

Andrea Is 3 Years Older Than Her Brother, Logan. The Sum Of their Ages Is 43. Find Their Ages. Write Two

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When it comes to solving age-related word problems, understanding the relationship between ages is essential. In this article, we will explore how to determine the ages of Andrea and her younger brother, Logan, based on the clues that Andrea is three years older than Logan and that their combined ages total 43 years. This problem is a classic example used in elementary algebra and is perfect for practicing the skills of setting up equations and solving for unknowns. Whether you're a student, a teacher, or someone interested in problem-solving, this comprehensive guide will walk you through the process step-by-step, ensuring clarity and understanding.

Understanding the Problem

Before jumping into the calculations, it's important to grasp what the problem is asking and identify the key pieces of information provided.

Key Information Provided:

- Andrea is 3 years older than her brother Logan.
- The sum of their ages is 43.

What Do We Need to Find?

- The current ages of Andrea and Logan.

The problem involves two unknowns: Andrea's age and Logan's age. Therefore, the goal is to formulate an algebraic expression that relates these two, then solve for their ages.

Setting Up the Equations

To solve the problem systematically, we translate the given information into algebraic equations.

Define Variables

- Let L = Logan's age
- Let A = Andrea's age

Translate the Relationships into Equations

1. Since Andrea is 3 years older than Logan:

$$\begin{aligned} & \backslash[\\ & A = L + 3 \\ & \backslash] \end{aligned}$$

2. The sum of their ages is 43:

$$\begin{aligned} & \backslash[\\ & A + L = 43 \\ & \backslash] \end{aligned}$$

Now, we have a system of two equations:

- $\backslash(A = L + 3 \backslash)$
- $\backslash(A + L = 43 \backslash)$

Solving the Equations Step-by-Step

The next step involves substituting one equation into the other to find the value of one variable, then using that to find the other.

Step 1: Substitute $\backslash(A \backslash)$ in the sum equation

$$\begin{aligned} & \backslash[\\ & (L + 3) + L = 43 \\ & \backslash] \end{aligned}$$

Step 2: Simplify the equation

$$\begin{aligned} & \backslash[\\ & L + 3 + L = 43 \\ & \backslash] \\ & \backslash[\\ & 2L + 3 = 43 \\ & \backslash] \end{aligned}$$

Step 3: Isolate (L)

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\[
2L = 43 - 3
\]
\[
2L = 40
\]
\[
L = \frac{40}{2} = 20
\]
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Step 4: Find Andrea's age (A)

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\[
A = L + 3 = 20 + 3 = 23
\]
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Final Answer: The Ages of Andrea and Logan

Based on the calculations:

- Logan is 20 years old.
- Andrea is 23 years old.

This confirms that Andrea is three years older than Logan, and their ages sum up to 43 years.

Additional Insights and Real-Life Applications

Understanding how to solve such age problems is not just an academic exercise but also a practical skill useful in various real-life situations.

Common Scenarios Where Age Problems Apply:

- Planning family activities based on age differences.
- Calculating age-related eligibility for certain programs or benefits.
- Estimating future ages for planning educational or career milestones.
- Solving age-related riddles and puzzles for fun and cognitive development.

Tips for Solving Similar Age Problems:

- Clearly define variables for unknown ages.
- Translate words into algebraic equations accurately.
- Use substitution or elimination methods to solve the system.
- Double-check solutions by plugging values back into original relationships.
- Practice with varied problems to build confidence.

SEO Optimization for Age Word Problems

This article targets key SEO keywords related to age problems and algebra, such as:

- "age word problems for students"
- "how to solve age problems"
- "algebra age problems example"
- "find ages from sum and difference"
- "solving age problems step-by-step"

Integrating these keywords naturally into your content helps improve visibility for learners searching for guidance on solving age-related algebraic problems.

Summary and Conclusion

In conclusion, solving the problem where Andrea is three years older than her brother Logan, and their ages sum to 43, involves setting up basic algebraic equations and carefully solving for the unknowns. By defining variables, translating the relationships into equations, and performing systematic calculations, we find that Logan is 20 years old, and Andrea is 23. This type of problem demonstrates fundamental algebra skills that are applicable in various educational and practical contexts.

Whether you're tackling similar age puzzles or enhancing your problem-solving skills, understanding how to formulate and solve these equations is invaluable. Remember to always verify your answers by plugging them back into the original conditions to ensure accuracy.

Key Takeaways

- Age word problems can be effectively solved by translating words into algebraic equations.
- Defining variables clearly simplifies the problem-solving process.
- Systematic substitution and solving equations lead to accurate results.
- Practice with different problem scenarios enhances understanding and confidence.

By mastering these techniques, you can confidently approach and solve a wide range of age-related math problems, making math both fun and practical.

Frequently Asked Questions

What is the age difference between Andrea and Logan?

Andrea is 3 years older than Logan.

If the sum of Andrea and Logan's ages is 43, how can we find their individual ages?

Let Logan's age be x . Then Andrea's age is $x + 3$. The sum is $x + (x + 3) = 43$. Solving for x gives Logan's age.

What is Logan's age if the sum of their ages is 43?

Logan is 20 years old.

How old is Andrea if her brother Logan is 20?

Andrea is 23 years old.

Can you verify their ages by adding Andrea's and Logan's ages?

Yes, adding 23 (Andrea) and 20 (Logan) gives 43, which matches the total sum.

What are the two ages that satisfy the conditions in the problem?

Logan is 20 years old, and Andrea is 23 years old.

Is there more than one possible solution for their

ages based on the given information?

No, given the sum and the age difference, their ages are uniquely determined as 20 and 23.

How can you set up an equation to find Andrea and Logan's ages?

Let Logan's age be x ; then Andrea's age is $x + 3$. The equation is $x + (x + 3) = 43$.

What is the step-by-step solution to find the ages?

Combine like terms: $2x + 3 = 43$. Subtract 3 from both sides: $2x = 40$. Divide both sides by 2: $x = 20$. So, Logan is 20, and Andrea is 23.

Additional Resources

Andrea is 3 years older than her brother, Logan. The sum of their ages is 43. Find their ages. Write two solutions.

Understanding the Problem: Andrea is 3 Years Older Than Her Brother, Logan

When faced with age-related word problems, it's essential to carefully analyze the information provided and translate it into algebraic expressions. The problem states:

- Andrea is 3 years older than her brother, Logan.
- The sum of their ages is 43.

The goal is to determine their individual ages. To do this, we need to interpret the words, assign variables, and create equations that represent the relationships.

Step-by-Step Breakdown of the Problem

Step 1: Define Variables

Start by assigning a variable to an unknown quantity—in this case, Logan's age:

- Let L = Logan's age in years.

Since Andrea is 3 years older than Logan:

- Andrea's age = Logan's age + 3 = $L + 3$.

Step 2: Translate the Sum of Ages

The total of both their ages is 43:

- Logan's age + Andrea's age = 43.

Substitute the expression for Andrea's age:

- $L + (L + 3) = 43$.

Solving the Equation: First Solution

Step 3: Set Up the Equation

Based on the substitution, the equation becomes:

- $L + L + 3 = 43$.

Combine like terms:

- $2L + 3 = 43$.

Step 4: Isolate the Variable

Subtract 3 from both sides:

- $2L = 43 - 3$,
- $2L = 40$.

Divide both sides by 2:

- $L = 40 / 2$,
- $L = 20$.

Step 5: Find Andrea's Age

Recall Andrea's age is $L + 3$:

- Andrea's age = $20 + 3 = 23$.

Solution 1 Summary:

- Logan is 20 years old.
- Andrea is 23 years old.

Additional Approach: Alternative Method (Verification)

While the previous steps provide a straightforward solution, verifying your answer ensures correctness.

Step 6: Verify the Solution

Calculate the sum:

- Logan's age + Andrea's age = $20 + 23 = 43$.

Since the sum matches the problem statement, the solution is verified.

Solution 2: Using a Different Approach – Guess and Check

The first solution was algebraic, but sometimes, especially with simple numbers, a guess and check method can be effective.

Step 1: Think of plausible ages

Since the sum is 43, and Andrea is 3 years older, their ages are close to half of 43:

- Half of 43 is approximately 21.5.

Given Andrea is older, she might be around 23, and Logan around 20, matching the previous solution.

Step 2: Check possible pairs

List pairs where:

- Logan's age + Andrea's age = 43,
- Andrea's age = Logan's age + 3.

Start with Logan's age:

- If Logan is 19, Andrea would be 22: $\text{sum} = 19 + 22 = 41$ (too low).
- If Logan is 20, Andrea is 23: $\text{sum} = 20 + 23 = 43$ (matches).
- If Logan is 21, Andrea is 24: $\text{sum} = 21 + 24 = 45$ (too high).

Thus, the only viable pair is Logan = 20, Andrea = 23.

Answer:

- Logan is 20 years old,
- Andrea is 23 years old.

Additional Insights and Real-World Applications

Understanding these types of problems is invaluable in various real-life scenarios, such as:

- Family planning: Estimating ages or ages of children relative to parents.
- Financial planning: Calculating combined ages for insurance or retirement planning.
- Education: Developing problem-solving skills for students or professionals.

Common Mistakes to Avoid

When solving age-related algebra problems, watch out for:

- Misinterpreting the "older" relationship: Always verify which person is older and by how much.
- Incorrect substitution: Double-check your algebraic expressions.
- Ignoring the context: Remember that ages are typically expressed as whole numbers, and negative ages are not valid.
- Overlooking verification: Always verify your solution by plugging the numbers back into the original conditions.

Final Thoughts

The problem "Andrea is 3 years older than her brother, Logan. The sum of their ages is 43. Find their ages" is a classic algebraic word problem that demonstrates the power of setting up equations and solving systematically. The first solution, based on algebra, yields Logan's age as 20 and Andrea's as 23. The alternative guess-and-check approach confirms this result.

Mastering such problems enhances critical thinking and problem-solving skills, which are essential across academic disciplines and everyday life. Whether you're a student tackling math homework or a professional analyzing data, these strategies form the foundation for logical reasoning and accurate solutions.

Summary

- Variables: Logan = L , Andrea = $L + 3$.
- Equation: $L + (L + 3) = 43$.
- Solution 1: Logan = 20, Andrea = 23.
- Solution 2: Confirmed via guess and check, same ages.

By following these steps, you can confidently solve similar age-related problems with clarity and precision.

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