

One Number Is 14 More Than Another. The Sum Of The Two Numbers Is 168, Find The Two Numbers

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When faced with algebraic word problems, such as finding two numbers based on given conditions, students and learners often find themselves needing a clear step-by-step approach to arrive at the correct solution. This particular problem – "One number is 14 more than another, and their sum is 168" – is a classic example of an algebraic word problem that tests your ability to translate words into mathematical equations. In this article, we'll explore how to solve this problem systematically, understand the underlying concepts, and learn useful strategies to tackle similar problems with confidence.

Understanding the Problem

Before jumping into calculations, it's crucial to understand what the problem is asking and identify the key pieces of information provided. The problem states:

- One number is 14 more than another.
- The sum of the two numbers is 168.

From this information, we need to find the two numbers.

Breaking Down the Problem

To solve such problems effectively, start by defining variables to represent the unknowns.

Defining Variables

Let's assign:

- Let x be the smaller number.
- Since one number is 14 more than the other, the larger number can be represented as $x + 14$.

Now, the problem states that the sum of these two numbers is 168, which translates mathematically to:

$$x + (x + 14) = 168$$

This forms the basis of our equation.

Formulating and Solving the Equation

With the variables defined, the next step is to set up an algebraic equation and solve for x .

Step 1: Write the Equation

Based on the problem description:

```
```plaintext
x + (x + 14) = 168
```
```

Step 2: Simplify the Equation

Combine like terms:

```
```plaintext
x + x + 14 = 168
```
```

which simplifies to:

```
```plaintext
2x + 14 = 168
```
```

Step 3: Isolate the Variable

Subtract 14 from both sides:

```
```plaintext
2x = 168 - 14
```
```

```
```plaintext
2x = 154
```
```

Now, divide both sides by 2:

```
```plaintext
x = 154 / 2
```
```

```
```plaintext
x = 77
```
```

```

Thus, the smaller number is 77.

### Step 4: Find the Other Number

Recall that the larger number is  $x + 14$ :

```
```plaintext
77 + 14 = 91
```
```

The larger number is 91.

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### Verifying the Solution

Always verify your solutions by plugging the numbers back into the original problem statement.

- Sum check:  $77 + 91 = 168$  ✓
- Difference check:  $91 - 77 = 14$  ✓

Both conditions are satisfied, confirming the solution's correctness.

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### Summary of the Solution

| Step | Description           | Result                        |
|------|-----------------------|-------------------------------|
| 1    | Define variables      | $x = 77$ , larger number = 91 |
| 2    | Set up equation       | $x + (x + 14) = 168$          |
| 3    | Simplify              | $2x + 14 = 168$               |
| 4    | Isolate $x$           | $x = 77$                      |
| 5    | Find the other number | $77 + 14 = 91$                |

The two numbers are 77 and 91.

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### Additional Tips for Solving Similar Word Problems

Understanding the methodology used above can help you solve a wide range of algebraic word problems efficiently.

## 1. Carefully Read the Problem

Identify what is being asked and note all given information.

## 2. Assign Variables Clearly

Choose meaningful variable names that relate to the problem context.

## 3. Translate Word Statements into Equations

Convert phrases like "more than," "sum of," "difference," "product," etc., into algebraic expressions.

## 4. Simplify and Solve Step-by-Step

Always simplify your equations and solve systematically, checking each step.

## 5. Verify Your Answer

Substitute your solutions back into the original problem to ensure correctness.

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## Practice Problems to Reinforce Learning

To strengthen your understanding, try solving these similar problems:

1. Problem: One number is 20 less than another. The sum of the two numbers is 100. Find the two numbers.

2. Problem: The sum of two numbers is 120. One number is triple the other. Find both numbers.

3. Problem: Two numbers have a difference of 35. Their sum is 215. Find the numbers.

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## Conclusion

Solving algebraic word problems like "One number is 14 more than another. The sum of the two numbers is 168, find the two numbers" involves a clear understanding of translating words into equations, defining variables, simplifying, and solving systematically. Remember to verify your answers to

ensure accuracy. With consistent practice and application of these strategies, you'll become more confident in tackling algebraic problems and developing strong problem-solving skills.

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## Final Thoughts

Mastering these types of problems not only enhances your algebra skills but also prepares you for more advanced mathematical concepts. Whether you're a student preparing for exams or simply someone who wants to strengthen critical thinking, understanding how to approach and solve such problems is invaluable. Keep practicing with different scenarios, and over time, you'll find solving similar problems becomes second nature.

## Frequently Asked Questions

**What are the two numbers if one is 14 more than the other and their sum is 168?**

Let the smaller number be  $x$ . Then, the larger number is  $x + 14$ . Their sum is  $x + (x + 14) = 168$ . Simplifying:  $2x + 14 = 168$ , so  $2x = 154$ , and  $x = 77$ . The two numbers are 77 and 91.

**How do you set up an equation to find two numbers where one is 14 more than the other and their sum is 168?**

Assign a variable to the smaller number, say  $x$ . The larger number is  $x + 14$ . Set up the equation:  $x + (x + 14) = 168$ . Simplify and solve for  $x$  to find both numbers.

**What is the step-by-step solution to find the two numbers in this problem?**

Step 1: Let the smaller number be  $x$ . Step 2: Write the larger number as  $x + 14$ . Step 3: Set up the equation:  $x + (x + 14) = 168$ . Step 4: Simplify to  $2x + 14 = 168$ . Step 5: Subtract 14 from both sides:  $2x = 154$ . Step 6: Divide both sides by 2:  $x = 77$ . Step 7: Find the larger number:  $77 + 14 = 91$ . The numbers are 77 and 91.

**Can this problem be solved using a different method other than setting up an equation?**

The most straightforward method is algebraic, but you could also use logical reasoning: since the sum is 168 and one number is 14 more than the other, guess and check or dividing the total into two parts with a difference of 14 can work. However, algebra provides a precise solution.

## What real-life situations could this problem model?

This problem could represent scenarios like two friends collecting money where one has 14 dollars more than the other, and together they have 168 dollars; or two weights where one is 14 units heavier, and their total weight is 168 units.

## What is the importance of understanding such algebraic problems in everyday life?

Understanding these problems helps develop problem-solving skills, logical reasoning, and the ability to set up and solve real-world situations involving relationships between quantities.

## Additional Resources

One Number Is 14 More Than Another. The Sum Of The Two Numbers Is 168, Find The Two Numbers

In the world of mathematics, word problems serve as essential tools for developing critical thinking and problem-solving skills. Among these, problems involving relationships between two numbers are particularly common and serve as foundational exercises for learners of all ages. One such problem states: "One number is 14 more than another. The sum of the two numbers is 168. Find the two numbers." Although seemingly straightforward, solving this problem requires a clear understanding of algebraic principles and logical reasoning.

This article delves into the process of solving such a problem step-by-step, illustrating how algebra can be used to translate words into equations, how to solve those equations systematically, and how to interpret the solutions accurately. Whether you are a student, teacher, or a curious learner, this exploration will deepen your comprehension of algebraic problem-solving techniques and demonstrate their practical applications.

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### Understanding the Problem: Breaking Down the Statement

Before jumping into calculations, it's crucial to analyze and understand what the problem is asking. The problem provides two critical pieces of information:

1. Relationship Between the Numbers: One number is 14 more than the other.
2. Sum of the Two Numbers: The total of the two numbers is 168.

The key here is to translate these statements into mathematical expressions, which form the foundation for setting up equations.

### Identifying the Variables

To systematically approach this problem, assign variables to the unknown quantities. Typically, in such problems, we designate:

- Let  $x$  be the smaller number.
- Let  $y$  be the larger number.

Given the relationship, "One number is 14 more than another," we can interpret:

-  $y$  is 14 more than  $x$ , or mathematically:

$$y = x + 14$$

The sum of the two numbers is 168:

$$- x + y = 168$$

Now, with these two equations:

1.  $y = x + 14$
2.  $x + y = 168$

the problem becomes a system of equations that can be solved for  $x$  and  $y$ .

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#### Setting Up the Equations: From Words to Mathematics

The translation of word statements into algebraic equations is one of the most critical skills in problem-solving. Let's formalize the process:

##### Equation 1: Relationship Between the Numbers

- Since  $y$  is 14 more than  $x$ , we have:

$$y = x + 14$$

##### Equation 2: Sum of the Numbers

- Their combined total is 168:

$$x + y = 168$$

Using Equation 1, substitute  $y$  in the second equation:

$$x + (x + 14) = 168$$

This substitution simplifies the problem to a single-variable equation, making it easier to solve.

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#### Solving the Equations: Step-by-Step Approach

With the substitution made, the next step is to solve for  $x$ .

##### Step 1: Simplify the equation

- Expand the equation:

$$x + x + 14 = 168$$

- Combine like terms:

$$2x + 14 = 168$$

Step 2: Isolate the variable

- Subtract 14 from both sides:

$$2x = 168 - 14$$

- Simplify:

$$2x = 154$$

Step 3: Solve for x

- Divide both sides by 2:

$$x = 154 / 2$$

- Calculate:

$$x = 77$$

Now that x is known, find y using Equation 1:

$$y = x + 14 = 77 + 14 = 91$$

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Interpreting the Results: What Are the Two Numbers?

The solutions indicate:

- The smaller number, x, is 77.
- The larger number, y, is 91.

To verify the correctness, check whether these values satisfy the original problem conditions:

1. Is one number 14 more than the other?

- 91 is indeed 14 more than 77.

2. Does the sum of the numbers equal 168?

- $77 + 91 = 168$

Both conditions are satisfied, confirming the accuracy of the solutions.

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Broader Insights: Variations and Applications

While this problem is straightforward, it exemplifies fundamental algebraic techniques applicable to a wide array of real-world scenarios.

Variations of the Problem

- Different difference values: The difference between the two numbers could be any number, not necessarily 14.
- Different sum totals: The sum could vary, requiring adjustments in calculations.



- Multiple relationships: Sometimes, problems involve additional constraints, such as ratios or percentages.

### Practical Applications

Understanding these types of problems extends beyond classroom exercises:

- Financial calculations: Determining investments or savings where one amount exceeds another.
- Inventory management: Balancing quantities with known differences.
- Scheduling: Allocating time slots with specified differences.

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### Tips for Solving Similar Word Problems

To effectively solve problems involving relationships between two quantities, consider the following approach:

1. Read Carefully: Identify key phrases indicating relationships (more than, less than, sum, difference).
2. Assign Variables: Choose clear and logical variable names.
3. Translate into Equations: Convert words into algebraic expressions systematically.
4. Use Substitution or Elimination: Simplify to a single equation whenever possible.
5. Solve Step-by-Step: Be methodical, checking calculations at each step.
6. Verify Your Solution: Plug values back into original conditions to confirm accuracy.

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### Conclusion: Bridging Words and Numbers

The problem, "One number is 14 more than another. The sum of the two numbers is 168. Find the two numbers," exemplifies how algebra transforms word-based challenges into solvable equations. By methodically translating statements into variables and equations, solving becomes an exercise in logical reasoning and arithmetic precision.

Mastering such problem-solving techniques enhances mathematical literacy, empowering individuals to approach everyday challenges confidently. Whether dealing with finances, logistics, or planning, understanding the core principles demonstrated here equips you with valuable tools for analytical thinking.

Remember, every complex problem can often be broken down into manageable parts—just as we did with this problem—making seemingly daunting tasks approachable and solvable.

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