

Add. Simplify The Answer And Write It As A Mixed Number. $\frac{1}{2} + \frac{2}{3} + \frac{1}{6}$

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Understanding how to add fractions and simplify the result into a mixed number is a fundamental skill in mathematics. Whether you're a student, a teacher, or someone brushing up on basic arithmetic, mastering this process helps build a solid math foundation. In this article, we will explore step-by-step how to add the fractions $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{1}{6}$, simplify the sum, and express it as a mixed number. By the end of this guide, you'll be confident in adding fractions and converting improper fractions into mixed numbers.

Understanding Fractions and Mixed Numbers

Before diving into the calculation, it's essential to understand key concepts:

What is a Fraction?

- A fraction represents a part of a whole.
- It consists of a numerator (top number) and a denominator (bottom number).

Example: In $\frac{3}{4}$, 3 is the numerator, and 4 is the denominator.

What Is a Mixed Number?

- A mixed number combines a whole number and a proper fraction.
- It's used when an improper fraction (top number larger than the bottom number) is simplified.

Example: $1\frac{1}{2}$ is a mixed number, which equals the improper fraction $\frac{3}{2}$.

Step-by-Step Guide to Adding Fractions

Adding fractions involves a few key steps: finding a common denominator, adding the numerators, and simplifying the result.

Step 1: Identify the Denominators

- The fractions involved are $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{1}{6}$.
- Denominators are 2, 3, and 6.

Step 2: Find the Least Common Denominator (LCD)

- The LCD is the smallest number that all denominators divide into evenly.
- List multiples:

Denominator	Multiples
2	2, 4, 6, 8, 10, 12, ...
3	3, 6, 9, 12, 15, ...
6	6, 12, 18, ...

- The least common denominator is 6.

Step 3: Convert Each Fraction to an Equivalent Fraction with the LCD

- For $\frac{1}{2}$:
 - Multiply numerator and denominator by 3:
 - $\frac{1}{2} = \frac{(1 \times 3)}{(2 \times 3)} = \frac{3}{6}$
- For $\frac{2}{3}$:
 - Multiply numerator and denominator by 2:
 - $\frac{2}{3} = \frac{(2 \times 2)}{(3 \times 2)} = \frac{4}{6}$
- For $\frac{1}{6}$:
 - Already with denominator 6:
 - $\frac{1}{6}$ remains the same.

Step 4: Add the Fractions

- Now, add the numerators:

$$\frac{3}{6} + \frac{4}{6} + \frac{1}{6} = \frac{(3 + 4 + 1)}{6} = \frac{8}{6}$$

Simplify the Resulting Fraction

Step 5: Simplify $\frac{8}{6}$

- Find the greatest common divisor (GCD) of 8 and 6:
 - Factors of 8: 1, 2, 4, 8
 - Factors of 6: 1, 2, 3, 6
 - GCD is 2
- Divide numerator and denominator by 2:

$$8 \div 2 = 4$$

$$6 \div 2 = 3$$

- Simplified fraction: $\frac{4}{3}$

Step 6: Convert to a Mixed Number

- Since $\frac{4}{3}$ is an improper fraction (numerator > denominator), convert it:

- Divide numerator by denominator:

$$4 \div 3 = 1 \text{ with a remainder of } 1$$

- Write as a mixed number:

$$1 \frac{1}{3}$$

Final answer: The sum of $\frac{1}{2} + \frac{2}{3} + \frac{1}{6}$, simplified and expressed as a mixed number, is $1 \frac{1}{3}$.

Additional Tips for Adding Fractions and Mixed Numbers

- Always find the least common denominator to make addition straightforward.
- Simplify fractions to their lowest terms to make the answer clearer.
- Convert improper fractions to mixed numbers when they are greater than 1.
- Practice with different fractions to strengthen your skills.

Common Mistakes to Avoid

- Forgetting to find the least common denominator.
- Not converting fractions properly.
- Forgetting to simplify the final answer.
- Misinterpreting improper fractions and mixed numbers.

Practice Problems for Mastery

Try solving these on your own:

1. Add $\frac{3}{4} + \frac{2}{5} + \frac{1}{20}$ and express as a mixed number.
2. Convert $\frac{9}{4}$ into a mixed number.
3. Add $\frac{5}{6} + \frac{1}{3} + \frac{2}{9}$ and simplify.

Answer these to reinforce your understanding and confidence.

Conclusion

Adding fractions and converting improper fractions into mixed numbers is a vital math skill that enhances your numerical fluency. By following systematic steps—finding the least common denominator, converting fractions, adding numerators, simplifying, and converting to a mixed number—you can confidently handle various fraction addition problems. Practice regularly, and these processes will become second nature, empowering you to tackle more complex math challenges with ease.

Whether you're preparing for exams, helping children learn math, or simply brushing up your skills, mastering fraction addition and simplification is a valuable step toward mathematical proficiency.

Frequently Asked Questions

How do I add fractions like $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{1}{6}$?

Find a common denominator, add the numerators, and simplify if needed.

What is the common denominator for $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{1}{6}$?

The least common denominator is 6.

How do I convert fractions to have the same denominator?

Multiply numerator and denominator to get the common denominator for each fraction.

What is $\frac{1}{2}$ plus $\frac{2}{3}$ plus $\frac{1}{6}$ in simplest form?

The sum is $2 \frac{1}{6}$.

How do I simplify the sum of mixed numbers and fractions?

Add fractions with common denominators, then convert improper fractions to mixed numbers.

Can you show me step-by-step how to add $\frac{1}{2} + \frac{2}{3} + \frac{1}{6}$?

Yes. Convert to sixths: $\frac{3}{6} + \frac{4}{6} + \frac{1}{6} = \frac{8}{6} = 1 \frac{2}{6} = 1 \frac{1}{3}$. But since the total is $2 \frac{1}{6}$, check calculations carefully.

Why is the answer a mixed number rather than an improper

fraction?

Because the sum exceeds 1, and mixed numbers clearly show the whole part and fraction part.

What is the final answer to $\frac{1}{2} + \frac{2}{3} + \frac{1}{6}$ as a mixed number?

The final answer is $2 \frac{1}{6}$.

Additional Resources

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When it comes to adding fractions, especially those with different denominators, the process can seem daunting at first. However, with a clear understanding of how to find common denominators and simplify the resulting sum, the task becomes much more manageable. In this article, we will explore in detail how to add the fractions $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{1}{6}$, simplify the resulting sum, and express it as a mixed number. This step-by-step guide aims to clarify the process, providing insights into key concepts and practical tips for handling similar problems efficiently.

Understanding the Problem

Before diving into the calculations, it's important to understand what the problem entails. The task is to:

- Add three fractions: $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{1}{6}$.
- Simplify the sum if necessary.
- Express the answer as a mixed number, which combines a whole number and a proper fraction.

At first glance, these fractions seem different, primarily because they have different denominators. To proceed, we need to find a common denominator, which allows us to combine the fractions directly.

Finding a Common Denominator

The key to adding fractions with different denominators is to find a common denominator, ideally the Least Common Denominator (LCD). The LCD is the smallest number that all the denominators divide into evenly.

Step 1: List the denominators

- Denominator of $1/2$ is 2.
- Denominator of $2/3$ is 3.
- Denominator of $1/6$ is 6.

Step 2: Find the Least Common Multiple (LCM)

- Factors of 2: 2
- Factors of 3: 3
- Factors of 6: 6

Since 6 is divisible by both 2 and 3, the LCD is 6.

Features of this step:

- Ensures all fractions are expressed with the same denominator.
- Simplifies addition process.

Pros:

- Smooth transition to adding fractions.
- Ensures accuracy in the sum.

Cons:

- Sometimes the LCD can be large, making calculations cumbersome if not simplified.

Converting Fractions to Equivalent Fractions with the LCD

Next, convert each fraction to an equivalent fraction with denominator 6.

- For $1/2$: Multiply numerator and denominator by 3:

$$1/2 = (1 \times 3)/(2 \times 3) = 3/6$$

- For $2/3$: Multiply numerator and denominator by 2:

$$2/3 = (2 \times 2)/(3 \times 2) = 4/6$$

- For $1/6$: Already with denominator 6, so it remains $1/6$.

Summary of conversions:

- $1/2 = 3/6$
- $2/3 = 4/6$
- $1/6 = 1/6$

Adding the Fractions

Now that all fractions have the same denominator, addition becomes straightforward:

$$\frac{3}{6} + \frac{4}{6} + \frac{1}{6}$$

Combine the numerators:

$$\frac{(3 + 4 + 1)}{6} = \frac{8}{6}$$

Features:

- Simplifies addition to sum of numerators over common denominator.
- Quick and efficient.

Pros:

- Easy to perform.
- Clear visual understanding of the process.

Cons:

- The resulting fraction may not be in simplest form.

Simplifying the Sum

The sum is:

$$\frac{8}{6}$$

To simplify, divide numerator and denominator by their greatest common divisor (GCD).

- GCD of 8 and 6 is 2.

Divide numerator and denominator by 2:

$$\frac{(8 \div 2)}{(6 \div 2)} = \frac{4}{3}$$

The simplified fraction is $\frac{4}{3}$.

Features:

- Fractions are reduced to lowest terms.
- Facilitates easier interpretation and conversion to mixed numbers.

Pros:

- Ensures the fraction is in simplest form.
- Prepares for converting to a mixed number if necessary.

Cons:

- Additional step, but essential for clarity.

Converting the Improper Fraction to a Mixed Number

Since $\frac{4}{3}$ is an improper fraction (numerator larger than denominator), convert it to a mixed number:

- Divide numerator by denominator:

$$\begin{aligned} & \backslash [\\ & 4 \div 3 = 1 \text{ (quotient)}, \text{ with a remainder of } 1 \\ & \backslash] \end{aligned}$$

- Write the mixed number as:

$$\begin{aligned} & \backslash [\\ & 1 \text{ (whole number)} + \frac{1}{3} \\ & \backslash] \end{aligned}$$

So,

$$\begin{aligned} & \backslash [\\ & \frac{4}{3} = 1 \frac{1}{3} \\ & \backslash] \end{aligned}$$

Features:

- Makes the answer more interpretable.
- Combines whole number and fractional parts for clarity.

Pros:

- Easier to understand, especially in real-world contexts.
- Commonly used in measurements and everyday calculations.

Cons:

- Slightly more complex notation for beginners.

Final Answer and Summary

The sum of $\frac{1}{2} + \frac{2}{3} + \frac{1}{6}$ simplifies to $1 \frac{1}{3}$ when expressed as a mixed number.

Summary of steps:

1. Find the LCD of the denominators (6).
2. Convert all fractions to equivalent fractions with denominator 6.
3. Sum the numerators ($3 + 4 + 1 = 8$).
4. Write the sum as an improper fraction ($\frac{8}{6}$).
5. Simplify to lowest terms ($\frac{4}{3}$).
6. Convert to a mixed number ($1 \frac{1}{3}$).

Practical Tips and Additional Considerations

- Always look for the LCD to facilitate addition.
- Simplify fractions before converting to mixed numbers for clarity.
- When converting improper fractions, division with remainder helps identify the whole number and fractional parts.
- Practice with similar problems to become more comfortable with the process.

Conclusion

Adding fractions with different denominators becomes a straightforward task once you understand the importance of finding the least common denominator, converting fractions appropriately, and simplifying the results. The problem $\frac{1}{2} + \frac{2}{3} + \frac{1}{6}$ demonstrates these principles clearly, culminating in the elegant mixed number answer: $1 \frac{1}{3}$. Mastering these steps not only simplifies similar problems but also enhances overall mathematical fluency, making fractions less intimidating and more accessible in everyday calculations and advanced math contexts.

Whether you're a student learning fractions or someone looking to sharpen your mental math skills, practicing these methods will ensure you handle fraction addition with confidence and precision.

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