Ali Used 2/7 Of A Foot Of Ribbon To Attach A Decoration To His Rearview Mirror. Now, He Has 10/21 Of

Ali Used 2/7 Of A Foot Of Ribbon To Attach A Decoration To His Rearview Mirror. Now, He Has 10/21 Of a certain amount of ribbon remaining, prompting an interesting exploration of fractions, subtraction, and real-world applications of math. This article delves into the problem, explaining how to understand and solve it, and provides insights into fraction operations, problem-solving strategies, and practical uses of math in everyday life.

Understanding the Problem: Fractions in Context

When we encounter a problem involving fractions like this, it's essential to interpret the scenario accurately. Ali starts with a certain length of ribbon. He uses a part of it, specifically 2/7 of a foot, to attach a decoration. Afterward, he is left with 10/21 of the original ribbon. The core question is: what was the original length of the ribbon, and how do these parts relate?

This type of problem is common in real-world situations where measurements are involved, such as crafting, tailoring, or decorating. It highlights the importance of understanding fractions, their operations, and how to manipulate them to find unknown quantities.

Breaking Down the Fractions

To approach this problem, we need to analyze the fractions involved:

- The amount used: 2/7 of a foot
- The amount remaining: 10/21 of the original length

The key is to determine the original length of the ribbon based on the given parts.

Mathematical Approach to the Problem

Step 1: Define the Variables

Let’s denote:

- L = the original length of the ribbon (in feet)

According to the problem:

- The amount used = $\frac{2}{7} \times L$
- The amount remaining = $\frac{10}{21} \times L$

Since the total original length is the sum of the used part and the remaining part:

$$
\frac{2}{7}L + \frac{10}{21}L = L
$$

Step 2: Express the Equation

Simplify the equation:

$$
\left(\frac{2}{7} + \frac{10}{21} \right) L = L
$$

To combine the fractions, find a common denominator:

- The denominators are 7 and 21
- The least common denominator (LCD) is 21

Rewrite $\frac{2}{7}$ as $\frac{6}{21}$:

$$
\left(\frac{6}{21} + \frac{10}{21} \right) L = L
$$

Now, sum the fractions:

$$
\frac{6 + 10}{21} L = L
$$

$$
\frac{16}{21} L = L
$$

Step 3: Solve for L

Divide both sides of the equation by L (assuming $L \neq 0$):

$$
\frac{16}{21} L \div L = 1
$$

\]

\[
\frac{16}{21} = 1
\]

This suggests that the sum of the used and remaining parts should equal the full length:

\[
\text{Used} + \text{Remaining} = 1 \times L
\]

But since the sum of the fractions \(\frac{2}{7} + \frac{10}{21} \) is less than 1, this indicates that the total used and remaining parts do not sum to the whole, unless the fractions are part of the same total length.

Alternatively, to find the original length \(L \), we need to relate the used and remaining parts directly:

- The used part: \(\frac{2}{7}L \)
- The remaining part: \(\frac{10}{21}L \)

Given the total is \(L \):

\[
\frac{2}{7}L + \frac{10}{21}L = L
\]

Expressed as:

\[
\left(\frac{6}{21} + \frac{10}{21} \right) L = L

\]

\[

\frac{16}{21} L = L

\]

If we interpret "Now, He Has 10/21 Of" as the remaining amount of ribbon, then the used part plus remaining should sum to the original length:

\[

\text{Used} + \text{Remaining} = L

\]

which implies:

\[

\frac{2}{7}L + \frac{10}{21}L = L

\]

And as shown, this simplifies to:

\[

\frac{16}{21}L = L

\]

But this only holds if the total used and remaining parts sum to the total length, which they do not unless the fractions are equal to 1.

Therefore, the key is to find the original length \(L \) based on the remaining amount.

Calculating the Original Length of the Ribbon

Given that Ali used 2/7 of the ribbon and now has 10/21 of it remaining, the total original length L can be found as follows:

Step 1: Express the remaining length in terms of L

$$
\text{Remaining} = \frac{10}{21} L
$$

Step 2: Express the used length in terms of L

$$
\text{Used} = \frac{2}{7} L
$$

Step 3: Sum of used and remaining

Since the total original length is the sum of used and remaining:

$$
\frac{2}{7} L + \frac{10}{21} L = L
$$

Express all fractions with common denominator 21:

$$
\frac{6}{21} L + \frac{10}{21} L = L
$$

Adding fractions:

$$
\frac{16}{21} L = L
$$

Step 4: Solve for L

Dividing both sides by L:

$$
\frac{16}{21} = 1
$$

This indicates that the sum of the used and remaining parts is less than the total, which suggests a misinterpretation, or that the remaining amount is after usage.

Alternatively, the problem might be asking:

- Ali started with a total length L.
- He used 2/7 of L.
- Now, he has 10/21 of L remaining.

If the remaining is after usage, then:

$$
\text{Remaining} = L - \text{Used}
$$

$$
\frac{10}{21} L = L - \frac{2}{7} L
$$

Express $\frac{2}{7} L$ as $\frac{6}{21} L$:

$$
\frac{10}{21} L = L - \frac{6}{21} L
$$

Rearranged:

$$
\frac{10}{21} L = \frac{21}{21} L - \frac{6}{21} L
$$

$$
\frac{10}{21} L = \frac{15}{21} L
$$

But $\frac{10}{21} L \neq \frac{15}{21} L$. So, this indicates inconsistency unless the fractions are representing parts of the total before and after usage.

Final approach:

Assuming the remaining amount is after Ali used 2/7 of the ribbon, then:

$$
\text{Remaining} = \left(1 - \frac{2}{7} \right) L = \frac{5}{7} L
$$

Given that the remaining amount is $\frac{10}{21}$ of the original:

$$
\frac{10}{21} L = \frac{5}{7} L
$$

Express $\frac{5}{7} L$ as $\frac{15}{21} L$:

$$
\frac{10}{21} L = \frac{15}{21} L
$$

which is not possible unless the fractions are not directly representing the same quantities.

Conclusion: Clarifying the Original Length Calculation

Based on the problem's wording, the most consistent interpretation is:

- Ali started with an unknown total length L.
- He used 2/7 of it.
- Now, he has 10/21 of the original length remaining.

Since the amount used plus the remaining amount should equal the original length:

$$
\frac{2}{7} L + \frac{10}{21} L = L
$$

Expressing $\frac{2}{7} L$ as $\frac{6}{21} L$:

$$
\frac{6}{21} L + \frac{10}{21} L = L
$$

$$
\frac{16}{21} L = L
$$

\]

Dividing both sides by \(L \):

\[
\frac{16}{21} = 1
\]

which is false, indicating that the data might be inconsistent or that the remaining is after the used part.

Practical Implications and Real-World Applications

Despite the complexity, this problem illustrates the importance of understanding fractions in practical contexts

Frequently Asked Questions

What fraction of the ribbon does Ali have left after using 2/7 of a foot?

Ali has 10/21 of a foot of ribbon remaining after using 2/7.

How can we verify that 2/7 of a foot is subtracted correctly from the original length to get 10/21?

By converting the fractions to a common denominator and subtracting: 2/7 equals 6/21, so 10/21 + 6/21 equals 16/21, indicating the original length was 16/21 of a foot.

What is the original length of the ribbon before Ali used any of it?

The original length of the ribbon was 16/21 of a foot.

If Ali used 2/7 of a foot of ribbon, how much more would he need to reach a total of 1 foot?

He would need 1 - 10/21 = 11/21 of a foot to reach 1 foot.

Why is the remaining ribbon expressed as 10/21 of a foot after using 2/7?

Because after converting 2/7 to 6/21 and subtracting from the original 16/21, the remaining is 10/21, representing the leftover length.

Is the remaining ribbon length of 10/21 of a foot more or less than half a foot?

Since half a foot is 10.5/21, the remaining 10/21 is slightly less than half a foot.

What is the practical significance of understanding fractions like 2/7 and 10/21 in everyday tasks?

Understanding fractions helps accurately measure and allocate materials, such as ribbon, ensuring precise use and resource management in real-life situations.

Additional Resources

Ali Used 2/7 Of A Foot Of Ribbon To Attach A Decoration To His Rearview Mirror. Now, He Has 10/21 Of

In a simple act of decorating his vehicle, Ali utilized a precise length of ribbon—specifically, two-sevenths of a foot—to attach a decorative piece to his rearview mirror. This seemingly straightforward action leads us into a fascinating exploration of fractions, their conversions, and what remains after a portion has been used. The question that naturally arises is: after using 2/7 of a foot of ribbon, how much ribbon does Ali have left? Moreover, how does this remaining amount compare to the initial total, expressed as the fraction 10/21? This article delves into the mathematical calculations involved, the significance of fractions in everyday life, and the practical applications of such calculations.

Understanding the Problem: Fractions in Daily Life

Before diving into calculations, it's essential to understand the context and significance of fractions in everyday scenarios. Whether cooking, measuring materials for a craft, or, as in Ali's case, decorating a vehicle, fractions help quantify parts of a whole.

Ali's scenario involves:

- An initial total length of ribbon.
- A portion used for decoration.
- The remaining length of ribbon after the use.
- A comparison of the remaining ribbon to a specific fraction, 10/21.

The key is to interpret these quantities accurately and determine the remaining ribbon, both in fractional form and in practical terms.

Step 1: Clarifying the Known Quantities

Let's list out what we know:

- Amount of ribbon used: 2/7 of a foot.
- Remaining ribbon after use: The problem states "Now, He Has 10/21 Of," which is incomplete but suggests that after using 2/7 of a foot, Ali has 10/21 of something remaining, likely the original total ribbon length.

To proceed, we need to interpret what the 10/21 of refers to. It is reasonable to assume that:

- The total ribbon length is some unknown quantity, say T (in feet).
- After using 2/7 of a foot, the remaining length is (10/21) T.

Our goal: Determine the original total length T based on the known used amount and the remaining fraction.

Step 2: Setting Up the Equation

Assuming the total ribbon length is T, then:

- The used length: (2/7) ft
- The remaining length: (10/21) T

Since the total length is the sum of used and remaining parts:

Total length, T = Used length + Remaining length

Expressed mathematically:

T = (2/7) + (10/21) T

Now, we can solve for T.

Step 3: Solving for the Total Ribbon Length

Rearranged, the equation becomes:

$$T - (10/21)\ T = (2/7)$$

Factor T on the left:

$$T\ (1 - 10/21) = 2/7$$

Calculate the parentheses:

$$1 - 10/21 = (21/21) - (10/21) = 11/21$$

Now, the equation simplifies to:

$$T\ (11/21) = 2/7$$

To solve for T:

$$T = (2/7)\ /\ (11/21)$$

Division of fractions:

$$T = (2/7)\ (21/11)$$

Multiply numerator and denominator:

$$T = (2\ 21)\ /\ (7\ 11) = 42\ /\ 77$$

Simplify numerator and denominator by dividing both by 7:

42 ÷ 7 = 6

77 ÷ 7 = 11

Thus,

T = 6 / 11

Interpretation:

The total length of the ribbon before any was used is 6/11 of a foot.

Step 4: Verifying the Calculation

To ensure accuracy, verify if the remaining amount aligns with the initial total:

- Used: 2/7 ft
- Total: 6/11 ft

Calculate the remaining length:

Remaining length = Total - Used = (6/11) - (2/7)

Find a common denominator for subtraction:

LCM of 11 and 7 is 77.

Convert fractions:

(6/11) = (6 7) / (11 7) = 42 / 77

(2/7) = (2 11) / (7 11) = 22 / 77

Subtract:

Remaining = (42/77) - (22/77) = (20/77)

Express remaining as a fraction of the total:

Remaining / Total = (20/77) / (6/11)

Dividing:

(20/77) (11/6) = (20 11) / (77 6) = 220 / 462

Simplify numerator and denominator by dividing both by 22:

220 ÷ 22 = 10

462 ÷ 22 = 21

Remaining fraction:

10 / 21

This confirms that after using 2/7 of a foot, the remaining ribbon constitutes 10/21 of the total length, aligning with the initial statement.

Summarizing the Findings

- The total ribbon length T is 6/11 of a foot.
- Ali used 2/7 of a foot for his decoration.
- After the usage, the remaining ribbon is 10/21 of the total length, which is approximately 0.2857 feet.
- The remaining length in feet: (Remaining fraction) T = (20/77) (6/11) = 120/847 □ 0.1416 feet.

Practical Implications and Applications

Understanding these calculations has practical significance beyond this specific scenario:

1. Accurate Measurement in Crafting and Decor: Knowing how to convert and manipulate fractions ensures precise cutting and usage of materials, minimizing waste.

2. Resource Management: Estimating remaining resources helps in planning projects, especially when working with limited supplies.

3. Educational Value: Such real-world applications reinforce the importance of fractions, division, and multiplication in everyday life.

4. Design and Aesthetics: Proper measurements ensure decorations are proportional and visually appealing, enhancing the overall aesthetic.

Conclusion

Ali's simple act of attaching a decoration with a specific length of ribbon opens a window into the practical application of fractional arithmetic. By carefully analyzing the given fractions and setting up the appropriate equations, we deduced that the total length of ribbon initially available was 6/11 of a foot. After using 2/7 of a foot, Ali was left with 10/21 of the original ribbon, demonstrating an elegant interplay of fractions and real-world measurements. Such calculations are invaluable in everyday tasks, highlighting the importance of mathematical literacy in managing resources efficiently and accurately.

In summary:

- Initial ribbon length: 6/11 foot
- Used for decoration: 2/7 foot
- Remaining: 10/21 of the total ribbon, which is about 0.14 feet

Whether in crafting, construction, or simple household tasks, understanding how to manipulate and interpret fractions ensures precision and efficiency—skills that are as practical as they are fundamental.

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