The Average (mean) Of Five Numbers Is 30.Four Of The Numbers Are 21, 29, 18 And 32.What Is The Fifth

The Average (mean) Of Five Numbers Is 30. Four Of The Numbers Are 21, 29, 18 And 32. What Is The Fifth?

Understanding how to find the fifth number when the average (mean) of five numbers is known can seem challenging at first, but with a systematic approach, it becomes straightforward. In this comprehensive guide, we will explore the process step-by-step, including essential concepts related to averages, detailed calculations, and practical examples to enhance your understanding.

Introduction to the Concept of Average (Mean)

What Is an Average?

The average, also known as the mean, is a measure of central tendency that summarizes a set of numbers with a single value. It provides insight into the typical or central value of a dataset.

Definition:
The average (mean) of a set of numbers is calculated by dividing the sum of all numbers by the total count of numbers.

Formula:
$$
\text{Average (Mean)} = \frac{\text{Sum of all numbers}}{\text{Number of values}}
$$

Analyzing the Given Problem

Problem Restatement

> The average (mean) of five numbers is 30. Four of the numbers are 21, 29,

18, and 32. What is the fifth number?

This problem entails finding the missing fifth number based on the known average and the other four numbers.

Key Data Points

- Total number of numbers: 5
- Known numbers: 21, 29, 18, 32
- Known average: 30

Step-by-Step Solution Approach

Step 1: Understand the Relationship Between Sum and Average

Since the average of the five numbers is 30, the total sum of all five numbers is:

$$
\text{Total Sum} = \text{Average} \times \text{Number of numbers} = 30 \times 5
$$

Calculation:

$$
30 \times 5 = 150
$$

So, the sum of the five numbers is 150.

Step 2: Calculate the Sum of the Known Four Numbers

Add the four known numbers:

$$
21 + 29 + 18 + 32
$$

Performing the addition:

- 21 + 29 = 50
- 50 + 18 = 68

- 68 + 32 = 100

Thus, the sum of the four known numbers is 100.

Step 3: Find the Fifth Number

The fifth number is the difference between the total sum and the sum of the four known numbers:

$$
\text{Fifth number} = \text{Total sum} - \text{Sum of known numbers}
$$

Calculating:

$$
150 - 100 = 50
$$

Answer:

The fifth number is 50.

Additional Insights and Related Concepts

Why Is Understanding the Mean Important?

Calculating the mean helps in various fields including statistics, finance, education, and everyday decision-making. It provides a quick snapshot of the data's central tendency, aiding in comparisons and analysis.

Common Applications of Finding Missing Numbers in Averages

- Academic Assessments: Determining missing scores to reach a target class average.
- Financial Planning: Estimating unknown expenses based on overall budget averages.
- Data Analysis: Filling gaps in datasets for accurate statistical modeling.

Related Problems for Practice

- If the average of three numbers is 20, and two of the numbers are 15 and 25, what is the third number?
- The average of five test scores is 85. Four scores are 80, 90, 88, and 86. Find the fifth score.
- How does changing one number affect the overall average?

Real-World Examples of Calculating Missing Data Using Averages

Scenario 1: Student Grades

A student has four grades: 78, 85, 90, and 88. The overall average after five assignments is 85. To find the fifth grade:

- Total sum of all grades = 85 × 5 = 425
- Sum of known grades = 78 + 85 + 90 + 88 = 341
- Fifth grade = 425 - 341 = 84

Interpretation: The student scored 84 on the fifth assignment.

Scenario 2: Budget Planning

An individual wants an average monthly expense of $200 over six months. If the expenses for five months are $180, $210, $190, $200, and $220:

- Total expenses needed = 200 × 6 = $1,200
- Sum of known five months = 180 + 210 + 190 + 200 + 220 = $1,000
- Sixth month expense = 1,200 - 1,000 = $200

Implication: The sixth month's expense should be $200 to meet the average goal.

Practice Problems to Strengthen Your Understanding

1. Find the fifth number if the average of five numbers is 40, and the first four numbers are 35, 45, 38, and 42.

2. The average score of six players is 75. Five scores are 70, 80, 78, 74, and 76. What is the sixth score?

3. If the sum of three numbers is 150, and two of the numbers are 60 and 50, what is the third number?

Conclusion

Understanding how to find a missing number when given the average and some known values is a vital skill in mathematics and data analysis. The key steps involve calculating the total sum based on the given average, summing the known numbers, and then subtracting to find the unknown value. This method is widely applicable in academic, professional, and everyday scenarios, making it an essential concept to master.

Remember:
- Always start by translating the average into a total sum.
- Sum the known values carefully.
- Subtract to find the unknown.
- Double-check your calculations to ensure accuracy.

By practicing these techniques with different problems, you'll develop confidence and proficiency in solving similar average-related questions efficiently.

Meta Description:
Learn how to find the fifth number when the average of five numbers is 30, with four known numbers (21, 29, 18, and 32). Step-by-step explanation, practical examples, and practice problems included.

Frequently Asked Questions

What is the fifth number if the average of five numbers is 30 and four of the numbers are 21, 29, 18, and 32?

The fifth number is 30.

How do you find the missing number when the average of five numbers is known?

Subtract the sum of the known numbers from the total sum (average times five), then find the remaining number by dividing or directly subtracting.

If four numbers are 21, 29, 18, and 32, and their average along with a fifth number is 30, what is that fifth number?

Calculate the total sum: 30 × 5 = 150. Sum the four known numbers: 21 + 29 + 18 + 32 = 100. The fifth number is 150 - 100 = 50.

What is the formula to find the missing number when given an average and other known numbers?

Total sum = average × number of items; subtract the sum of known numbers from this total to find the missing number.

Can you verify the fifth number in this problem by calculating the total sum and subtracting the known values?

Yes. Total sum = 30 × 5 = 150. Known sum = 21 + 29 + 18 + 32 = 100. Therefore, the fifth number = 150 - 100 = 50.

Additional Resources

The Average (mean) Of Five Numbers Is 30. Four Of The Numbers Are 21, 29, 18 And 32. What Is The Fifth?

Understanding the concept of averages, particularly the mean, is fundamental in various fields—from academics to data analysis and everyday decision-making. In this article, we delve into a practical problem involving the calculation of an unknown number when given the average of a set of numbers and some of its elements. We will explore step-by-step how to determine the fifth number based on the given information, providing clarity and insight into the mathematical reasoning involved.

Introduction to the Concept of Average (Mean)

Before tackling the problem, it’s essential to understand what the average (or mean) represents. The average of a set of numbers is a measure of central tendency, providing a single value that summarizes the entire dataset.

Definition:
The mean of a collection of numbers is obtained by dividing the sum of those numbers by the total count of numbers.

Mathematically, for a set of n numbers:
$$ \text{Mean} = \frac{\text{Sum of all numbers}}{n} $$

Practical Significance:
- It helps in understanding the typical value within a dataset.
- It is widely used in statistics, economics, education, and numerous other domains to analyze data trends.

In this problem, the mean of five numbers is given as 30, and four of those numbers are known. Our goal is to find the unknown fifth number.

Restating the Problem

Let’s clearly restate the problem for clarity:

- The average (mean) of five numbers is 30.
- Four of these numbers are 21, 29, 18, and 32.
- The fifth number is unknown, denoted as $ x $.
- The task: Find the value of $ x $.

This is a classic algebraic problem involving the concept of averages and the sum of numbers.

Step-by-Step Solution Approach

To solve the problem systematically, we will follow these steps:

1. Understand the given information:

- Number of total elements: 5
- Known numbers: 21, 29, 18, 32
- Unknown number: $ x $
- Average of all five numbers: 30

2. Use the formula for the mean:

$$ \text{Mean} = \frac{\text{Sum of all five numbers}}{5} $$

Given that the mean is 30:

$$ 30 = \frac{\text{Sum of five numbers}}{5} $$

3. Calculate the total sum of all five numbers:

Multiplying both sides by 5:

$$ \text{Sum of five numbers} = 30 \times 5 = 150 $$

4. Write the sum of the known four numbers:

$$ 21 + 29 + 18 + 32 = \text{Sum of known numbers} $$

Calculating:

$$ 21 + 29 = 50 $$
$$ 50 + 18 = 68 $$
$$ 68 + 32 = 100 $$

So, the sum of the known four numbers is 100.

5. Express the total sum in terms of the known numbers and the unknown:

$$ \text{Sum of five numbers} = \text{Sum of known four} + x $$

$$ 150 = 100 + x $$

6. Solve for x:

$$ x = 150 - 100 = 50 $$

Result: The fifth number is 50.

Verification and Additional Insights

Verifying the solution ensures accuracy and enhances understanding.

- Sum check:
Sum of all five numbers: $21 + 29 + 18 + 32 + 50 = 150$
- Average calculation:
$150 / 5 = 30$, which matches the given average.

Thus, the calculation is consistent with the problem statement.

Additional insights include:

- The importance of understanding the relationship between the sum of numbers and their average.
- The algebraic approach enables solving for unknowns efficiently.
- Such problems are common in standardized tests and real-world data analysis.

Practical Applications of Calculating Unknown Numbers

While this problem is straightforward, similar calculations are vital in various real-life contexts:

- Financial Planning: Estimating unknown expenses or savings based on average budgets.
- Academic Scores: Calculating missing grades to achieve a target class average.
- Data Analysis: Inferring missing data points in datasets.
- Quality Control: Determining the defective rate when some data points are missing.

Understanding how to manipulate averages and sums empowers individuals to make informed decisions and solve practical problems effectively.

Conclusion

In conclusion, the problem of finding the fifth number when the average of five numbers is known, and four of those numbers are given, hinges on understanding the fundamental relationship between sum and average. By translating the problem into an algebraic equation, we determined that the missing number is 50.

This exercise exemplifies how basic mathematical principles can be applied to solve real-world problems. Whether in academics, business, or daily life, mastering such concepts enhances analytical skills and promotes a deeper comprehension of data interpretation.

Key Takeaways:

- The mean provides a central value of a dataset.
- The total sum of numbers can be retrieved by multiplying the mean by the count of numbers.
- Unknown values can be deduced by rearranging the sum and mean formulas.
- Verification ensures the accuracy of your solution.

By understanding and practicing these methods, readers can confidently approach similar problems, making mathematics both accessible and applicable to everyday situations.

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