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Introduction

Understanding basic algebraic problems involving money can be both intriguing and rewarding. One common scenario involves two individuals, Peter and Jane, sharing or exchanging money, and analyzing how their amounts change as a result. The problem at hand involves Peter and Jane having a combined total of $90. If Peter gives Jane $16, he will then have $14 less than Jane. The question is: how much money does each person initially have?

This problem combines elements of addition, subtraction, and algebraic reasoning to determine the initial amounts of Peter and Jane. By carefully analyzing the given information and translating it into algebraic equations, we can systematically find the solution.

Understanding the Problem

Before diving into calculations, it's essential to clearly understand what is being asked and the conditions provided:

- The total amount of money Peter and Jane have together is $90.
- If Peter gives Jane $16:
- Peter’s new amount will be his original amount minus $16.
- Jane’s new amount will be her original amount plus $16.
- After this transaction, Peter has $14 less than Jane.

The goal is to find out how much money each person initially had: Peter’s original amount and Jane’s original amount.

Defining Variables

To approach the problem systematically, assign variables to represent the unknown quantities:

Variables

- P = Peter’s initial amount of money
- J = Jane’s initial amount of money

Our task is to find the values of P and J.

Translating the Problem into Equations

Using the variables, we can express the conditions mathematically.

Total Money Condition

The total initial amount of money they have together is $90:

$$
P + J = 90
$$

Post-Transaction Condition

If Peter gives Jane $16:

- Peter’s new amount: $P - 16$
- Jane’s new amount: $J + 16$

According to the problem, after this exchange, Peter has $14 less than Jane:

$$
P - 16 = (J + 16) - 14
$$

This equation states that Peter’s amount after giving the money is $14 less than Jane’s after receiving it.

Formulating the System of Equations

Combining the above, we have two equations:

1. $P + J = 90$
2. $P - 16 = J + 16 - 14$

Simplify the second equation:

$$
P - 16 = J + 2
$$

Rearranged:

$$
P = J + 18
$$

Now, substitute $P = J + 18$ into the first equation:

$$
(J + 18) + J = 90
$$

Combine like terms:

$$
2J + 18 = 90
$$

Solve for J:

$$
2J = 90 - 18
$$
$$
2J = 72
$$
$$
J = 36
$$

Now, find P:

$$
P = J + 18 = 36 + 18 = 54
$$

Therefore, Peter initially had \$54, and Jane initially had \$36.

Verification of the Solution

It's important to verify that these values satisfy the conditions of the problem.

Check the total:

$$
P + J = 54 + 36 = 90 \quad \checkmark
$$

Check the post-transaction amounts:

- Peter gives Jane $16:
- Peter’s new amount: $54 - 16 = 38$
- Jane’s new amount: $36 + 16 = 52$

- Difference after transaction:

$$
52 - 38 = 14
$$

- Since Peter has $14 less than Jane after the transaction:

$$
38 = 52 - 14 \quad \checkmark
$$

The conditions are satisfied, confirming that the initial amounts are correct.

Conclusion

By translating the problem into algebraic equations, we identified that Peter initially had $54 and Jane initially had $36. The problem demonstrates the power of algebra in solving real-world money problems involving exchanges and comparisons.

Understanding such problems enhances your ability to analyze similar scenarios involving transactions, differences, and total sums. The key steps are to define variables clearly, translate conditions into equations, solve the system, and verify the solutions.

Additional Tips for Solving Similar Problems

- **Always define variables:** Clear variables help set up the equations accurately.
- **Translate words into equations:** Read carefully to identify total sums, differences, and transactions.
- **Simplify equations:** Combine like terms and isolate variables systematically.
- **Verify your solution:** Plug the values back into the original conditions to ensure correctness.
- **Practice with variations:** Modify the amounts or conditions to strengthen understanding and problem-solving skills.

Mastering these steps allows for efficient solving of a wide range of algebraic word problems involving money, transactions, and differences.

In summary, Peter initially had \$54, Jane initially had \$36, and these amounts satisfy the total and difference conditions specified in the problem. This exercise underscores the importance of algebra in practical scenarios and develops critical thinking skills that are valuable beyond mathematics.

Frequently Asked Questions

What is the total amount Peter and Jane have together initially?

They have $90 together initially.

If Peter gives Jane $16, how much money would Peter have left?

Peter would have $16 less than he originally had after giving $16 to Jane.

After Peter gives Jane $16, how much money does Jane have?

Jane's amount increases by $16 after receiving from Peter.

What is the relationship between Peter's and Jane's amounts after the transfer?

Peter would have $14 less than Jane after the transfer.

How can we set up an equation to find Peter's and Jane's original amounts?

Let P be Peter's initial amount and J be Jane's initial amount; then P + J = 90.

How do we express Peter's amount after giving $16 to Jane?

Peter would have P - $16.

How do we express Jane's amount after receiving $16 from Peter?

Jane would have J + $16.

What equation relates Peter's and Jane's amounts after the transfer?

P - 16 = (J + 16) - 14, since Peter has $14 less than Jane after the transfer.

What are the steps to solve for Peter's and Jane's original amounts?

Use the equations: P + J = 90 and P - 16 = J + 16 - 14, then solve simultaneously to find P and J.

Additional Resources

Peter And Jane Have $90 Together If Peter Gave Jane $16 He Would Have $14 Less Than Jane How Much Does — this intriguing problem combines elements of algebra and logical reasoning to challenge our understanding of relationships between amounts of money. Such problems are common in algebraic word puzzles, and they serve as excellent exercises for developing critical thinking skills. In this article, we will thoroughly analyze this problem, break down its components, and guide you step-by-step through the process of finding the solution.

Understanding the Problem

At first glance, the problem offers several key pieces of information:

- Peter and Jane together have $90.
- If Peter gives Jane $16, then Peter would have $14 less than Jane.

The main goal is to find out how much money Peter and Jane originally had.

Restating the Problem in Simpler Terms

Let’s restate the problem in our own words:

- Initial total: Peter + Jane = $90
- Scenario after transfer: Peter gives Jane $16
- Resulting amounts:
- Peter’s amount becomes (initial Peter’s amount) - $16
- Jane’s amount becomes (initial Jane’s amount) + $16
- Relationship after transfer: Peter's new amount = Jane's new amount - $14

Our goal: Find the initial amounts of Peter and Jane.

Setting Up Variables

To solve the problem systematically, assign variables:

- Let P = Peter’s initial amount
- Let J = Jane’s initial amount

From the first piece of information:

$$ P + J = 90 \quad \text{(Equation 1)} $$

From the second piece of information, after Peter gives Jane $16:

- Peter has $P - 16$
- Jane has $J + 16$

And, the relationship states:

$$ P - 16 = (J + 16) - 14 $$

Simplify the right side:

$$ P - 16 = J + 16 - 14 $$
$$ P - 16 = J + 2 $$

This is our second equation:

$$ P - J = 18 \quad \text{(Equation 2)} $$

Now, we have a system of two equations:

- $P + J = 90$
- $P - J = 18$

Solving the System of Equations

Step 1: Add the equations to eliminate J

Adding Equation 1 and Equation 2:

$$(P + J) + (P - J) = 90 + 18$$

Simplify:

$$P + J + P - J = 108$$

$$2P = 108$$

$$P = 54$$

Step 2: Find J using Equation 1

Substitute $P = 54$ into Equation 1:

$$54 + J = 90$$

$$J = 90 - 54$$

$$J = 36$$

Final Answers

- Peter’s initial amount: $54
- Jane’s initial amount: $36

Verifying the Solution

It’s always good to verify our solution with the original problem.

Step 1: Check the total

$$54 + 36 = 90 \quad \text{(Correct)}$$

Step 2: Check the scenario after Peter gives Jane $16

- Peter: $54 - 16 = 38$
- Jane: $36 + 16 = 52$

Step 3: Verify the relationship

Peter would have $14 less than Jane:

$$52 - 14 = 38$$

which matches Peter’s amount after the transfer. The verification confirms our solution is correct.

Additional Insights and Variations

This problem exemplifies how algebra can be used to solve real-world puzzles involving money and relationships. Variations of this problem might include different transfer amounts or different total sums, but the approach remains similar.

Possible variations include:

- Changing the total amount they have initially
- Altering the transfer amount
- Changing the difference after transfer

Understanding how to set up and solve the equations helps tackle these variations effectively.

Summary: Key Takeaways

- Assign variables to unknown quantities.
- Translate words into algebraic equations carefully.
- Use basic algebraic operations (adding, subtracting, substitution) to solve systems.
- Always verify your solution against the original problem.

Final Thoughts

The problem involving Peter And Jane Have $90 Together If Peter Gave Jane $16 He Would Have $14 Less Than Jane How Much Does is a classic example of how algebraic methods can solve puzzles involving relationships between amounts of money. By methodically translating word problems into equations and solving step by step, you can uncover solutions that might not be immediately obvious. Practice similar problems to strengthen your problem-solving skills and develop a more intuitive understanding of algebraic reasoning.

Whether you're a student preparing for exams or just love brain teasers, mastering these techniques will empower you to approach a wide array of mathematical challenges with confidence.

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