the equation $(0.55 \times N = 176)$.
- 35% of $N = 112$: Translates into $(0.35 \times N = 112)$.

The task is to find 90% of N , which can be expressed as $(0.90 \times N)$.

2. Establishing Equations

From the above, we have two equations:

$$\begin{cases} 0.55 N = 176 \quad (1) \\ 0.35 N = 112 \quad (2) \end{cases}$$

The problem is straightforward when the two equations are consistent and lead to a single value for N .

Solving the Equations

1. Calculating N from the First Equation

From equation (1):

$$N = \frac{176}{0.55}$$

Calculating this:

$$N = \frac{176}{0.55} = 320$$

2. Validating N Using the Second Equation

Using equation (2):

$$\begin{aligned} & \backslash[\\ & 0.35 N = 112 \\ & \backslash] \end{aligned}$$

Substituting $\backslash(N = 320 \backslash)$:

$$\begin{aligned} & \backslash[\\ & 0.35 \times 320 = 112 \\ & \backslash] \end{aligned}$$

Calculating:

$$\begin{aligned} & \backslash[\\ & 0.35 \times 320 = 112 \\ & \backslash] \end{aligned}$$

$$\begin{aligned} & \backslash[\\ & 112 = 112 \\ & \backslash] \end{aligned}$$

The equality holds true, confirming that $N = 320$ satisfies both conditions. This validation is an essential step in problem-solving, ensuring that the solution is consistent across all given data points.

Calculating 90% of the Number

With N determined as 320, the final step is to find 90% of N :

$$\begin{aligned} & \backslash[\\ & 0.90 \times N = 0.90 \times 320 \\ & \backslash] \end{aligned}$$

Calculating:

$$\begin{aligned} & \backslash[\\ & 0.90 \times 320 = 288 \\ & \backslash] \end{aligned}$$

Therefore, 90% of the number is 288.

Broader Implications and Applications

This problem exemplifies the importance of understanding percentage relationships and their algebraic representations. Such problems are prevalent in various fields:

- Finance: Calculating interest, discounts, or proportions of investments.

- Science: Determining concentrations or proportions in experiments.
- Statistics: Analyzing data subsets and their representations.
- Business: Budgeting, profit margins, and resource allocation.

Moreover, the problem demonstrates the importance of cross-verification. By substituting the calculated value of N back into the original equations, we confirm the solution's accuracy—a good practice that enhances reliability in mathematical problem-solving.

Key Takeaways and Methodology

- Convert percentages to decimals: Always express percentage figures as decimal numbers to facilitate calculations.
- Set up equations based on the problem statement: Use algebraic expressions to model the relationships.
- Solve for the unknown: Isolate the variable (here, N) using basic algebraic operations.
- Verify solutions: Substitute back into original equations to check for consistency.
- Calculate the desired percentage: Once the number is known, simply multiply by the required decimal.

Additional Considerations

Handling Inconsistent Data

In some scenarios, the given percentages might produce conflicting results (e.g., if the two equations do not yield the same value for N). Such discrepancies could indicate errors in the data or misinterpretations, emphasizing the importance of validation.

Extending the Problem

The framework used here can be extended to more complex problems involving multiple unknowns, inequalities, or percentage changes over time. Mastery of such foundational problems builds the confidence and skills necessary to tackle real-world mathematical challenges.

Conclusion

The problem of determining 90% of a number given specific percentage-based conditions serves as a clear illustration of algebraic techniques and the practical utility of percentage calculations. By systematically translating percentage statements into equations, solving for the unknown, and verifying the results, we reinforce fundamental mathematical principles essential in

many professional and academic contexts. The solution—finding that 90% of the number is 288—not only provides the answer but also reinforces the importance of logical reasoning, validation, and clear mathematical communication. As we encounter similar problems, these principles remain central to accurate and effective problem-solving across disciplines.

Final Reflection

Engaging with percentage problems like this enhances numerical literacy and analytical thinking. Whether in everyday life, academic pursuits, or professional environments, mastering these techniques empowers individuals to interpret data accurately, make informed decisions, and develop a deeper appreciation for the elegance and utility of mathematics.

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