

Given That A : B= 8:5 And 6: C= 3: 4,find The Ratio A : 6:cGive Your Answer In Its Simplest Form.(3 Marks)

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Introduction

Ratios are fundamental in mathematics, particularly in solving problems involving proportional relationships among quantities. Understanding how to manipulate ratios to find unknown values is an essential skill that applies across various fields, including physics, economics, and everyday problem-solving. This article provides a comprehensive guide to solving a specific type of ratio problem involving multiple ratios and finding the simplest form of the resulting ratio. We will explore the problem statement, break down the steps involved, and provide detailed explanations to ensure clarity.

Understanding the Problem

The problem is as follows:

"Given that A : B = 8:5 and 6 : C = 3:4, find the ratio A : 6 : C in its simplest form."

Let's analyze what information is provided and what we need to find.

Key points:

- The ratio of A to B is 8:5.
- The ratio of 6 to C is 3:4.
- The goal is to find the ratio A : 6 : C in its simplest form.

Step-by-Step Solution Approach

To solve this problem, we need to express all quantities in comparable terms and then combine the ratios appropriately. Here's an outline of the approach:

1. Express A in terms of B

From the ratio A : B = 8 : 5, we can write:

$\backslash$

$A = \frac{8}{5} \times B$

\]

2. Express C in terms of a common unit

From the ratio $6 : C = 3 : 4$, we see that 6 and C are related. To find C in terms of a common unit, rewrite this ratio:

\[

$$6 : C = 3 : 4$$

\]

which implies:

\[

$$C = \frac{4}{3} \times 6 = \frac{4}{3} \times 6$$

\]

3. Calculate C

\[

$$C = \frac{4}{3} \times 6 = \frac{4 \times 6}{3} = \frac{24}{3} = 8$$

\]

Thus:

\[

$$C = 8$$

\]

4. Express A in terms of a common scale

To find the ratio $A : 6 : C$, we need A in a comparable form to 6 and C. Let's find A in terms of a common scale that includes 6.

Since A is expressed in terms of B, and B isn't directly given, we need to relate B to known quantities. However, B isn't directly involved in the final ratio, so we can focus on expressing A in terms of the same units as 6 and C.

Expressing A Using the Known Ratios

From earlier:

\[

$$A = \frac{8}{5} \times B$$

\]

But without B's value, we need to find a way to relate A to known quantities.

Finding a Common Scale for All Quantities

Since C is 8, and we want the ratio $A : 6 : C$, we need to express A in terms of 6 or find A's value relative to 6.

1. Express A in terms of B, but relate B to known quantities:

From the ratio $A : B = 8 : 5$:

\[

$$A = \frac{8}{5} B$$

If we can find B in terms of 6, then A can be expressed in terms of 6.

2. Find B in terms of 6

We notice that B isn't directly linked to 6 in the problem statement. To resolve this, consider the possibility that B might not be necessary to find the ratio A : 6 : C if we can relate A directly to 6 using the ratio A : B = 8 : 5.

3. Express B in terms of 6

Suppose B is proportional to 6, then we can set:

$$B = k \times 6$$

for some constant (k) .

From the ratio A : B = 8 : 5:

$$A = \frac{8}{5} B = \frac{8}{5} \times k \times 6$$

which simplifies to:

$$A = \frac{8}{5} \times 6 \times k$$

Now, to find the ratio A : 6, express A as a multiple of 6:

$$A = \left(\frac{8}{5} \times k \times 6 \right)$$

Dividing A by 6:

$$\frac{A}{6} = \frac{\frac{8}{5} \times k \times 6}{6} = \frac{8}{5} \times k$$

Similarly, C is 8, so the ratio A : 6 : C becomes:

$$A : 6 : C = \left(\frac{8}{5} \times k \times 6 \right) : 6 : 8$$

Divide each term by 6 to simplify:

$$A : 6 : C = \left(\frac{8}{5} \times k \right) : 1 : \frac{8}{6}$$

Since $\left(\frac{8}{6} = \frac{4}{3}\right)$, the ratio simplifies to:

$$A : 6 : C = \left(\frac{8}{5} \times k\right) : 1 : \frac{4}{3}$$

Final Step: Eliminating the Parameter (k)

To finalize the ratio, we need to eliminate the parameter (k) . Recall that B is arbitrary unless specified; since B is not involved in the final ratio, the problem likely expects the ratio to be expressed in terms of A , 6 , and C without the parameter.

Given the previous steps, a more straightforward approach is to directly relate A and C without involving B , by assuming the ratios are independent, or consider that B is an intermediate variable.

Alternative Approach: Directly Using the Ratios

Let's revisit the problem with a different perspective:

- From $A : B = 8 : 5$, so $(A = 8x)$ and $(B = 5x)$ for some (x) .
- From $6 : C = 3 : 4$, so $(6 = 3y)$ and $(C = 4y)$ for some (y) .

Since we want the ratio $(A : 6 : C)$, express all three quantities:

$$\begin{aligned} A &= 8x \\ 6 &= 3y \Rightarrow y = \frac{6}{3} = 2 \\ C &= 4y = 4 \times 2 = 8 \end{aligned}$$

Now, the ratio becomes:

$$A : 6 : C = 8x : 6 : 8$$

To express this ratio purely numerically, we need to relate (x) to 6 .

- Since $(A = 8x)$, and (A) is to be expressed in terms of 6 , we need to find (x) such that (A) is proportional to 6 .

If we set $(A = 6k)$, then:

$$\begin{aligned} & 8x = 6k \\ & x = \frac{6k}{8} = \frac{3k}{4} \end{aligned}$$

Substitute $(x = \frac{3k}{4})$ into (A) :

$$A = 8x = 8 \times \frac{3k}{4} = 8 \times \frac{3k}{4} = 2 \times 3k = 6k$$

Thus, $(A = 6k)$, and $(C = 8)$. The ratio becomes:

$$A : 6 : C = 6k : 6 : 8$$

Divide all terms by 2 to simplify:

$$3k : 3 : 4$$

Now, to express in simplest form, choose $(k = 1)$:

$$A : 6 : C = 3 \times 1 : 3 : 4 = 3 : 3 : 4$$

Finally, divide through by 3:

$$1 : 1 : \frac{4}{3}$$

But ratios are typically expressed with whole numbers, so multiply all parts by 3:

$$3 : 3 : 4$$

which simplifies to:

$$\boxed{3 : 3 : 4}$$

Final Answer:

The ratio $A : 6 : C$ in its simplest form is $\boxed{3 : 3 : 4}$.

Summary of Key Points

- Ratios can be manipulated by expressing variables in terms of common parameters.
- When ratios involve unknowns, assign variables to represent proportional quantities.
- Convert ratios to comparable units before combining.
- Simplify ratios by dividing all terms by their greatest common divisor (GCD).
- Always check for the simplest whole-number ratio for clarity and standard form.

Additional Tips for

Frequently Asked Questions

Given that $A : B = 8 : 5$ and $B : C = 6 : 3$, find the ratio $A : C$ in its simplest form.

The ratio $A : C$ is $16 : 5$.

How do you find the combined ratio $A : C$ from the given ratios $A : B$ and $B : C$?

You multiply the ratios $A : B$ and $B : C$ by making B's parts equal and then combine, resulting in $A : C$.

Given $A : B = 8 : 5$ and $B : C = 6 : 4$, what is the ratio $A : C$?

First, make B's parts equal: $A : B = 8 : 5$, $B : C = 6 : 4$. Multiply $A : B$ by 6 and $B : C$ by 5 to get common B: $86 : 56 = 48 : 30$ and $65 : 45 = 30 : 20$. So, $A : C = 48 : 20$, which simplifies to $12 : 5$.

What is the importance of simplifying ratios in problems like this?

Simplifying ratios makes comparisons easier and provides the ratio in its most reduced form for clarity and accuracy.

In the ratio $A : B = 8 : 5$ and $B : C = 6 : 4$, what is the value of $A : 6 : C$?

First, find $A : C$ as $16 : 5$, then express $A : 6 : C$ as $16 : 6 : 5$, which simplifies to $8 : 3 : 5$.

How do you find the ratio $A : 6 : C$ from the given ratios?

Convert both ratios to have a common B , find $A : C$, then incorporate the 6 by comparing $A : 6$ and $C : 6$, leading to the ratio $A : 6 : C$.

Can ratios like $A : B$ and $B : C$ be directly combined? Why or why not?

They cannot be directly combined unless B 's parts are equal; you must adjust ratios to make B 's parts equal before combining.

What is the final simplified ratio of $A : 6 : C$ given the initial ratios?

The final ratio is $8 : 6 : 5$.

Why is it necessary to find the least common multiple (LCM) when working with ratios?

The LCM helps to make the parts of the ratios equal, allowing for accurate combination and simplification of ratios.

Additional Resources

Understanding the Ratio Given That $A : B = 8 : 5$ and $6 : C = 3 : 4$ to Find the Ratio $A : 6 : C$ in Its Simplest Form

When tackling problems involving ratios, especially those that require combining or comparing multiple ratios, it's essential to understand how to manipulate and relate different parts of the ratios effectively. In this particular problem, we are given two ratios: $A : B = 8 : 5$ and $6 : C = 3 : 4$, and asked to find the ratio $A : 6 : C$ in its simplest form. This involves a strategic approach to equalize parts of the ratios and combine them

seamlessly.

This guide will walk you through a detailed, step-by-step process to solve such ratio problems efficiently, ensuring a clear understanding of the concepts involved and the methods used.

Understanding the Problem Statement

The problem states:

- $A : B = 8 : 5$
- $6 : C = 3 : 4$

Our goal:

- Find the ratio $A : 6 : C$ in its simplest form.

Key points to note:

- The ratios involve three variables: A, B, and C.
- The ratios are provided in pairs, implying relationships between A and B, and between 6 and C.
- The problem asks us to find a combined ratio involving A, 6, and C.

Breaking Down the Given Ratios

Before combining ratios, it's essential to understand what each ratio tells us.

Ratio 1: $A : B = 8 : 5$

This indicates that:

```
\[
A = 8k \\
B = 5k
\]
```

for some positive constant k.

Ratio 2: $6 : C = 3 : 4$

This indicates that:

$$\begin{aligned} & \backslash[\\ 6 &= 3m \backslash\backslash \\ C &= 4m \\ & \backslash] \end{aligned}$$

for some positive constant m .

Step 1: Expressing Variables in Terms of Constants

To relate A and C directly, we need to express both in terms of common variables or constants.

From the first ratio:

$$\begin{aligned} & \backslash[\\ A &= 8k \\ & \backslash] \end{aligned}$$

From the second ratio:

$$\begin{aligned} & \backslash[\\ C &= 4m \\ & \backslash] \end{aligned}$$

Our goal is to find the ratio $A : 6 : C$. Since 6 is already given, we need to relate A and C to 6 .

Step 2: Find the Relationship Between Constants

Since A and C are expressed in terms of k and m respectively, but the ratio involves all three elements, we need to connect these constants.

Notice in the second ratio:

$$\begin{aligned} & \backslash[\\ 6 &= 3m \rightarrow m = \frac{6}{3} = 2 \\ & \backslash] \end{aligned}$$

Therefore:

$$C = 4m = 4 \times 2 = 8$$

Now, C is explicitly known as 8.

Next, consider the first ratio:

$$A = 8k$$

But we don't yet know k. To find k, we need to relate A and C through some common ground.

Step 3: Establishing a Common Basis

Since C is determined as 8, and A is expressed as 8k, if we can relate A to C directly, then we can form the ratio A : 6 : C.

Recall that:

$$A = 8k$$

$$C = 8$$

Thus,

$$A = 8k$$

$$C = 8$$

So,

$$A : C = 8k : 8 = 8k : 8$$

To express A in terms of C, note:

$$A$$

$$A = 8k$$

\]

Now, the key is to find the value of k in relation to the other known quantities.

Step 4: Relate A and C via a consistent scale

Since we want the ratio involving A , 6 , and C , and we have $C = 8$, the ratio becomes:

\[

$$A : 6 : C = A : 6 : 8$$

\]

To express A in terms of 6 , we need to find a proportionality constant that relates A to 6 .

Recall that A is originally expressed as $(A = 8k)$.

We know that:

- A is proportional to some multiple of 8 .
- 6 is a fixed number.

Our approach:

- Express A in terms of 6 , so that the ratio is in a comparable form.

Suppose:

\[

$$A = x \times 6$$

\]

Then, the ratio $A : 6 : C$ becomes:

\[

$$x \times 6 : 6 : 8$$

\]

Simplify:

\[

$$6x : 6 : 8$$

\]

Divide all parts by 2 to simplify:

$$\begin{aligned} & \backslash[\\ & 3x : 3 : 4 \\ & \backslash] \end{aligned}$$

Now, the ratio is:

$$\begin{aligned} & \backslash[\\ & 3x : 3 : 4 \\ & \backslash] \end{aligned}$$

At this point, we need to find the value of x .

Step 5: Use the given ratios to find x

Recall the initial ratios:

- $A : B = 8 : 5$
- $6 : C = 3 : 4$

From earlier:

$$\begin{aligned} & \backslash[\\ & A = 8k \\ & \backslash] \\ & \backslash[\\ & C = 8 \\ & \backslash] \end{aligned}$$

Now, since $(A = x \times 6)$, and $(A = 8k)$, then:

$$\begin{aligned} & \backslash[\\ & 8k = x \times 6 \\ & \backslash] \end{aligned}$$

Similarly, from earlier, we had $(k = \frac{A}{8})$, so:

$$\begin{aligned} & \backslash[\\ & k = \frac{x \times 6}{8} \\ & \backslash] \end{aligned}$$

But this seems to complicate things. Alternatively, perhaps it's more straightforward to find a common scale that links A and C directly via the ratios.

Step 6: Cross-multiplied approach to unify ratios

Let's revisit the original ratios:

- $(A : B = 8 : 5)$
- $(6 : C = 3 : 4)$

From the second:

$$C = \frac{4}{3} \times 6 = 8$$

From the first:

$$A = \frac{8}{5} \times B$$

To find A and C in a common framework, perhaps it is best to express B in terms of A:

$$B = \frac{5}{8} A$$

But this doesn't directly help relate to C.

Alternatively, consider that the ratio $A : 6 : C$ can be viewed as:

$$A : 6 : C$$

If we can express A and C in terms of the same variable or scale, then the ratio becomes straightforward.

Step 7: Finalizing the ratio

Given the prior, the best approach is:

- A is proportional to 8k.
- C is 8 from earlier.
- 6 is fixed.

From the second ratio:

$$\begin{aligned} & \backslash[\\ 6 : C &= 3 : 4 \\ & \backslash] \end{aligned}$$

which yields $(C = 8)$ when $(6 = 3 \times 2)$.

From the first ratio:

$$\begin{aligned} & \backslash[\\ A : B &= 8 : 5 \\ & \backslash] \end{aligned}$$

but B is not specified in relation to 6 or C, so perhaps we should interpret the problem as involving ratios scaled to a common basis.

Step 8: Constructing the ratio in simplest form

Given that:

- $A : B = 8 : 5$
- $6 : C = 3 : 4$

and that from the second ratio:

$$\begin{aligned} & \backslash[\\ C &= 8 \\ & \backslash] \end{aligned}$$

and from the first ratio:

$$\begin{aligned} & \backslash[\\ A &= 8k \\ & \backslash] \end{aligned}$$

but without additional info about B or its relation to C, the key is to relate A and C directly.

Let's assume A and C are proportional via their respective ratios, and we want to express A in terms of 6 to form the ratio $A : 6 : C$.

From the second ratio, 6 corresponds to:

$$\begin{aligned} & \backslash[\\ 6 &= 3 \rightarrow \text{scale factor} = 1 \\ & \backslash] \end{aligned}$$

and C is 4 in the ratio 3:4, scaled by the same factor:

$$\begin{aligned} & \backslash[\\ & C = 4 \\ & \backslash] \end{aligned}$$

But earlier, we found $C = 8$ when considering the actual value of 6.

Putting it all together:

- From $6 : C = 3 : 4$

$$\begin{aligned} & \backslash[\\ & C = \frac{4}{3} \times 6 = 8 \\ & \backslash] \end{aligned}$$

- To find A relative to 6 and C, we note:

$$\begin{aligned} & \backslash[\\ & A = 8k \\ & \backslash] \end{aligned}$$

but since A is related to B via $8 : 5$, and B is not directly connected to C, perhaps the most straightforward way is to express A in terms of the same scale as 6.

Recall that:

$$\begin{aligned} & \backslash[\\ & A : B = 8 : 5 \\ & \backslash] \end{aligned}$$

and B can be expressed as:

$$\begin{aligned} & \backslash[\\ & B = \frac{5}{8} A \\ & \backslash] \end{aligned}$$

If B is related to C, perhaps through an implied connection, then to find the ratio $A : 6 : C$, and knowing C is 8, A can be written as:

$$\begin{aligned} & \backslash[\\ & A = \frac{8}{5} B \\ & \backslash] \end{aligned}$$

But without a specific value

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