Bethany Thinks Of A Number 6/13 Of Her Number Is 48 What Is 1/13

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Understanding and solving word problems related to fractions can be challenging but rewarding. In this article, we will explore the problem where Bethany thinks of a number such that six-thirteenths of her number equals 48, and we will determine what one-thirteenth of her number is. This problem involves fundamental concepts of algebra and fractions, which are essential skills in mathematics. By breaking down the problem step-by-step and providing a clear explanation, this guide aims to help learners grasp the concepts effectively and improve their problem-solving skills.

Understanding the Problem

The problem statement reads: Bethany thinks of a number, and six-thirteenths of this number is 48. What is one-thirteenth of her number?

Breaking down this statement:

- Bethany’s number is unknown; let's denote it as N.
- Six-thirteenths of her number is given as 48, which translates to the equation:

$$
\frac{6}{13} \times N = 48
$$

- The goal is to find $\frac{1}{13}$ of her number, which is:

$$
\frac{1}{13} \times N
$$

The problem involves solving for N, then calculating $\frac{1}{13} \times N$.

Step-by-Step Solution

To find the answer, follow these steps:

Step 1: Write the equation

From the problem:

$$
\frac{6}{13} \times N = 48
$$

Step 2: Isolate N

To find N, multiply both sides of the equation by the reciprocal of $\frac{6}{13}$, which is $\frac{13}{6}$:

$$
N = 48 \times \frac{13}{6}
$$

Step 3: Simplify the expression

Perform the multiplication:

$$
N = 48 \times \frac{13}{6}
$$

Since 48 and 6 are both divisible by 6, simplify before multiplying:

$$
48 \div 6 = 8
$$

So,

$$
N = 8 \times 13
$$

Calculate:

$$
N = 104
$$

Bethany’s number is 104.

Step 4: Find one-thirteenth of Bethany’s number

Now, calculate $\frac{1}{13} \times N$:

$$
\frac{1}{13} \times 104 = \frac{104}{13} = 8
$$

Answer:

$$
\boxed{8}
$$

So, one-thirteenth of Bethany’s number is 8.

Key Concepts and Takeaways

Understanding how to approach this problem involves several fundamental mathematical concepts:

1. Fractions and Multiplication

- Recognizing that "six-thirteenths of a number" translates to multiplying the number by $\frac{6}{13}$.
- Applying the inverse operation (multiplying both sides by the reciprocal) to solve for the unknown.

2. Solving for an Unknown in an Equation

- Rearranging the equation to isolate the variable.
- Using reciprocal multiplication as the primary method for solving fractional equations.

3. Simplifying Fractions

- Reducing fractions to their simplest form for easier calculations.
- Dividing numerator and denominator by their greatest common divisor (GCD).

4. Concept of “Part of a Whole”

- Understanding that $\frac{1}{13}$ of a number is dividing the number into 13 equal parts and taking one part.

Additional Practice Problems

To reinforce understanding, here are some related practice problems:

- **Problem 1:** If $\frac{3}{4}$ of a number is 60, what is $\frac{1}{4}$ of the number?
- **Problem 2:** Bethany’s number is such that $\frac{5}{8}$ of it equals 50. Find $\frac{1}{8}$ of her number.
- **Problem 3:** A number is triple what it is when divided into four parts. If each part is 15, what is the total number?

How to Approach Similar Fraction Word Problems

When tackling similar problems, keep these steps in mind:

1. Identify the Unknown

- Assign a variable (e.g., N) to the unknown number.

2. Translate the Word Problem into an Equation

- Convert phrases like "six-thirteenths of a number" into fractional expressions.

3. Isolate the Variable

- Use algebraic operations to solve for the unknown.

4. Perform the Final Calculation

- Once the variable is known, calculate the specific part asked for in the problem.

5. Check Your Work

- Verify the solution by plugging it back into the original equation.

Applications of Fraction Problems in Everyday Life

Understanding how to manipulate fractions and solve related problems has practical applications:

- Financial calculations: Determining shares, discounts, or interest rates.
- Cooking recipes: Adjusting ingredient quantities based on fractions.
- Measurement conversions: Splitting quantities into parts.
- Statistics: Interpreting parts of data sets or probabilities.

Conclusion

The problem "Bethany Thinks Of A Number 6/13 Of Her Number Is 48 What Is 1/13" illustrates the importance of algebra and fractions in problem-solving. By translating the word problem into an algebraic equation, solving for the unknown, and then calculating the desired fraction, we find that Bethany’s number is 104, and one-thirteenth of her number is 8. Mastering these steps enhances mathematical reasoning and prepares you for more complex problems involving fractions and algebra.

Remember, breaking down complex problems into manageable steps makes solving them less intimidating and more systematic. Practice with similar problems to develop confidence and proficiency in handling fractional word problems effectively.

Keywords: Bethany thinks of a number, fractions, algebra, solving equations, part of a whole, mathematical problem-solving, fraction word problems, algebra for beginners, practical math applications

Frequently Asked Questions

Bethany thinks of a number, and 6/13 of her number is 48. What is her original number?

Her original number is 104.

If 6/13 of Bethany's number equals 48, how do you find her total number?

Divide 48 by 6/13 (which is the same as multiplying 48 by 13/6): 48 × 13/6 = 104.

What is 1/13 of Bethany's number if 6/13 is 48?

First, find her total number (104), then 1/13 of it is 8.

How do you calculate the number Bethany thinks of if 6/13 of it is 48?

Set up the equation: (6/13) × N = 48. Solving for N: N = 48 × 13/6 = 104.

What is the value of 6/13 of Bethany's number if the total number is 104?

It is 48, confirming the problem statement.

How do you find 1/13 of Bethany's number when 6/13 of it is given?

First find the total number (104), then 1/13 of it is 8.

If Bethany's number is 104, what is 1/13 of her number?

1/13 of 104 is 8.

Why is dividing 48 by 6/13 the correct method to find Bethany's number?

Because 6/13 of the number equals 48, so reversing the multiplication by dividing isolates the total number.

What are the key steps to solve for Bethany's number in this

problem?

Identify the fraction of the number given, set up the equation, solve for the total number, then find 1/13 of it.

Can you generalize how to find 1/13 of a number if 6/13 of it is known?

Yes. First, find the total number by dividing the known part by 6/13, then divide the total by 13 to find 1/13 of the number.

Additional Resources

Bethany Thinks Of A Number 6/13 Of Her Number Is 48 What Is 1/13 is an intriguing mathematical puzzle that challenges one's understanding of fractions and proportional reasoning. This problem, while seemingly straightforward, opens the door to deeper mathematical concepts and problem-solving techniques. It is a classic example often used in classrooms to teach students how to translate word problems into algebraic expressions, interpret fractions, and ultimately find unknown quantities. In this article, we will thoroughly analyze this problem, explore its mathematical foundations, and discuss strategies for solving similar fraction-based puzzles.

Understanding the Problem Statement

Before delving into solution methods, it is essential to interpret the problem correctly. The statement "Bethany thinks of a number, 6/13 of her number is 48, what is 1/13?" involves a few key components:

- Bethany has a certain unknown number, which we can denote as N.
- Six thirteenths (6/13) of her number equals 48.
- The question asks: What is one thirteenth (1/13) of her number?

This problem is a typical example of translating a word problem into a mathematical equation and solving for the unknown.

Breaking Down the Mathematical Components

Expressing the Given Information Mathematically

The first step is to translate the phrase "6/13 of her number is 48" into an algebraic expression:

$$\frac{6}{13} \times N = 48$$

Here, N is the unknown number Bethany is thinking of.

The goal is to find the value of N, and subsequently determine $\frac{1}{13} \times N$.

Setting Up the Equation

From the equation:

$$\frac{6}{13} N = 48$$

we can solve for N by isolating it:

$$N = 48 \times \frac{13}{6}$$

This step involves multiplying both sides of the equation by the reciprocal of $\frac{6}{13}$, which is $\frac{13}{6}$.

Solving the Equation

Let's walk through the solution process:

1. Calculate N:

$$N = 48 \times \frac{13}{6}$$

2. Simplify the multiplication:

$$N = 48 \times \frac{13}{6} = \left(48 \div 6 \right) \times 13 = 8 \times 13 = 104$$

Therefore, Bethany's number N is 104.

3. Find $\frac{1}{13}$ of Bethany's number:

$$\frac{1}{13} \times N = \frac{1}{13} \times 104 = \frac{104}{13} = 8$$

Answer: $\boxed{8}$

This straightforward calculation reveals that one thirteenth of Bethany's number is 8.

Understanding the Significance of the Solution

The problem illustrates the importance of understanding fractions and their relationship to whole numbers. It emphasizes the concept that fractions represent parts of a whole and how to manipulate algebraic expressions to find unknown quantities.

Key insights include:

- The multiplication by the reciprocal to solve for an unknown in an equation involving fractions.
- The importance of simplifying fractions before performing calculations.
- Recognizing that the problem is a proportional relationship, making it applicable in real-world contexts such as sharing, dividing, or scaling quantities.

Features and Analysis of the Problem

Features

- Fractional reasoning: The problem is centered around understanding parts of a whole, which is foundational in mathematics.
- Algebraic application: It involves setting up and solving a simple algebraic equation.
- Real-world relevance: Such problems are common in everyday situations—dividing quantities, sharing resources, or calculating portions.

Pros of Using Such Problems

- Enhances understanding of fractions and proportional relationships.
- Develops algebraic thinking skills.
- Useful in practical scenarios involving division or sharing.

Cons or Challenges

- Can be confusing for beginners unfamiliar with fractions or reciprocal multiplication.
- Might require multiple steps, which can lead to calculation errors if not handled carefully.
- Some students may misinterpret the problem's wording, leading to incorrect setups.

Alternative Approaches and Strategies

While the direct algebraic approach is straightforward, alternative methods can reinforce understanding:

Using Proportions

Since $\frac{6}{13}$ of the number is 48, the proportion:

$$\frac{6}{13} = \frac{48}{N}$$

can be used to set up:

$$ 6 \times N = 13 \times 48 $$

which leads to the same calculation:

$$ N = \frac{13 \times 48}{6} $$

This method emphasizes cross-multiplication and proportional reasoning.

Graphical Representation

Visual aids like pie charts or bar diagrams can help students see the parts of the whole and understand how fractions relate to the entire number.

Extending the Concept: Variations and Related Problems

Once comfortable with this problem, learners can explore variations:

- Changing the fraction: What if 7/13 of the number is 48? How does that affect the total?
- Different totals: If 6/13 of her number is some other value, find her number.
- Multiple parts: If Bethany thinks of a number such that 6/13 of it is 48, what is the total, and what is 1/13?

These variations encourage flexible thinking and deeper understanding of fractional relationships.

Practical Applications

Mathematical problems involving fractions and proportions like this are applicable in various fields:

- Finance: Calculating shares or interest.
- Cooking: Dividing ingredients proportionally.
- Construction: Scaling measurements.
- Statistics: Interpreting data proportions.

Understanding how to manipulate fractions and set up equations is fundamental in these areas.

Summary and Final Thoughts

The problem "Bethany thinks of a number, 6/13 of her number is 48, what is 1/13?" encapsulates essential mathematical skills: translating word problems into equations, understanding fractions, and

solving for unknowns using algebra. The key steps involve recognizing the proportional relationship, setting up the correct equation, and simplifying calculations.

Its importance lies in fostering a solid grasp of fractions, algebra, and problem-solving strategies. This type of problem also encourages students to think critically about relationships and develop mathematical reasoning skills that are widely applicable.

Key takeaways:

- The total number Bethany is thinking of is 104.
- One-thirteenth of this number is 8.
- The problem exemplifies fundamental algebraic and fractional concepts.

Pros:

- Reinforces understanding of fractions and proportions.
- Builds problem-solving confidence.
- Applicable in practical scenarios.

Cons:

- May be challenging for students new to fractions.
- Requires careful setup and calculations to avoid errors.

By mastering such problems, learners can develop a strong foundation in mathematics that will serve them well across diverse fields and real-world situations.

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