

If 90% Of A Number Is 110, Find 9% Of That Number.

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This mathematical problem is a common example of percentage calculations that often appears in exams, quizzes, and real-world scenarios involving proportions and percentages. Understanding how to approach such problems not only enhances your math skills but also provides practical knowledge applicable in finance, statistics, and everyday decision-making. In this comprehensive guide, we will explore step-by-step methods to solve this problem, delve into related concepts, and provide useful tips to master percentage calculations.

Understanding the Problem

Before diving into the solution, it's essential to understand what the problem is asking and identify the key pieces of information provided:

- 90% of a certain number equals 110.
- The goal is to find 9% of that same number.

This kind of problem involves basic percentage calculations, which require converting percentages into their decimal form and applying them to the number in question.

Breaking Down the Problem

Let's analyze the problem systematically:

What is being asked?

- The problem asks for 9% of an unknown number, given a specific percentage (90%) of that number.

What information is provided?

- 90% of the number = 110

What is the unknown?

- The value of the original number
- The value of 9% of that number

Step-by-Step Solution Approach

To find 9% of the number, we need to first determine what the entire number is. Here is a step-by-

step approach:

Step 1: Convert the percentage to a decimal

Percentages are converted to decimals by dividing by 100.

- $90\% = 0.90$

- $9\% = 0.09$

Step 2: Set up an equation for the known information

Let's denote the unknown number as X .

Since 90% of X equals 110, we can write:

$$0.90 \times X = 110$$

Step 3: Solve for the unknown number

Rearranging the equation:

$$X = \frac{110}{0.90}$$

Calculating:

$$X = \frac{110}{0.90} = 122.22 \text{ (rounded to two decimal places)}$$

Step 4: Calculate 9% of the number

Now that we know $X \approx 122.22$, find 9% of X :

$$0.09 \times 122.22 \approx 11.00$$

Answer: 9% of the number is approximately 11.

Key Concepts in Percentage Calculations

Understanding the core principles behind percentage problems is crucial for solving similar questions efficiently.

1. Converting Percentages to Decimals

- Percentages are parts per hundred.
- To convert a percentage to a decimal, divide by 100.
- Example: $75\% = 75/100 = 0.75$

2. Setting Up Equations

- Use the given percentage and total to set up algebraic equations.
- Example: If $Y\%$ of a number is known, express as:
$$\frac{Y}{100} \times \text{Number} = \text{Known value}$$

3. Solving for the Unknown

- Rearrange the equation to isolate the variable.
- Use division to find the total number when given a percentage of it.

4. Calculating a Specific Percentage of the Number

- Once the total number is known, multiply by the desired percentage in decimal form.

Practical Applications of Percentage Problems

Understanding how to manipulate percentages has numerous applications:

- **Financial calculations:** Finding discounts, interest, and profit margins.
- **Statistics:** Calculating proportions, percentages, and data analysis.
- **Daily life:** Shopping discounts, tax calculations, and budgeting.

Tips for Solving Percentage Problems

To improve your efficiency and accuracy, keep these tips in mind:

1. **Always convert percentages to decimals** before calculations.
2. **Identify what is known and what needs to be found** to set up correct equations.
3. **Double-check your calculations** to avoid simple errors, especially with decimal points.
4. **Practice different types of percentage problems** to build confidence and familiarity.

Common Mistakes to Avoid

When working through percentage problems, be cautious of these pitfalls:

- Using the wrong decimal equivalent for percentages (e.g., using 0.9 instead of 0.90 for 90%).
- Mixing up the parts and the whole in calculations.
- Forgetting to round appropriately, especially when dealing with monetary values.

- Not verifying the reasonableness of your answer (e.g., if the number looks unexpectedly large or small).

Additional Practice Problems

To reinforce your understanding, try solving these similar problems:

1. If 75% of a number is 150, what is 10% of that number?
2. Find 20% of a number if 50% of the number equals 80.
3. What is 5% of a number if 60% of the number is 120?
4. If 30% of a number is 90, find 15% of that number.

Solutions:

1. For the first problem:

$$0.75 \times X = 150 \Rightarrow X = \frac{150}{0.75} = 200$$

Then, 10% of X:

$$0.10 \times 200 = 20$$

2. For the second problem:

$$0.50 \times X = 80 \Rightarrow X = \frac{80}{0.50} = 160$$

Find 20% of X:

$$0.20 \times 160 = 32$$

3. For the third problem:

$$0.60 \times X = 120 \Rightarrow X = \frac{120}{0.60} = 200$$

Find 5% of X:

$$0.05 \times 200 = 10$$

4. For the fourth problem:

$$0.30 \times X = 90 \Rightarrow X = \frac{90}{0.30} = 300$$

Find 15% of X:

$$0.15 \times 300 = 45$$

Conclusion

The key to solving percentage problems efficiently lies in understanding the relationship between parts and wholes, converting percentages to decimals, and setting up simple algebraic equations. In the specific problem where 90% of a number is 110, calculating the total number and then deriving 9% is straightforward once you follow the step-by-step process outlined above. Mastering these concepts enhances not only your mathematical competence but also your problem-solving skills in

various practical contexts.

By practicing similar problems regularly and applying these fundamental principles, you'll become proficient in percentage calculations and able to tackle a wide range of related mathematical challenges with confidence.

Frequently Asked Questions

If 90% of a number is 110, what is the number?

The number is 122.22 (since 90% of the number is 110, so $\text{number} = 110 \div 0.9$).

How do you find 9% of the number if 90% of it is 110?

First, find the number by dividing 110 by 0.9 to get approximately 122.22, then calculate 9% of that number: $0.09 \times 122.22 \approx 11$.

What is the step-by-step method to solve this problem?

Step 1: Find the total number by dividing 110 by 0.9. Step 2: Multiply the result by 0.09 to find 9% of the number.

Can you verify the answer by checking 90% of the number?

Yes. 90% of 122.22 is $0.9 \times 122.22 \approx 110$, confirming the calculation is correct.

What is the importance of understanding percentages in such problems?

Understanding percentages helps in solving real-world problems involving parts of a whole, proportions, and discounts efficiently.

Is there a quick way to find 9% of the number without full calculations?

Yes, once you find the number, multiply it by 0.09 directly. Alternatively, estimate by taking 10% and subtracting 1% if needed for quick approximation.

Additional Resources

Understanding the Problem: "If 90% Of A Number Is 110, Find 9% Of That Number"

When tackling mathematical word problems, especially those involving percentages, it's crucial to approach the problem systematically. The given problem is a classic example that combines basic algebra with percentage calculations. The core challenge here is to determine the original number

based on a percentage of it, and then find a different percentage of that number.

Let's begin by dissecting the problem step-by-step, understanding the principles involved, and then working through the solution in detail.

Breaking Down the Problem: What is Being Asked?

The problem states:

If 90% of a number is 110, find 9% of that number.

The key points:

- The initial information: 90% of some number equals 110.
- The goal: Find 9% of that same number.

From a high-level perspective, the problem asks us to:

1. Find the original number, given a percentage of it.
2. Use this number to calculate a different percentage of it.

This problem is a two-step process, involving basic algebra and percentage calculations.

Understanding Percentages and Their Representations

Before solving, it's important to understand what percentages represent.

Percentage Definition:

- Percentage (denoted as %) is a way of expressing a number as a fraction of 100.
- For example, $90\% = 90/100 = 0.9$.
- Likewise, $9\% = 0.09$.

Expressing Percentages Mathematically:

- If a percentage of a number (N) is given as $(P\%)$, then:

$$\text{Part} = \frac{P}{100} \times N$$

In our problem:

- 90% of the number is 110, so:

$$0.9 \times N = 110$$

This forms the basis for finding the original number (N) .

Step 1: Calculating the Original Number

Given:

$$0.9 \times N = 110$$

Solving for (N) :

$$N = \frac{110}{0.9}$$

Calculation:

$$N = \frac{110}{0.9} = \frac{110 \times 10}{9} = \frac{1100}{9}$$

$$N \approx 122.22$$

Interpretation:

- The original number (N) is approximately 122.22.
- Exact value as a fraction:

$$N = \frac{1100}{9}$$

- It's often more precise to keep the fractional form for further calculations, especially when dealing with percentages.

Step 2: Calculating 9% of the Number

Now that the value of (N) is known, the next step is to find 9% of (N) .

Using the percentage formula:

$$\text{9\% of } N = 0.09 \times N$$

Substituting the fractional form:

$$0.09 \times N = 0.09 \times \frac{1100}{9}$$

Calculating:

$$= \frac{9}{100} \times \frac{1100}{9}$$

Notice that 9 in numerator and denominator cancels out:

$$= \frac{1}{100} \times 1100 = \frac{1100}{100} = 11$$

Result:

$$\boxed{9\% \text{ of the number} = 11}$$

So, 9% of the number is 11.

Summary of the Solution

- The original number (N) is $(\frac{1100}{9})$ or approximately 122.22.
- 9% of that number is 11.

This process highlights a straightforward approach: convert the percentage to a decimal, set up an algebraic equation, solve for the number, then calculate the required percentage of that number.

Deeper Insights and Alternative Approaches

While the above solution is the most direct, understanding alternative methods and related concepts enriches mathematical comprehension.

Alternative Method: Using Ratio and Proportions

- Since 90% of (N) is 110:

$$\frac{90}{100} \times N = 110$$

- Rearranged as:

$$N = \frac{110 \times 100}{90} = \frac{11000}{90} = \frac{1100}{9}$$

- To find 9%:

$$0.09 \times N = 0.09 \times \frac{1100}{9} = \frac{9}{100} \times \frac{1100}{9} = \frac{1100}{100} = 11$$

This confirms the previous result.

Understanding the Relationship Between Percentages

- The problem involves percentages that are related: 90% and 9%.
- Notice that 9% is exactly 1/10th of 90%.

Implication:

- Since 90% of (N) is 110, then:

$$\text{If } 0.9N = 110,$$

- Then, 1% of (N) :

$$0.01N = \frac{0.9N}{90} = \frac{110}{90} \approx 1.2222$$

- Therefore, 9%:

$$\begin{aligned} & \backslash \\ 0.09N &= 9 \times 0.01N \approx 9 \times 1.2222 = 11 \\ & \backslash \end{aligned}$$

Again, confirming the earlier calculation.

Real-World Applications and Contexts

Understanding percentage problems like this is fundamental in various real-life scenarios, including:

- Finance and Banking: Calculating interest, discounts, or loan payments based on percentages.
- Business and Economics: Determining profit margins, sales commissions, or market shares.
- Science and Engineering: Converting measurements, concentrations, or efficiencies expressed as percentages.
- Everyday Life: Budgeting, shopping discounts, or analyzing statistical data.

For example, suppose a store offers a discount of 10% on a product whose sale price is 110. Knowing how to reverse-calculate the original price or understand what percentage of the original price the sale price represents is essential.

Common Mistakes to Avoid

When solving percentage problems, be aware of frequent pitfalls:

- Confusing the percentage with the actual number: Remember that percentages are fractions of the total; converting percentages to decimals is key.
- Incorrectly setting up the equation: Ensure the percentage is correctly applied to the variable (the number).
- Not simplifying fractions: Keeping the fractional form of the number can improve accuracy.
- Ignoring units: Always be consistent with units (i.e., percentages as decimals, or fractions).

Practice Problems for Reinforcement

To solidify understanding, consider practicing similar problems:

1. If 75% of a number is 150, find 15% of that number.

2. A certain amount is such that 25% of it equals 50. What is 10% of that amount?
3. If 60% of a number is 180, what is 6% of the number?

Working through these problems will reinforce the concept of manipulating percentages and algebraic equations.

Conclusion: Mastering Percentage Problems

The problem "If 90% of a number is 110, find 9% of that number" exemplifies fundamental percentage calculations, algebra, and proportional reasoning. By understanding the basic principles—converting percentages to decimals, setting up equations, and solving systematically—you can confidently tackle a wide range of percentage-related problems.

The key takeaways:

- Always convert percentages to decimals or fractions before calculations.
- Use algebra to find the original quantity when given a percentage of it.
- Remember the relationship between different percentages (e.g., 9% is 1/10th of 90%).

Mastering these steps allows for efficient problem-solving and a deeper understanding of how percentages work in various contexts. Whether in academics, finance, or everyday decision-making, these skills are invaluable.

In summary:

- The original number is $\left(\frac{1100}{9}\right)$ (~122.22).
- 9% of that number is 11.

This problem exemplifies the elegance and simplicity of percentage calculations when approached with clarity and systematic methods.

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