

Ben Walked $\frac{2}{5}$ Mile. Tonya Walked $\frac{1}{4}$ Mile. What Fraction Of A Mile Did They Walk In Total?

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When it comes to understanding how to combine fractions, especially in real-life situations like walking distances, it can seem challenging at first. In this article, we will explore how to find the total distance Ben and Tonya walked together by adding their individual distances expressed as fractions of a mile. We will break down the process step-by-step, discuss the concepts of fractions, least common denominators, and how to simplify the final answer. Whether you're a student working on math homework or someone interested in practical applications of fractions, this guide will provide clear explanations and helpful tips.

Understanding Fractions in Real-Life Contexts

Before diving into calculations, it's important to understand what fractions represent in everyday scenarios like walking distances.

What Are Fractions?

- Fractions are numbers that represent parts of a whole.
- They consist of a numerator (top number) and a denominator (bottom number).
- For example, in $\frac{2}{5}$, 2 is the numerator, indicating two parts, and 5 is the denominator, indicating the total parts that make up the whole.

Fractions as Distances

- When measuring distances, fractions allow us to express partial miles.
- For instance, $\frac{2}{5}$ mile means two out of five equal parts of a mile.
- Similarly, $\frac{1}{4}$ mile is one of four equal parts of a mile.

Adding Fractions: The Key to Finding Total Distance

To find the total distance walked by Ben and Tonya, we need to add their individual fractional distances. This involves a few important steps:

Step 1: Understand the Need for a Common Denominator

- Fractions can only be directly added or subtracted if they have the same denominator.
- Since $\frac{2}{5}$ and $\frac{1}{4}$ have different denominators, we need to find a common denominator before adding.

Step 2: Find the Least Common Denominator (LCD)

- The LCD of 5 and 4 is the smallest number divisible by both, which is 20.
- To convert each fraction to an equivalent fraction with denominator 20, we perform the following conversions:
- For $\frac{2}{5}$: multiply numerator and denominator by 4 $\rightarrow \frac{8}{20}$
- For $\frac{1}{4}$: multiply numerator and denominator by 5 $\rightarrow \frac{5}{20}$

Step 3: Add the Fractions

- Now that both fractions have the same denominator, addition is straightforward:
- $\frac{8}{20} + \frac{5}{20} = \frac{(8 + 5)}{20} = \frac{13}{20}$

Final Calculation: Total Distance Walked

The combined distance Ben and Tonya walked is $\frac{13}{20}$ mile.

Understanding the Result

- The total distance is $\frac{13}{20}$ mile, which is a fraction less than 1 mile.
- To interpret this in decimal form, divide 13 by 20:
- $13 \div 20 = 0.65$ miles
- This means they walked a total of 0.65 miles together.

Why Simplify Fractions?

In this case, $\frac{13}{20}$ is already in its simplest form because 13 and 20 share no common factors other than 1. However, understanding how to simplify fractions is important in many similar problems.

How to Simplify Fractions

- Find the greatest common divisor (GCD) of numerator and denominator.
- Divide both numerator and denominator by the GCD.
- For example, if a fraction is $\frac{4}{8}$:

- GCD of 4 and 8 is 4.
- Divide numerator and denominator by 4:
- $4 \div 4 = 1$
- $8 \div 4 = 2$
- Simplified fraction: $\frac{1}{2}$

Practical Applications of Fraction Addition in Daily Life

Understanding how to add fractions isn't limited to math class; it has many real-world uses:

1. Measuring Distances and Lengths

- Combining partial distances when walking, running, or biking.
- Calculating total length of materials cut into fractional parts.

2. Cooking and Recipes

- Combining fractional measurements like $\frac{1}{2}$ cup and $\frac{1}{4}$ cup ingredients.

3. Financial Calculations

- Summing fractional shares or interest rates expressed as fractions.

Summary: How Much Did Ben and Tonya Walk Together?

To sum up, Ben walked $\frac{2}{5}$ mile, and Tonya walked $\frac{1}{4}$ mile. By finding a common denominator (20), converting the fractions to $\frac{8}{20}$ and $\frac{5}{20}$, and adding them, we arrive at a total of:

- $\frac{13}{20}$ mile

This approximate value in decimal form is 0.65 miles, meaning they walked just over half a mile together.

Key Takeaways

- Converting fractions to a common denominator is essential for addition.
- The least common denominator of 5 and 4 is 20.

- The sum of $\frac{2}{5}$ and $\frac{1}{4}$ is $\frac{13}{20}$.
- The total distance they walked is $\frac{13}{20}$ mile or 0.65 miles.
- Simplifying fractions makes calculations easier and results clearer.

Additional Tips for Working with Fractions

- Always look for the least common denominator to simplify calculations.
- Convert mixed numbers to improper fractions before adding.
- Practice simplifying fractions to improve speed and accuracy.
- Remember to interpret your final answer in both fractional and decimal forms for better understanding.

Conclusion

Adding fractions like $\frac{2}{5}$ and $\frac{1}{4}$ might seem complicated at first, but with a systematic approach, it becomes straightforward. Understanding how to find common denominators, convert fractions, and perform addition is a vital skill with numerous practical applications. Whether measuring distances, cooking, or handling financial data, mastering fractions enhances your mathematical literacy and everyday problem-solving abilities. So, the next time you walk, drive, or cook, remember that fractions are your friends in making sense of parts of a whole!

Frequently Asked Questions

What is the total distance Ben and Tonya walked combined?

They walked a total of $\frac{13}{20}$ miles.

How do you add fractions like $\frac{2}{5}$ and $\frac{1}{4}$?

Find a common denominator, which for 5 and 4 is 20. Convert $\frac{2}{5}$ to $\frac{8}{20}$ and $\frac{1}{4}$ to $\frac{5}{20}$, then add: $\frac{8}{20} + \frac{5}{20} = \frac{13}{20}$.

What is the sum of $\frac{2}{5}$ mile and $\frac{1}{4}$ mile as a simplified fraction?

The sum is $\frac{13}{20}$ miles, which simplifies to $\frac{13}{20}$ miles.

Why do we need a common denominator when adding fractions like these?

A common denominator allows us to compare and add fractions directly because it represents the same total parts, ensuring the fractions are on the same scale.

Can you convert $13/20$ into a decimal to understand the total miles walked?

Yes, dividing 13 by 20 gives 0.65, so they walked a total of 0.65 miles.

Additional Resources

Ben Walked $2/5$ Mile. Tonya Walked $1/4$ Mile. What Fraction Of A Mile Did They Walk In Total?

When examining simple arithmetic problems involving fractions, such as "Ben walked $2/5$ mile and Tonya walked $1/4$ mile," it might seem straightforward at first glance. However, understanding how to combine these fractions accurately to determine the total distance walked can reveal a deeper appreciation for fraction addition, common denominators, and real-world applications. This problem offers a perfect example of applying basic math concepts to everyday situations, making it both educational and engaging. In this review, we will explore the problem in detail, dissect the mathematical steps involved, and discuss the importance of fractions in practical scenarios.

Understanding the Problem

The problem at hand involves two individuals, Ben and Tonya, who walk different distances, expressed as fractions of a mile. The question asks: what fraction of a mile did they walk in total? To solve this, we need to:

1. Recognize that the total distance is the sum of the individual distances.
2. Convert these distances into compatible fractions for addition.
3. Simplify the resulting sum if possible.

This kind of problem emphasizes the importance of understanding fractions, least common denominators, and addition of unlike fractions. It also demonstrates how abstract mathematical concepts can be directly applied to real-world scenarios, like measuring distances walked.

Breaking Down the Fractions

Before adding the fractions, it's essential to understand their values:

- Ben's distance: $\frac{2}{5}$ mile
- Tonya's distance: $\frac{1}{4}$ mile

Both are proper fractions less than 1, representing parts of a mile. To combine these, we need to find a common denominator, which allows us to add the numerators directly.

Finding the Least Common Denominator

The denominators are 5 and 4. To add fractions with different denominators, find the least common denominator (LCD):

- Multiples of 5: 5, 10, 15, 20, 25, ...
- Multiples of 4: 4, 8, 12, 16, 20, ...

The smallest common multiple is 20, so the LCD is 20.

Converting Fractions to a Common Denominator

Next, convert each fraction to an equivalent fraction with denominator 20:

- Ben's fraction:

$$\left[\frac{2}{5} = \frac{2 \times 4}{5 \times 4} = \frac{8}{20} \right]$$

- Tonya's fraction:

$$\left[\frac{1}{4} = \frac{1 \times 5}{4 \times 5} = \frac{5}{20} \right]$$

Now, both fractions are expressed with the same denominator, making addition straightforward.

Adding the Fractions

Add the numerators:

$$\left[\frac{8}{20} + \frac{5}{20} = \frac{8 + 5}{20} = \frac{13}{20} \right]$$

This sum, $\left(\frac{13}{20}\right)$, represents the total fraction of a mile that Ben and Tonya walked together.

Is $\left(\frac{13}{20}\right)$ simplified?

Since 13 is prime and does not share any common factors with 20 other than 1, $\left(\frac{13}{20}\right)$ is already in simplest form.

Interpreting the Result

The total distance walked in miles is $\left(\frac{13}{20}\right)$. To understand this better, consider:

- Decimal form:

$$\left[\frac{13}{20} = 0.65 \text{ miles} \right]$$

- Percentage form:

$$\left[0.65 \times 100 = 65\% \right]$$

This means Ben and Tonya together walked a little over half a mile, specifically 0.65 miles, or 65% of a mile.

Practical Applications of the Calculation

Understanding how to combine fractions like these is useful beyond classroom exercises. Some real-world scenarios include:

- Fitness tracking: Combining distances for total steps or miles walked.
- Travel planning: Calculating total distances covered in segments.
- Budgeting: Adding fractional parts of resources or costs.
- Construction and carpentry: Combining measurements expressed as fractions.

By mastering these concepts, individuals can make accurate calculations in various daily activities, ensuring precision and efficiency.

Pros and Cons of Using Fractions in Distance Calculation

While fractions are a powerful way to express parts of a whole, they come with their own advantages and challenges.

Pros:

- Precision: Fractions allow exact representation of parts of a mile, avoiding rounding errors.
- Educational value: Strengthens understanding of ratios, proportions, and arithmetic operations.
- Versatility: Applicable to many fields, including engineering, cooking, and finance.

Cons:

- Complexity: Addition and subtraction require finding common denominators, which can be cumbersome.
- Misinterpretation: Improper handling of fractions can lead to errors, especially with larger numbers or more complex fractions.
- Conversion needed: Sometimes, converting to decimal form makes calculations easier for quick estimates but reduces precision.

Features and Variations of the Problem

The basic problem can be expanded or modified for different learning objectives:

- Adding more fractions: For example, include additional distances walked or run.
- Mixed numbers: Incorporate whole miles plus fractional parts, e.g., 1 $\frac{1}{2}$ miles plus $\frac{2}{5}$ miles.
- Different units: Convert walking distances from miles to kilometers or other units, reinforcing unit conversions.
- Real-life scenarios: Use actual walking or running distances from fitness

routines to make the problem more engaging.

These variations help develop a comprehensive understanding of fractions and their practical applications.

Conclusion

The problem of calculating the total distance Ben and Tonya walked— $\frac{2}{5}$ mile + $\frac{1}{4}$ mile = $\frac{13}{20}$ mile—serves as an excellent example of fundamental fraction addition. It illustrates the importance of finding common denominators, converting fractions appropriately, and simplifying the result. Beyond the mathematical process, understanding such calculations empowers individuals to handle real-world tasks involving measurements and quantities accurately. Whether in education, everyday life, or professional contexts, mastering fractions and their addition is a vital skill that enhances numerical literacy and problem-solving capabilities. Through this example, we see that even simple fractions can unlock valuable insights and practical knowledge, making math both relevant and essential in our daily routines.

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