

2 2 determine unit rates with ratios of fractions answer key

2 2 Determine Unit Rates with Ratios of Fractions Answer Key

Understanding unit rates is essential in mathematics, particularly when dealing with ratios and fractions. The concept of unit rates allows individuals to compare quantities effectively and make informed decisions in everyday situations, such as shopping, cooking, or even budgeting. This article will explore how to determine unit rates using ratios of fractions, providing step-by-step guidance, examples, and an answer key to reinforce learning.

What is a Unit Rate?

A unit rate is a comparison between two different quantities where one of the quantities is set to one. It is often expressed in the form of "a per b," where 'a' and 'b' represent the quantities being compared. For example, if a car travels 120 miles in 3 hours, the unit rate would be 40 miles per hour ($120 \text{ miles} \div 3 \text{ hours} = 40 \text{ miles/hour}$).

Why are Unit Rates Important?

Unit rates are crucial for various reasons:

1. Simplifying Comparisons: They allow for straightforward comparisons between different options, such as prices or speeds.
2. Making Informed Decisions: Understanding unit rates helps consumers make better choices when shopping or planning.
3. Problem Solving: Many real-world problems require the use of unit rates for effective solutions.

Understanding Ratios of Fractions

Before diving into determining unit rates, it's essential to understand what ratios of fractions are. A ratio compares two quantities, which can be represented as fractions. For example, if we have a ratio of $\frac{1}{2}$ to $\frac{3}{4}$, we can express it as:

$$\text{Ratio} = \frac{\frac{1}{2}}{\frac{3}{4}}$$

This expression represents the comparison of the two fractions, which can then be simplified to find a unit rate.

Steps to Determine Unit Rates with Ratios of Fractions

Determining unit rates from ratios of fractions involves a few systematic steps:

Step 1: Set Up the Ratio

Identify the two fractions you are comparing. For example, let's consider the ratio of $\frac{2}{3}$ to $\frac{5}{6}$.

Step 2: Write the Ratio as a Fraction

Express the ratio as a fraction:

$$\text{Ratio} = \frac{\frac{2}{3}}{\frac{5}{6}}$$

Step 3: Simplify the Fraction

To simplify a fraction that involves division of fractions, multiply by the reciprocal of the denominator:

$$\frac{\frac{2}{3}}{\frac{5}{6}} = \frac{2}{3} \times \frac{6}{5}$$

Now, multiply the numerators and the denominators:

$$= \frac{2 \times 6}{3 \times 5} = \frac{12}{15}$$

Step 4: Reduce the Fraction to its Lowest Terms

Now, simplify the fraction $\frac{12}{15}$:

$$\frac{12 \div 3}{15 \div 3} = \frac{4}{5}$$

Thus, the unit rate for the ratio of $\frac{2}{3}$ to $\frac{5}{6}$ is $\frac{4}{5}$.

Step 5: Interpret the Unit Rate

The simplified fraction $\left(\frac{4}{5}\right)$ can be interpreted based on the context of the problem. For instance, it might mean that for every 5 units of the second quantity, there are 4 units of the first quantity.

Example Problems

To reinforce understanding, let's look at a few example problems and walk through the solutions.

Example 1

Determine the unit rate of the ratio $\left(\frac{3/4}{2/5}\right)$.

1. Set up the ratio:

$$\left[\frac{3/4}{2/5}\right]$$

2. Write it as a fraction:

$$\left[\begin{aligned} &= \frac{3/4}{2/5} = \frac{3}{4} \times \frac{5}{2} = \frac{3 \times 5}{4 \times 2} = \frac{15}{8} \end{aligned}\right]$$

3. The unit rate is $\left(\frac{15}{8}\right)$, which means for every 8 units of the second quantity, there are 15 units of the first quantity.

Example 2

Determine the unit rate of the ratio $\left(\frac{5/6}{1/3}\right)$.

1. Set up the ratio:

$$\left[\frac{5/6}{1/3}\right]$$

2. Write it as a fraction:

$$\left[\begin{aligned} &= \frac{5/6}{1/3} = \frac{5}{6} \times \frac{3}{1} = \frac{5 \times 3}{6 \times 1} = \frac{15}{6} \end{aligned}\right]$$

3. Reduce the fraction:

$$\left[\begin{aligned} &= \frac{15 \div 3}{6 \div 3} = \frac{5}{2} \end{aligned}\right]$$

\]

The unit rate is $\left(\frac{5}{2}\right)$, indicating that for every 2 units of the second quantity, there are 5 units of the first quantity.

Answer Key for Example Problems

1. For the ratio $\left(\frac{3}{4} \div \frac{2}{5}\right)$, the unit rate is $\left(\frac{15}{8}\right)$.
2. For the ratio $\left(\frac{5}{6} \div \frac{1}{3}\right)$, the unit rate is $\left(\frac{5}{2}\right)$.

Conclusion

Determining unit rates with ratios of fractions is a valuable skill that simplifies the comparison of quantities. By following the steps outlined in this article, individuals can confidently calculate unit rates and utilize them in various real-world applications. Understanding these concepts not only strengthens mathematical skills but also enhances decision-making abilities in everyday life. With practice and application, mastering unit rates will become a straightforward task.

Frequently Asked Questions

What is a unit rate?

A unit rate is a comparison of two different quantities where one of the quantities is expressed as one unit.

How do you determine a unit rate from a ratio of fractions?

To determine a unit rate from a ratio of fractions, divide the numerator by the denominator to convert the fraction into a decimal, then express that decimal in terms of one unit.

If you have a ratio of 3/4 to 2/5, how would you find the unit rate?

First, divide $\frac{3}{4}$ by $\frac{2}{5}$. This is equivalent to multiplying by the reciprocal, so $\frac{3}{4} \div \frac{2}{5} = \frac{15}{8}$. The unit rate is $\frac{15}{8}$ or 1.875.

What is the importance of finding unit rates?

Finding unit rates is important for making comparisons between different ratios, simplifying complex ratios, and making informed decisions based on cost or value per unit.

Can you provide an example of a unit rate involving fractions?

Sure! If a car travels $\frac{3}{5}$ of a mile in $\frac{1}{2}$ hour, the unit rate would be $(\frac{3}{5}) \div (\frac{1}{2}) = (\frac{3}{5}) (\frac{2}{1}) = \frac{6}{5}$ miles per hour.

What happens when the fractions in a ratio have different denominators?

When the fractions have different denominators, you can still find the unit rate by finding a common denominator or converting the fractions to decimals before dividing.

How can unit rates help in everyday situations?

Unit rates can help in everyday situations like comparing prices of products, calculating speed, or determining the best deal when shopping.

What is the formula to convert a ratio of fractions into a unit rate?

The formula is: Unit Rate = (Numerator of first fraction) / (Denominator of second fraction) multiplied by (Denominator of first fraction).

Are there any tools to help calculate unit rates?

Yes, calculators and various online tools can assist in calculating unit rates, especially when dealing with complex fractions.

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