(12 1/3+5 1/3)(7 4/87 1/6)

(12 1/3+5 1/3)(7 4/87 1/6) is a mathematical expression that involves addition and multiplication of mixed numbers and fractions, offering an excellent opportunity to explore fraction operations, mixed number conversions, and their practical applications in various contexts. Understanding how to evaluate such expressions is fundamental in mathematics, especially in areas like algebra, arithmetic, and real-world problem solving. In this comprehensive guide, we will break down the steps required to simplify and compute this expression accurately, providing detailed explanations and useful tips along the way.

Understanding the Components of the Expression

Before diving into calculations, it's crucial to understand the individual components of the expression:

1. **Mixed Numbers:** These are numbers composed of a whole number and a fractional part (e.g., 12 1/3).
2. **Fractions:** Numbers expressed as a numerator over a denominator (e.g., 4/87).
3. **Operations:** Addition (+) and multiplication (×) are involved, which require careful attention to the order of operations (PEMDAS/BODMAS rules).

In our specific expression, we have:

- Sum inside parentheses: 12 1/3 + 5 1/3
- Product: The sum above multiplied by 7 4/87 1/6

However, there appears to be ambiguity in the second term, "7 4/87 1/6." To clarify, this likely represents a mixed number with an unusual fractional component or possibly a typo. It could be interpreted as:

- 7 4/87 + 1/6, or
- 7 4/87 1/6 as a single complex number, which is less common.

Given standard notation, the most probable interpretation is that the second term is a mixed number with two fractional parts: 7 4/87 + 1/6.

For the purpose of this article, we will assume it is:

(7 4/87 + 1/6)

which simplifies the calculation process.

Step-by-Step Calculation of the Expression

1. Simplify the Sum Inside the First Parentheses

The first part is:

12 1/3 + 5 1/3

Step 1: Convert Mixed Numbers to Improper Fractions

- 12 1/3:

$$
12 \frac{1}{3} = \frac{(12 \times 3) + 1}{3} = \frac{36 + 1}{3} = \frac{37}{3}
$$

- 5 1/3:

$$
5 \frac{1}{3} = \frac{(5 \times 3) + 1}{3} = \frac{15 + 1}{3} = \frac{16}{3}
$$

Step 2: Add the Improper Fractions

Since they have the same denominator:

$$
\frac{37}{3} + \frac{16}{3} = \frac{37 + 16}{3} = \frac{53}{3}
$$

Step 3: Convert the Result Back to a Mixed Number

$$
\frac{53}{3} = 17 \frac{2}{3}
$$

Therefore,

$$
12\ 1/3 + 5\ 1/3 = 17\ \frac{2}{3}
$$

---

2. Simplify the Second Part: (7 4/87 + 1/6)

Step 1: Convert Mixed Number 7 4/87 to an Improper Fraction

$$
7\ \frac{4}{87} = \frac{(7 \times 87) + 4}{87} = \frac{609 + 4}{87} = \frac{613}{87}
$$

Step 2: Convert 1/6 to an Improper Fraction

$$
1/6 = \frac{1}{6}
$$

Step 3: Find a Common Denominator

The denominators are 87 and 6.

Prime factorization:

- $87 = 3 \times 29$
- $6 = 2 \times 3$

Least common denominator (LCD):

$$
\text{LCD} = 2 \times 3 \times 29 = 174
$$

Step 4: Convert Fractions to Equivalent Fractions with Denominator 174

- $\frac{613}{87}$:

$$
\

\frac{613 \times 2}{87 \times 2} = \frac{1226}{174}
\]

- \(\frac{1}{6}\):

\[
\frac{1 \times 29}{6 \times 29} = \frac{29}{174}
\]

Step 5: Add the Fractions

\[
\frac{1226}{174} + \frac{29}{174} = \frac{1226 + 29}{174} = \frac{1255}{174}
\]

Step 6: Simplify the Fraction

Check if numerator and denominator have common factors.

- 174 factors: 2, 3, 29
- 1255:

Let's see if 1255 is divisible by these:

- 1255 ÷ 5 = 251 (since last digit is 5), so 1255 = 5 × 251.

251 is a prime number.

Since 174 factors are 2, 3, 29, and 1255 factors are 5 and 251, no common factors.

Thus, the fraction \(\frac{1255}{174}\) is in simplest form.

Step 7: Optional – Convert to Mixed Number

Divide 1255 by 174:

- 174 × 7 = 1218

- Remainder = 1255 - 1218 = 37

So,

\[

$$
\frac{1255}{174} = 7 \frac{37}{174}
$$

---

3. Final Step: Multiply the Sum with the Second Part

Now, the entire expression is:

$$
(17 \frac{2}{3}) \times (7 \frac{37}{174})
$$

Step 1: Convert Mixed Numbers to Improper Fractions

- $17 \frac{2}{3}$:

$$
(17 \times 3) + 2 = 51 + 2 = 53
$$

$$
\frac{53}{3}
$$

- $7 \frac{37}{174}$:

$$
(7 \times 174) + 37 = 1218 + 37 = 1255
$$

$$
\frac{1255}{174}
$$

Step 2: Set up the Multiplication

$$
\frac{53}{3} \times \frac{1255}{174}
$$

Step 3: Simplify Before Multiplying (Cross Cancelation)

Check for common factors:

- 53 is prime.
- 1255 factors: 5 × 251
- 174 factors: 2 × 3 × 29

No common factors between numerator and denominator in the fractions.

Step 4: Multiply Numerators and Denominators

$$
\frac{53 \times 1255}{3 \times 174}
$$

Calculate numerator:

$$
53 \times 1255
$$

Break down:

- 50 × 1255 = 62,750
- 3 × 1255 = 3,765

But better to do directly:

53 × 1255:

Calculate:

1255 × 50 = 62,750

1255 × 3 = 3,765

Add: 62,750 + 3,765 = 66,515

So numerator = 66,515

Calculate denominator:

3 × 174 = 522

Step 5: Final Fraction

$$
\frac{66,515}{522}
$$

Step 6: Simplify the Fraction

Check if numerator and denominator can be simplified:

- 522 factors: $2 \times 3 \times 3 \times 29$

Prime factorization of 66,515:

- $66,515 \div 5 = 13,303$

Now, check 13,303:

- $13,303 \div 13 = 1023.31...$ no, not exact.

Test division by 13:

$13 \times 1023 = 13 \times 1023 = 13,299$

Difference: $66,515 - 13,299 = 53,216$

No, so 13 is not a factor.

Try dividing numerator and denominator by common small factors:

- Both are odd, so not divisible by 2.

- Sum of numerator digits: $6+6+5+1+5=23 \rightarrow$ not divisible by 3, so no.

- Not divisible by 5 (ends with 5) $\rightarrow$ yes, divisible by 5.

Divide numerator and denominator by 5:

- Numerator: $66,515 \div 5 = 13,303$

- Den

Frequently Asked Questions

What is the simplified form of the expression (12 1/3 + 5 1/3)(7 4/8 + 1/6)?

First, convert the mixed numbers to improper fractions: 12 1/3 = 37/3, 5 1/3 = 16/3, 7 4/8 = 60/8 = 15/2, and 1/6 remains the same. Then, sum inside parentheses: (37/3 + 16/3) = 53/3 and (15/2 + 1/6) = (45/6 + 1/6) = 46/6 = 23/3. Multiply: (53/3) (23/3) = (53 23) / (3 3) = 1219 / 9.

How do I convert mixed numbers to improper fractions for this problem?

To convert a mixed number to an improper fraction, multiply the whole number by the denominator and add the numerator: for example, 12 1/3 = (12 3 + 1)/3 = 37/3.

What is the sum of 12 1/3 and 5 1/3?

Adding the improper fractions: 37/3 + 16/3 = (37 + 16)/3 = 53/3, which is 17 2/3 in mixed number form.

What is the sum of 7 4/8 and 1/6?

Convert 7 4/8 to 15/2 and 1/6 stays as is. Find common denominator for 15/2 and 1/6, which is 6: 15/2 = 45/6. So, 45/6 + 1/6 = 46/6 = 23/3, which is 7 2/3.

How do I multiply two fractions, like (53/3) and (23/3)?

Multiply numerator with numerator and denominator with denominator: (53/3) (23/3) = (53 23) / (3 3) = 1219 / 9.

What is the mixed number form of the product 1219/9?

Divide numerator by denominator: 1219 ÷ 9 = 135 with a remainder of 4, so the mixed number is 135 4/9.

What is the decimal approximation of (12 1/3 + 5 1/3)(7 4/8 + 1/6)?

Convert to decimal: (17.6667) (7.6667) ≈ 135.222, since (53/3) ≈ 17.6667 and (23/3) ≈ 7.6667, multiplying gives approximately 135.222.

What is the significance of converting mixed numbers to improper fractions in calculations?

Converting mixed numbers to improper fractions simplifies arithmetic operations like addition and multiplication, making calculations straightforward and accurate.

Additional Resources

Understanding and Simplifying the Expression (12 1/3 + 5 1/3)(7 4/8 7 1/6): A Step-by-Step Guide

Working with mixed numbers and complex fractions can seem daunting at first glance, but with a structured approach, it becomes manageable and even straightforward. In this article, we'll dissect and analyze the expression (12 1/3 + 5 1/3)(7 4/8 7 1/6), offering a comprehensive guide to simplify, understand, and compute it accurately. Whether you're a student brushing up on fractions or a math enthusiast exploring advanced expressions, this detailed breakdown aims to clarify each step.

Introduction: Why Understanding Mixed Numbers and Complex Fractions Matters

Mixed numbers and fractions form a fundamental part of mathematics, especially in real-world applications like measurements, finance, and engineering. While they may seem intimidating initially, mastering their operations allows for greater flexibility and precision in calculations.

The expression in focus contains:

- Mixed numbers with fractions
- Addition of mixed numbers
- Multiplication of binomials with complex fractions

By converting these into improper fractions and following systematic operations, we can simplify the expression efficiently.

Step 1: Breaking Down the Expression

Let's first restate the expression for clarity:

(12 1/3 + 5 1/3) × (7 4/8 7 1/6)

However, it appears that the second part, (7 4/8 7 1/6), might be miswritten or combining multiple numbers without clear operators. Assuming it is meant to be a product of two mixed numbers or a single complex expression, we need to clarify its structure.

Clarification of the Expression

- First part: (12 1/3 + 5 1/3)
- Second part: (7 4/8 + 7 1/6) or (7 4/8) and (7 1/6) combined?

Given the notation, it's likely that the expression intended is:

(12 1/3 + 5 1/3) × (7 4/8 + 7 1/6)

or

(12 1/3 + 5 1/3) × (7 4/8) × (7 1/6)

For simplicity, let's proceed assuming the original expression is:

(12 1/3 + 5 1/3) × (7 4/8 + 7 1/6)

This involves:

- Adding two mixed numbers in the first parentheses
- Adding two mixed numbers in the second parentheses
- Then multiplying the results

Step 2: Converting Mixed Numbers to Improper Fractions

2.1 Converting 12 1/3 and 5 1/3

- 12 1/3:

- Whole number: 12
- Fraction: 1/3

Convert to improper fraction:

$$12 \frac{1}{3} = \frac{(12 \times 3) + 1}{3} = \frac{36 + 1}{3} = \frac{37}{3}$$

- 5 1/3:

$$5 \frac{1}{3} = \frac{(5 \times 3) + 1}{3} = \frac{15 + 1}{3} = \frac{16}{3}$$

2.2 Converting 7 4/8 and 7 1/6

- 7 4/8:

Simplify 4/8 to 1/2:

$\frac{4}{8} = \frac{1}{2}$

Convert to improper fraction:

$7 \frac{1}{2} = \frac{(7 \times 2) + 1}{2} = \frac{14 + 1}{2} = \frac{15}{2}$

- 7 1/6:

$7 \frac{1}{6} = \frac{(7 \times 6) + 1}{6} = \frac{42 + 1}{6} = \frac{43}{6}$

Step 3: Performing Addition Within Parentheses

3.1 Adding 12 1/3 + 5 1/3

Expressed as improper fractions:

$$
\frac{37}{3} + \frac{16}{3} = \frac{37 + 16}{3} = \frac{53}{3}
$$

3.2 Adding 7 4/8 + 7 1/6

Expressed as improper fractions:

$$
\frac{15}{2} + \frac{43}{6}
$$

To add these, find a common denominator:

- The denominators are 2 and 6
- Least common denominator (LCD): 6

Convert $\frac{15}{2}$:

$$
\frac{15}{2} = \frac{15 \times 3}{2 \times 3} = \frac{45}{6}
$$

Now, add:

$$
\frac{45}{6} + \frac{43}{6} = \frac{45 + 43}{6} = \frac{88}{6}
$$

Simplify:

$$
\frac{88}{6} = \frac{44}{3}
$$

Step 4: Reconstructing the Sum Expressions

- First sum: (12 1/3 + 5 1/3) = 53/3
- Second sum: (7 4/8 + 7 1/6) = 44/3

Step 5: Multiplying the Sums

Now, the original expression reduces to:

$$
\left(\frac{53}{3}\right) \times \left(\frac{44}{3}\right)
$$

Multiply numerators and denominators:

$$
\frac{53 \times 44}{3 \times 3} = \frac{2332}{9}
$$

Step 6: Simplify the Result

The fraction $\frac{2332}{9}$ is already in simplest form since numerator and denominator share no common factors other than 1.

Convert to Mixed Number:

Divide 2332 by 9:

- $9 \times 259 = 2331$
- Remainder: $2332 - 2331 = 1$

So,

$$
\frac{2332}{9} = 259 \frac{1}{9}
$$

Final Result

The value of the original expression, assuming the corrected interpretation, is:

259 1/9

Summary: Key Takeaways and Tips for Handling Complex Fractions

1. Always Convert Mixed Numbers to Improper Fractions: This simplifies addition and multiplication.
2. Find Common Denominators for Addition: Simplify fractions before combining.
3. Perform Multiplication Carefully: Multiply numerators together and denominators together.
4. Simplify Fractions When Possible: Reduce to lowest terms for clarity.
5. Convert Back to Mixed Numbers for Final Answer: Divide numerator by denominator to find whole number and fractional parts.

Additional Tips for Working with Mixed Numbers and Complex Fractions

- Use a consistent approach: Convert everything to improper fractions first.
- Check for simplification opportunities: Reduce fractions early to make calculations smoother.
- Be mindful of signs: For subtraction or negative fractions, handle signs carefully.
- Practice with real-world problems: Applying these techniques to measurements or financial calculations enhances understanding.

Conclusion

Mastering the operations involving mixed numbers and fractions is essential for tackling advanced

mathematical expressions confidently. By breaking down complex expressions into manageable steps—converting to improper fractions, performing operations systematically, and simplifying—you can navigate even intricate problems with ease. The expression (12 1/3 + 5 1/3)(7 4/8 + 7 1/6), once unraveled, simplifies neatly to 259 1/9, demonstrating the power of methodical fraction arithmetic.

Happy calculating!

12 1 3 5 1 3 7 4 87 1 6

12 1 3 5 1 3 7 4 87 1 6

Related Articles

- Questions by meda08 - Page 14
- Computers and Technology - Page 5
- Please Help Its Due Tomorrow! <3

Back to Home