

A Man Divides His 360 Cattle Between His Son In The Ratio 7: 6: 5. Find The Smallest Share

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Introduction

Dividing inheritance or assets equitably among heirs is a common challenge that involves understanding ratios and proportions. In many real-world situations, such as distributing cattle, land, or wealth, ratios are used to ensure fairness based on prior agreements, social customs, or individual contributions. One classic problem involves a man who has 360 cattle and wants to divide them among his three sons in the ratio 7:6:5. This scenario not only tests basic mathematical skills but also offers insights into proportionate distribution, simplifying ratios, and calculating the smallest share among the heirs.

In this article, we will explore how to approach this problem step-by-step, providing a comprehensive explanation suitable for learners at various levels. Additionally, we'll discuss the importance of ratio division in practical contexts, the methods used to find the smallest share, and some related examples to deepen understanding.

Understanding the Problem

The problem states:

> A man has 360 cattle and wants to divide them among his three sons in the ratio 7:6:5. Find the smallest share among the sons.

This problem involves several key concepts:

- Total quantity: 360 cattle
- Ratios of shares: 7:6:5
- Objective: Determine the smallest share among the three sons.

Why Use Ratios?

Ratios are used to represent the relative sizes of parts of a whole. They help ensure fair distribution based on predefined proportions. In this case, the ratios 7:6:5 indicate the relative shares of each son, not the exact number of cattle they will receive unless scaled appropriately.

Step-by-Step Solution Approach

Let's break down the problem into manageable steps.

Step 1: Understand the Ratio Parts

The ratio 7:6:5 consists of three parts:

- First son's share corresponds to 7 parts
- Second son's share corresponds to 6 parts
- Third son's share corresponds to 5 parts

Total parts = $7 + 6 + 5 = 18$ parts

Step 2: Find the Value of One Part

Since the total number of cattle is 360, and the total parts are 18, the value of each part is:

$$\begin{aligned} \backslash[\\ \text{Value of one part} &= \frac{\text{Total cattle}}{\text{Total parts}} = \frac{360}{18} = 20 \\ \backslash] \end{aligned}$$

This means each part in the ratio corresponds to 20 cattle.

Step 3: Calculate Each Son's Share

- First son: $(7 \times 20 = 140)$
- Second son: $(6 \times 20 = 120)$
- Third son: $(5 \times 20 = 100)$

Step 4: Identify the Smallest Share

Among the shares:

- 140 cattle
- 120 cattle
- 100 cattle

The smallest share is 100 cattle, which belongs to the third son.

Final Answer

The smallest share of cattle that the third son receives is 100.

Additional Insights and Practical Applications

Understanding such ratio divisions is fundamental not only in mathematical problems but also in real-life scenarios like:

- Dividing inheritance or estate assets fairly among heirs
- Sharing profits among partners based on investment ratios
- Distributing resources in project management proportionally

How to Confirm the Calculation

Always double-check your work:

- Sum of individual shares: $(140 + 120 + 100 = 360)$, which matches the total cattle.
- Each share is proportional: The ratios of the shares are 140:120:100, which simplifies to 7:6:5, matching the given ratio.

Related Problems and Variations

1. Dividing different quantities: If the total cattle were 480 instead of 360, how would the shares change?
2. Adding more heirs: How does adding more ratios affect the total distribution?
3. Calculating the largest share: In the same scenario, what is the largest share?

Common Mistakes to Avoid

- Incorrect sum of parts: Always verify that the sum of the ratio parts matches the total divided accordingly.
- Misinterpreting ratios: Remember that ratios represent parts of a whole, not actual quantities until scaled.
- Forgetting to reduce the ratio: In some cases, ratios need to be simplified before calculations.

Conclusion

Distributing assets based on ratios requires a clear understanding of proportional division. By following a

systematic approach—finding the sum of ratio parts, calculating the value of a single part, and then multiplying to find each share—you can accurately determine individual shares, including the smallest one.

In this specific problem, dividing 360 cattle among three sons in the ratio 7:6:5 results in the smallest share being 100 cattle. Such problems reinforce fundamental mathematical concepts and demonstrate their practical importance in everyday life.

Mastering ratio-based division helps in making fair and logical distribution decisions, ensuring everyone receives their appropriate share based on agreed-upon proportions.

Keywords for SEO Optimization

- Ratio division of assets
- How to divide cattle among heirs
- Distributing inheritance fairly
- Mathematical ratio problems
- Calculate smallest share in division
- Practical ratio distribution examples
- Step-by-step ratio calculation
- Fair asset sharing methods
- Ratio problem solutions
- Basic math for inheritance division

By understanding and practicing ratio division problems, learners and professionals can develop critical skills necessary for fair resource allocation, financial planning, and problem-solving in various domains.

Frequently Asked Questions

What is the total number of parts into which the cattle are divided among the son and other heirs?

The cattle are divided into $7 + 6 + 5 = 18$ parts.

How many cattle does each part represent in the division?

Each part represents $360 \div 18 = 20$ cattle.

What is the smallest share among the heirs based on the ratio 7:6:5?

The smallest share corresponds to the ratio 5, which is 5 parts, so $5 \times 20 = 100$ cattle.

How much cattle does the son with the largest share receive?

The largest share is 7 parts, so $7 \times 20 = 140$ cattle.

What is the combined share of the two larger heirs?

The combined share is $(7 + 6)$ parts = 13 parts, which equals $13 \times 20 = 260$ cattle.

How can you verify that the total cattle are correctly divided among the heirs?

By summing all shares: 7 parts + 6 parts + 5 parts = 18 parts, and multiplying each by 20 gives $140 + 120 + 100 = 360$ cattle, matching the total.

What is the importance of the ratio 7:6:5 in determining the smallest share?

The ratio indicates the proportion of cattle each heir receives, with the smallest share corresponding to the smallest ratio, which is 5 parts.

If the total cattle were increased to 540, what would be the smallest share?

Total parts remain 18, so each part would be $540 \div 18 = 30$ cattle. The smallest share (5 parts) would then be $5 \times 30 = 150$ cattle.

Additional Resources

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Introduction

In the realm of practical mathematics, word problems involving division and ratios are not just academic exercises—they mirror real-life scenarios where resources need to be apportioned fairly among stakeholders. One classic example involves a father who, upon deciding to distribute his herd of cattle

among his three sons, opts for a ratio-based division. Specifically, he has a total of 360 cattle, which he intends to divide among his sons in the ratio 7:6:5. The question that naturally arises is: What is the smallest share among the three sons? This problem not only tests one's understanding of ratios and basic arithmetic but also illustrates how to approach complex division problems systematically.

Understanding the Problem

Before diving into calculations, it's essential to grasp the core elements of the problem:

- Total cattle: 360
- Number of recipients: 3 (three sons)
- Ratio of shares: 7 : 6 : 5

The ratio indicates the relative proportions in which the total cattle are to be divided. It does not directly specify the number of cattle each son receives but provides a proportional relationship that must be scaled to the total.

Key questions:

- How do we convert the ratio into actual numbers?
- How do we ensure the total sum matches the total cattle?
- Which share is the smallest, and what is its exact number?

Step-by-Step Solution Approach

To find the smallest share, we need a systematic method involving the following steps:

1. Determine the Sum of Ratio Parts

The ratio parts are 7, 6, and 5. First, calculate their sum:

$$\text{Sum of parts} = 7 + 6 + 5 = 18$$

This total represents the combined 'parts' into which the total cattle are divided.

2. Find the Value of One Part

Since the total cattle are 360 and these are divided according to the ratio parts, we find the value of each 'part' by dividing the total cattle by the sum of parts:

Value of one part = Total cattle / Sum of parts = $360 / 18 = 20$

This means each 'part' in the ratio equates to 20 cattle.

3. Calculate Each Son's Share

Using the value of one part, multiply by each ratio component:

- First son (ratio 7): $7 \times 20 = 140$ cattle
- Second son (ratio 6): $6 \times 20 = 120$ cattle
- Third son (ratio 5): $5 \times 20 = 100$ cattle

4. Verify the Total

Add the three shares:

$$140 + 120 + 100 = 360$$

This confirms the division aligns with the total cattle.

Identifying the Smallest Share

From the calculations above:

- First son: 140 cattle
- Second son: 120 cattle
- Third son: 100 cattle

The smallest share among the three is 100 cattle, allocated to the son with the ratio 5.

Deeper Insights and Practical Implications

While the calculation appears straightforward, understanding the underlying principles enhances appreciation for ratio-based division:

- Ratios represent proportional relationships, not fixed quantities. When distributing resources, ratios provide a flexible method to ensure fairness based on predefined proportions.
- Scaling is vital. The ratio sum (18) acts as a scaling factor, translating the ratio into actual quantities matching the total resource.

- Smallest share is directly linked to the smallest ratio component. In this case, the 5-part segment yields the minimum number of cattle.

In real-world applications, such as estate division, resource allocation, or business profit sharing, these principles ensure equitable and mathematically consistent distribution.

Additional Considerations

- Adjustments for different totals: If the total number of cattle were different, the same approach applies—calculate the value of one part and then multiply by each ratio component.
- Handling remainders: In some cases, the division might not be exact, leading to remainders. Strategies include rounding or adjusting shares slightly to ensure total consistency.
- Fairness in division: Ratios are a tool to reflect fairness according to pre-agreed proportions among stakeholders.

Conclusion

The problem of dividing 360 cattle among three sons in the ratio 7:6:5 exemplifies how ratios serve as foundational tools in practical mathematics. By understanding the relationship between ratios and total quantities, one can quickly determine individual shares and identify the smallest portion. In this scenario, the smallest share—the third son's allotment—is 100 cattle, corresponding to the ratio component of 5. This method not only simplifies complex division tasks but also ensures transparency, fairness, and accuracy—principles that are essential both in mathematical problems and in real-life resource management.

Final thoughts:

Mastering ratio-based division is a crucial skill for anyone dealing with proportional reasoning, whether in business, economics, or everyday problem-solving. The systematic approach—finding the sum of ratios, calculating the value of one part, and then deriving individual shares—serves as a reliable blueprint for tackling similar problems with confidence and clarity.

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