

Ann, Ben, And Cheryl Share Some Money In The Ratio 3:7:10. Ben Received 650 More Than Ann. Calculate

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When it comes to sharing money among friends or family members, understanding ratios and how to work with them is essential. In this article, we will explore a common problem involving three individuals—Ann, Ben, and Cheryl—who share a sum of money in a specific ratio. The problem states that Ann, Ben, and Cheryl share money in the ratio 3:7:10, and that Ben received 650 more than Ann. Our goal is to determine the actual amounts each person received. This kind of problem not only enhances problem-solving skills but also provides practical insights into ratios and proportional reasoning.

Understanding the Problem

Details of the Share Distribution

The problem presents a scenario where three individuals—Ann, Ben, and Cheryl—share a certain total amount of money. Their shares are in the ratio 3:7:10, which indicates the proportional parts of the total that each person receives.

Additional Information Provided

It is given that Ben received 650 more than Ann. This piece of information helps us relate their shares to each other and ultimately find the total amount shared.

Setting Up the Problem

Assigning Variables to the Shares

To solve this problem, let's assign a variable to represent the common multiplier of the ratio parts.

- Let x be the common factor.
- Therefore:
- Ann's share = $3x$
- Ben's share = $7x$

- Cheryl's share = $10x$

Expressing the Difference Between Ben and Ann

Since Ben received 650 more than Ann, we can express this as:

$$\text{Ben's share} - \text{Ann's share} = 650$$

Substituting the expressions:

$$7x - 3x = 650$$

Simplify:

$$4x = 650$$

Now, solve for x :

$$x = 650 / 4 = 162.5$$

This means each part of the ratio corresponds to 162.5 units of money.

Calculating the Individual Shares

Ann's Share

Using $x = 162.5$:

$$\text{Ann's share} = 3x = 3 \times 162.5 = 487.5$$

Ben's Share

Similarly:

$$\text{Ben's share} = 7x = 7 \times 162.5 = 1137.5$$

Cheryl's Share

And:

$$\text{Cheryl's share} = 10x = 10 \times 162.5 = 1625$$

Finding the Total Amount Shared

To determine the total sum shared among Ann, Ben, and Cheryl, add their individual shares:

- Ann: 487.5
- Ben: 1137.5
- Cheryl: 1625

Total amount:

$$\text{Total} = 487.5 + 1137.5 + 1625 = 3,250$$

Therefore, the total amount shared among the three individuals is 3,250 units of currency.

Summary of Results

Person	Share (units)	Amount (currency units)
Ann	3x	487.5
Ben	7x	1137.5
Cheryl	10x	1625
Total		3,250

Conclusion

Understanding ratios and how to apply algebraic methods allow us to solve real-world problems involving sharing money. In this case, by setting up the ratio and using the additional information that Ben received 650 more than Ann, we determined the value of x and calculated each person's share. The key steps involved were:

- Assigning variables based on the ratio
- Formulating an equation from the given difference
- Solving for the common multiplier x
- Calculating individual shares
- Summing these shares to find the total amount

This approach not only reveals the individual shares but also reinforces the importance of ratios in everyday financial scenarios.

Additional Tips for Similar Problems:

- Always start by defining variables based on the ratios.
- Use the given conditions to form equations.
- Check your calculations by verifying the differences or total amounts.
- Practice with different ratios and conditions to strengthen your problem-solving skills.

In summary, if you encounter a problem involving sharing money in a ratio and additional conditions about differences in amounts, breaking down the problem into these steps can help you arrive at an accurate solution efficiently.

Frequently Asked Questions

What is the total amount shared among Ann, Ben, and Cheryl in the ratio 3:7:10?

To find the total, first find the sum of the parts: $3 + 7 + 10 = 20$ parts. Since Ben received 650 more than Ann, we can set up equations to determine their individual amounts once the total is known.

How much money did Ann receive if Ben received 650 more than her in the ratio 3:7:10?

Let the common multiplying factor be x . Then Ann received $3x$, Ben received $7x$, and Cheryl received $10x$. Given that Ben received 650 more than Ann: $7x - 3x = 650$, so $4x = 650$, hence $x = 162.5$. Therefore, Ann received $3 \times 162.5 = 487.50$.

How much money did Cheryl get in the sharing ratio 3:7:10 with Ann and Ben?

Using $x = 162.5$, Cheryl received $10 \times 162.5 = 1625$.

What is the total amount of money shared among Ann, Ben, and Cheryl?

Total amount = $(3 + 7 + 10) \times x = 20 \times 162.5 = 3250$.

If Ben received 650 more than Ann in the ratio 3:7:10, how is the ratio related to their actual

amounts?

The ratio 3:7:10 corresponds to Ann, Ben, and Cheryl's shares scaled by a common factor. Since Ben received 650 more than Ann, this difference confirms the ratio and helps determine the value of the scaling factor.

Can we verify the amounts received by Ann, Ben, and Cheryl with the given ratio and difference?

Yes. Ann received 487.50, Ben received 650, and Cheryl received 1625. The difference between Ben and Ann is 650, matching the problem statement, confirming the calculations are correct.

What is the formula to find each person's share in the ratio 3:7:10 when the difference between Ben and Ann is known?

First, find the value of x using the difference: $7x - 3x = \text{difference}$. Then, calculate Ann's share as $3x$, Ben's as $7x$, and Cheryl's as $10x$. In this case, $x = \text{difference} / 4$.

How do you interpret the ratio 3:7:10 in terms of actual money distribution?

The ratio indicates that for every 20 parts total, Ann gets 3 parts, Ben gets 7 parts, and Cheryl gets 10 parts. The actual amounts are scaled based on the value of each part, which can be found using the given difference between Ben and Ann.

Additional Resources

Understanding the Sharing of Money in the Ratio 3:7:10: A Comprehensive Breakdown

When it comes to dividing money among individuals based on a specific ratio, the problem becomes both interesting and educational, providing insights into ratios, algebra, and problem-solving techniques. In this detailed review, we will explore a scenario involving Ann, Ben, and Cheryl sharing some money in the ratio 3:7:10, with the added piece of information that Ben received 650 more than Ann. Our goal is to understand the problem deeply, develop a step-by-step solution, and highlight key mathematical concepts involved.

Introduction to Ratios and Their Significance

Ratios are fundamental in mathematics, especially in problems involving sharing or distributing quantities. A ratio describes the relative sizes of quantities, providing a way to compare them directly without specifying absolute amounts.

- Definition: If two quantities are in the ratio $a:b$, then for some positive number k , the quantities can be expressed as ak and bk .
- Application: Ratios are used in various contexts such as mixture problems, scale models, and sharing situations.

In our scenario, Ann, Ben, and Cheryl share a sum of money in the ratio 3:7:10. This means:

- Ann's share is proportional to 3
- Ben's share is proportional to 7
- Cheryl's share is proportional to 10

Restating the Problem Clearly

Let's articulate the problem with clarity:

- The total money shared among Ann, Ben, and Cheryl is divided in the ratio 3:7:10.
- It is given that Ben received 650 more than Ann.
- We are tasked with calculating the total amount of money shared or determining the individual shares.

This problem involves understanding the ratio, setting up algebraic expressions, and solving for the unknowns.

Step-by-Step Breakdown and Approach

To solve this, we'll follow a structured approach:

Step 1: Assign variables based on the ratio

Let the common multiplying factor be k . Then:

- Ann's share = $3k$

- Ben's share = $7k$
- Cheryl's share = $10k$

Step 2: Use the given information about the difference between Ann and Ben

We know:

- Ben received 650 more than Ann, which translates to:

$$7k - 3k = 650$$

Simplify:

$$4k = 650$$

Step 3: Solve for the common ratio factor, k

From the above:

$$k = \frac{650}{4} = 162.5$$

This value of k helps us find the individual shares.

Step 4: Calculate each person's share

- Ann's share:

$$3k = 3 \times 162.5 = 487.5$$

- Ben's share:

$$7k = 7 \times 162.5 = 1137.5$$

- Cheryl's share:

$$10k = 10 \times 162.5 = 1625$$

Step 5: Find the total amount shared

Total sum:

$$\text{Total} = 3k + 7k + 10k = (3 + 7 + 10)k = 20k$$

Substitute $k = 162.5$:

$$20 \times 162.5 = 3250$$

Total money shared = \$3,250

Deep Dive into the Mathematical Concepts

Understanding the core concepts involved in this problem enhances mathematical literacy:

Ratios and Proportions

Ratios express the relative quantities among different parts. When sharing an amount in a ratio, the total sum can be reconstructed by summing the parts and multiplying by the common factor.

Algebraic Expressions and Equations

- Assigning variables (k) simplifies the problem.
- Formulating equations based on given conditions allows for straightforward solutions.

Solving for Unknowns

- Once the equation is set, algebraic manipulation (division, multiplication) yields the unknowns.
- Ensuring the units and quantities are consistent is crucial.

Real-World Applications

- Such problems model real-life scenarios like splitting profits, dividing inheritance, or sharing resources among parties based on agreed ratios.

Additional Interpretations and Variations

While this problem has a straightforward solution, exploring variations enhances understanding:

- What if the ratio is different? For example, 2:5:8.
- What if the total sum is known, and we need to find individual shares? This involves setting up similar equations.
- What if the difference between two individuals is given, but the total is unknown? In such cases, the ratio and difference can help find the total.

Common Mistakes and How to Avoid Them

When solving ratio problems, learners often make several errors:

- Mixing ratios with actual amounts: Always remember ratios are relative, and actual amounts depend on the value of the common multiplier.
- Incorrectly setting up equations: Ensure the equation accurately reflects the given difference or total.
- Forgetting to verify units and calculations: Double-check calculations for accuracy.

Final Summary and Key Takeaways

This problem exemplifies the power of ratios and algebra in solving real-world problems:

- By assigning a common variable to the ratio parts, complex sharing problems become manageable.
- The difference between individuals' shares provides a direct way to find the value of the common multiplier.
- Once the multiplier is known, individual shares and total amounts follow straightforwardly.

In essence:

- The ratio 3:7:10 indicates relative shares.
- The difference of 650 between Ben and Ann translates into an algebraic equation.
- Solving the equation yields the common factor, enabling calculation of individual shares.
- The total sum of money shared is 3,250.

Conclusion

Understanding how to divide money according to a ratio, especially when given specific differences, is a vital skill in mathematics, applicable in finance, economics, and everyday life. This detailed exploration from defining ratios to solving algebraic equations demonstrates an effective approach to tackling such problems systematically.

By mastering these concepts, learners can confidently handle similar problems involving ratios, differences, and proportions, equipping them with essential analytical skills for academics and real-life situations.

Key Takeaway: In ratio problems involving differences between shares, always translate the problem into algebraic equations, solve for the common factor, and then compute individual amounts accordingly.

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