Brainly Josh Is 3 Years Older Than 4 Times Kim's Age. The Sum Of Their Ages Is Less Than 43. Select The

Brainly Josh Is 3 Years Older Than 4 Times Kim's Age. The Sum Of Their Ages Is Less Than 43. Select The problem presents an interesting challenge in algebra and problem-solving, requiring us to analyze relationships between ages and inequalities. Such problems are common in math competitions and educational settings, offering students a chance to develop critical thinking and algebraic skills. In this article, we will dissect this problem thoroughly, exploring how to translate the words into mathematical expressions, set up equations and inequalities, and then solve for the possible ages of both individuals.

Understanding the Problem Statement

Before diving into calculations, it’s essential to understand the key components of the problem:

- Brainly Josh's age is related to Kim's age by a specific relationship.
- The relationship involves a multiple of Kim’s age, with a constant offset.
- The sum of their ages is constrained to be less than a given number.

The statement reads: "Brainly Josh is 3 years older than 4 times Kim's age." This indicates a direct relationship between Josh’s age and Kim’s age, which can be expressed algebraically.

Furthermore, the phrase "The sum of their ages is less than 43" places an upper bound on the combined ages, leading to an inequality.

Translating Words Into Mathematical Expressions

To analyze the problem, we need to define variables:

- Let K = Kim's age (in years).
- Let J = Josh's age (in years).

Based on the problem:

- Josh’s age is 3 years more than 4 times Kim’s age:

$$
J = 4K + 3
$$

- The sum of their ages is less than 43:

$$
J + K < 43
$$

Using the first equation, we can substitute for J in the second inequality:

$$
(4K + 3) + K < 43
$$

Simplify:

$$
5K + 3 < 43
$$

This inequality now contains only one variable, K, which we can solve to find Kim's possible ages.

Solving the Inequality for Kim's Age

Starting from:

$$
5K + 3 < 43
$$

Subtract 3 from both sides:

$$
5K < 40
$$

Divide both sides by 5:

$$
K < 8
$$

Since age is a non-negative, whole number value (assuming ages in whole years), K must satisfy:

$$
0 \leq K < 8
$$

In practical terms, Kim's age could be any whole number from 0 up to 7 years old.

Determining Josh's Age Range

Recall the relationship:

$$
J = 4K + 3
$$

Substitute the maximum value for K:

- When K = 7:

$$
J = 4 \times 7 + 3 = 28 + 3 = 31
$$

And when K = 0:

$$
J = 4 \times 0 + 3 = 3
$$

Therefore, Josh's age varies from 3 years (when Kim is 0) up to 31 years (when Kim is 7).

Verifying the Age Sum Constraints

We should verify that the total age sum remains less than 43 for these maximum values:

- When K = 0, J = 3:

$$
J + K = 3 + 0 = 3 < 43
$$

- When K = 7, J = 31:

$$
J + K = 31 + 7 = 38 < 43
$$

In both cases, the sum is less than 43, confirming that these values satisfy the problem's constraints.

Possible Age Combinations

Given the above, the possible age pairs (K, J) are:

Kim's Age (K)	Josh's Age (J)	Sum of Ages	Meets Condition?
0	3	3	Yes
1	7	8	Yes
2	11	13	Yes
3	15	18	Yes
4	19	23	Yes
5	23	28	Yes
6	27	33	Yes
7	31	38	Yes

Any age pair where Kim's age is an integer between 0 and 7 (inclusive) will satisfy the problem conditions.

Additional Considerations

While the problem assumes ages in whole years, in real-world contexts, ages can be fractional, especially if considering months. For simplicity, and typical of algebra problems, whole-number ages are assumed.

Furthermore, the problem does not specify minimum ages, but practically, Kim and Josh are likely to be at least a few years old. For example, Kim's age can't realistically be negative or zero in the context of a typical problem involving ages, unless the problem explicitly states that children or infants are considered.

If we restrict Kim's age to positive integers ($K \geq 1$):

- The maximum K is still 7.
- The possible values are $K = 1, 2, 3, 4, 5, 6, 7$.

Corresponding Josh's ages:

- For $K = 1$: $J = 4(1) + 3 = 7$
- For $K = 2$: $J = 11$
- For $K = 3$: $J = 15$
- For $K = 4$: $J = 19$
- For $K = 5$: $J = 23$
- For $K = 6$: $J = 27$
- For $K = 7$: $J = 31$

All these pairs satisfy the sum less than 43 constraint.

Summary of the Mathematical Approach

To solve problems like "Brainly Josh is 3 years older than 4 times Kim's age, and their combined ages are less than 43," the key steps are:

1. Define variables for unknown quantities.
2. Translate words into algebraic expressions.
3. Set up equations and inequalities based on relationships.
4. Solve inequalities to find ranges of possible values.
5. Verify the constraints with boundary cases.
6. List all possible solutions within the feasible range.

This approach exemplifies how algebraic modeling can solve real-world or word problems efficiently.

Conclusion

The problem involving Brainly Josh and Kim’s ages is a classic example of translating verbal statements into algebraic expressions and inequalities. By defining variables, setting up equations, and solving inequalities, we discover that Kim can be between 0 and 7 years old, with corresponding Josh ages from 3 to 31 years, and the total ages always remaining below 43. Such problems reinforce the importance of algebraic thinking and problem-solving strategies, which are foundational skills in mathematics education.

Understanding these concepts enables students and learners to approach similar word problems systematically, leading to accurate solutions and a deeper appreciation of algebra's power in real-world applications.

Frequently Asked Questions

How is Brainly Josh's age related to Kim's age in the problem?

Brainly Josh's age is 3 years older than four times Kim's age.

What inequality represents the sum of Brainly Josh's and Kim's ages being less than 43?

If J is Josh's age and K is Kim's age, then $(J + K) < 43$.

How can we express Brainly Josh's age in terms of Kim's age?

Brainly Josh's age is $J = 4K + 3$, where K is Kim's age.

What is the combined inequality involving Kim's age that satisfies the condition?

Substituting $J = 4K + 3$ into the sum inequality gives $(4K + 3 + K) < 43$, simplifying to $5K + 3 < 43$.

How do we solve for Kim's age based on the inequality?

Subtract 3 from both sides: $5K < 40$, then divide both sides by 5: $K < 8$.

What is the maximum possible age of Kim based on the conditions?

Kim's age must be less than 8, so the maximum integer age is 7.

What is Brainly Josh's age if Kim is 7 years old?

If $K=7$, then $J = 4(7) + 3 = 28 + 3 = 31$ years old.

What are the possible ages of Brainly Josh and Kim

that satisfy all conditions?

Kim's age can be any integer less than 8 (e.g., 0 to 7), and Brainly Josh's age is four times Kim's age plus 3, with their sum less than 43.

Additional Resources

Brainly Josh Is 3 Years Older Than 4 Times Kim's Age is a fascinating mathematical problem that delves into algebraic reasoning, age-related word problems, and the application of logical deduction. Such problems are quintessential in developing critical thinking skills among students and math enthusiasts alike. They challenge individuals to translate real-world scenarios into mathematical expressions and solve for unknown variables, fostering both analytical and problem-solving abilities. In this article, we will explore this problem comprehensively, breaking it down into understandable segments, analyzing the constraints, and examining the methods to arrive at the solution.

Understanding the Problem

The core statement—"Brainly Josh is 3 years older than 4 times Kim's age"—sets the foundation for the algebraic model. The second part, "The sum of their ages is less than 43," introduces an inequality constraint. To analyze this problem effectively, it’s essential to identify what information is given and what is asked.

Key Elements:
- Josh's age relative to Kim's age
- The total age sum constraint
- The goal: to determine possible ages for Josh and Kim

This problem is representative of typical algebraic age puzzles, which are common in standardized tests and math competitions.

Breaking Down the Variables

Assigning Variables

To approach the problem systematically, we assign variables to the unknowns:
- Let K = Kim's age

- Let J = Josh's age

From the problem statement:
- Josh is 3 years older than four times Kim's age, which translates to:

$$J = 4K + 3$$

- The sum of their ages is less than 43:

$$J + K < 43$$

Formulating the Mathematical Model

Using the variable assignments, the inequality becomes:

$$(4K + 3) + K < 43$$

Simplifying:

$$5K + 3 < 43$$

Subtract 3 from both sides:

$$5K < 40$$

Divide both sides by 5:

$$K < 8$$

This inequality indicates that Kim's age must be less than 8 years. Since age is generally considered as a non-negative integer, and typically ages are whole numbers, Kim's age must be an integer satisfying:

$$K \leq 7$$

Additionally, ages are positive integers (assuming Kim and Josh are children or teenagers), so:

$$K \in \{0, 1, 2, 3, 4, 5, 6, 7\}$$

Now, for each possible Kim's age, we can find Josh's age and check if the sum constraint holds.

Analyzing Possible Ages

Let's examine each potential age of Kim and compute corresponding Josh's age and total sum:

Kim's Age (K)	Josh's Age (J) = 4K + 3	Sum (J + K)	Meets < 43?
0	4(0) + 3 = 3	3 + 0 = 3	Yes
1	4(1) + 3 = 7	7 + 1 = 8	Yes
2	8 + 3 = 11	11 + 2 = 13	Yes
3	12 + 3 = 15	15 + 3 = 18	Yes
4	16 + 3 = 19	19 + 4 = 23	Yes
5	20 + 3 = 23	23 + 5 = 28	Yes
6	24 + 3 = 27	27 + 6 = 33	Yes
7	28 + 3 = 31	31 + 7 = 38	Yes

In each case, the sum remains less than 43, satisfying the inequality criterion.

Note: For K=8, J=4(8)+3=35, sum=43, which is not less than 43, so K=8 is invalid.

Discussion of the Solution

The above analysis indicates that Kim can be any age from 0 to 7, and corresponding Josh's age will be determined by the algebraic expression J=4K+3. The total age sum will always be less than 43 in this range.

Implications:

- The problem demonstrates how inequalities can restrict the range of possible values.
- It highlights the importance of translating word problems into algebraic expressions.
- It emphasizes the need to verify boundary conditions, especially when inequalities are involved.

Features and Insights:

- Linear relationships: The problem models a straightforward linear relationship between two variables (ages).
- Inequality constraints: These limit the domain of possible solutions,

demonstrating the importance of inequalities in real-world problems.
- Integer solutions: Since ages are whole numbers, solutions are discrete, simplifying the solution process.
- Logical reasoning: The problem encourages verifying edge cases to ensure comprehensive understanding.

Pros and Cons of the Approach

Pros:
- Clear step-by-step translation from textual problem to algebraic expressions.
- Systematic enumeration of possible solutions ensures no valid options are missed.
- Reinforces fundamental algebraic skills and understanding of inequalities.

Cons:
- The method can be time-consuming for larger ranges or more complex problems.
- Assumes age is an integer, which may not be applicable in all contexts.
- Does not consider real-world age constraints, such as age being non-negative and realistic for the scenario.

Extensions and Variations

The problem can be expanded or modified in various ways to challenge learners further:

- Include additional constraints: For example, "Kim is at least 2 years old," which would adjust the domain.
- Use different relationships: Such as Josh being older than Kim by a certain amount, or age differences varying over time.
- Solve for exact ages: Instead of inequalities, find the specific ages satisfying all conditions.
- Consider real-world context: Incorporate ages in months or consider age differences over time.

Practical Applications of Similar Problems

Age-related algebraic problems like this are not just academic exercises—they have practical applications in:

- Financial planning: Calculating age-related benefits or retirement planning.
- Demographic studies: Estimating age distributions based on constraints.
- Game design: Creating scenarios with age-based rules or constraints.
- Educational assessments: Testing reasoning and algebra skills in students.

Conclusion

The problem "Brainly Josh is 3 years older than 4 times Kim's age" combined with the constraint that their ages sum to less than 43 offers a rich example of algebraic modeling, inequalities, and logical reasoning. By assigning variables, deriving expressions, and analyzing possible values, learners can develop a deeper understanding of how to approach and solve real-world problems mathematically.

This type of problem exemplifies how simple algebraic relationships can model complex scenarios, emphasizing the importance of translating words into mathematical expressions and verifying solutions within their contextual constraints. Whether used in classroom settings or competitive exams, such problems are invaluable in honing critical thinking, logical deduction, and algebraic skills.

In summary:
- Kim's age ranges from 0 to 7 years.
- Josh's age is determined by J=4K+3.
- The total age sum remains less than 43 for these values.
- The problem highlights key algebraic concepts and problem-solving strategies.

Engaging with such problems not only enhances mathematical prowess but also cultivates analytical thinking applicable across various disciplines and real-world situations.

Brainly Josh Is 3 Years Older Than 4 Times Kim S Age The Sum Of Their Ages Is Less Than 43 Select The

Brainly Josh Is 3 Years Older Than 4 Times Kim S Age The Sum Of Their Ages Is Less Than 43 Select The

Related Articles

- A Dartboard Has 20 Equally Divided Wedges, And You Are Awarded The Number Of Points In The Section Your
- A Spherical Balloon Is Inflated With Helium At A Rate Of 140pift^3/min How Fast Is The Balloon's Radius
- A Note Card Company Has Found That The Marginal Cost Per Card Of Producing X Note Cards Is Given By The

Back to Home