

Find The Exact Value Of $5/6 + 2/3 - 12/357/9$

Find The Exact Value Of $5/6 + 2/3 - 12/357/9$ is a mathematical expression that involves a combination of fractions and arithmetic operations. Understanding how to evaluate such an expression accurately is essential for students, educators, and anyone dealing with fractions regularly. This article will guide you through the step-by-step process of simplifying and calculating the exact value of this expression, emphasizing clarity and precision.

Breaking Down the Expression

Before diving into calculations, it is important to analyze the structure of the expression:

- The expression is: $5/6 + 2/3 - 12/357/9$
- At first glance, it appears to involve basic addition and subtraction of fractions, but the segment " $12/357/9$ " suggests a more complex fraction or perhaps a division operation.
- The expression appears ambiguous due to the lack of parentheses, so determining the intended order of operations is crucial.

Clarifying the Expression

Given the expression as written, there are a few possible interpretations:

1. Interpreting " $12/357/9$ " as a single fraction:
 - This could mean $(12/357)/9$, which simplifies to 12/357 divided by 9.
2. Interpreting it as "12 divided by 357 divided by 9":
 - Similar to the first, since division is associative in this context.
3. A typographical error or missing parentheses:
 - Maybe the expression is intended as: $5/6 + 2/3 - (12/357)/9$

Given the context, the most logical interpretation is:

$$5/6 + 2/3 - (12/357)/9$$

This approach aligns with standard mathematical conventions, where division operations are performed from left to right, and parentheses clarify order.

Step-by-Step Calculation

Now, let's proceed with evaluating the expression under the assumption that it is:

$$5/6 + 2/3 - (12/357)/9$$

Step 1: Simplify the individual fractions

- 5/6 remains as is.
- 2/3 remains as is.
- (12/357)/9 requires further simplification.

Step 2: Simplify (12/357)/9

Recall that dividing a fraction by a number is equivalent to multiplying by its reciprocal:

$$\left[\frac{12}{357} \div 9 = \frac{12}{357} \times \frac{1}{9} \right]$$

Calculate this:

$$\left[\frac{12}{357} \times \frac{1}{9} = \frac{12 \times 1}{357 \times 9} = \frac{12}{3213} \right]$$

Next, simplify the fraction if possible.

Step 3: Simplify 12/3213

Find the greatest common divisor (GCD) of numerator and denominator:

- Factors of 12: 1, 2, 3, 4, 6, 12
- Factors of 3213: Let's check divisibility:
- $3213 \div 3 = 1071$ (since $3 \times 1071 = 3213$), so 3 is a common factor.

Divide numerator and denominator by 3:

$$\left[\frac{12 \div 3}{3213 \div 3} = \frac{4}{1071} \right]$$

No further simplification is possible since 4 and 1071 share no common factors other than 1.

Step 4: Rewrite the entire expression

Now, the expression becomes:

$$\left[\frac{5}{6} + \frac{2}{3} - \frac{4}{1071} \right]$$

Calculating the Sum and Difference of Fractions

To combine these fractions, we need a common denominator.

Step 1: Find the least common denominator (LCD)

- Denominators: 6, 3, 1071

Prime factorization:

- $6 = 2 \times 3$
- $3 = 3$
- $1071 = ?$

Factor 1071:

- $1071 \div 3 = 357$
- $357 \div 3 = 119$
- $119 = 7 \times 17$

So, prime factors of 1071:

$$1071 = 3 \times 3 \times 7 \times 17$$

The LCD must include all prime factors at highest powers:

$$\text{LCD} = 2 \times 3^2 \times 7 \times 17$$

Calculate:

- $(3^2 = 9)$
- $(2 \times 9 = 18)$
- $(18 \times 7 = 126)$
- $(126 \times 17 = 2142)$

Thus, $\text{LCD} = 2142$

Step 2: Convert fractions to equivalent fractions with denominator 2142

- For $\left(\frac{5}{6}\right)$:

$$\left[\frac{5}{6} = \frac{5 \times 357}{6 \times 357} = \frac{1785}{2142}\right]$$

(since $(2142 \div 6 = 357)$)

- For $\left(\frac{2}{3}\right)$:

$$\left[\frac{2}{3} = \frac{2 \times 714}{3 \times 714} = \frac{1428}{2142}\right]$$

(since $(2142 \div 3 = 714)$)

- For $\left(\frac{4}{1071}\right)$:

$$\left[\frac{4}{1071} = \frac{4 \times 2}{1071 \times 2} = \frac{8}{2142}\right]$$

(since $(1071 \times 2 = 2142)$)

Final Calculation

Now, combine the fractions:

$$\left[\frac{1785}{2142} + \frac{1428}{2142} - \frac{8}{2142} = \frac{1785 + 1428 - 8}{2142}\right]$$

Calculate numerator:

$$\left[1785 + 1428 = 3213\right]$$

$$\left[3213 - 8 = 3205\right]$$

Thus, the result is:

$$\boxed{\frac{3205}{2142}}$$

Step 3: Simplify the Fraction (if possible)

Check if numerator and denominator share a common factor:

- Factors of 3205:
- $3205 \div 5 = 641$ (since last digit is 5, divisible by 5)
- Factors of 2142:
- $2142 \div 2 = 1071$

Since 3205 is divisible by 5, but 2142 is divisible by 2, they share no common factors other than 1. Therefore, the fraction $\frac{3205}{2142}$ is in its simplest form.

Final Answer

The exact value of the original expression, interpreted as:

$$\frac{5}{6} + \frac{2}{3} - \frac{12}{357 \times 9}$$

is:

$$\boxed{\frac{3205}{2142}}$$

which is approximately 1.496. This precise fractional form allows for exact calculations and further mathematical manipulations without rounding errors.

Summary and Key Takeaways

- Always clarify ambiguous expressions with parentheses.
- Simplify complex fractions by rewriting division as multiplication by reciprocals.
- Find the least common denominator (LCD) to combine fractions.
- Simplify the resulting fraction to its lowest terms.

- When in doubt, verify your calculations step by step to avoid errors.

Whether you're tackling algebraic fractions or more complex expressions, understanding these fundamental principles ensures accurate and efficient calculations.

Frequently Asked Questions

What is the exact value of the expression $5/6 + 2/3 - 12/357/9$?

The exact value is approximately 2.0558. To find it, convert all fractions to a common denominator or decimal form and perform the operations step-by-step.

How do I simplify the expression $5/6 + 2/3 - 12/357/9$?

First, convert all fractions to decimals or find a common denominator, then perform addition and subtraction accordingly. For example, $5/6 = 0.8333$, $2/3 = 0.6667$, and $12/357/9$ simplifies to a decimal which can be added or subtracted.

Is there a shortcut to compute $5/6 + 2/3 - 12/357/9$ directly?

Yes. Convert each term to decimals for quick calculation: $5/6 \approx 0.8333$, $2/3 \approx 0.6667$, and evaluate $12/357/9$ as a decimal before performing the operations.

What is the value of $12/357/9$ in the expression?

Assuming the expression is 12 divided by 357, then divided by 9, it equals $(12 / 357) / 9 \approx 0.003747 / 9 \approx 0.000416$. Use this value in the overall calculation.

Can I use a calculator to find the exact value of this expression?

Yes, using a calculator is the most straightforward way to find an accurate result for this expression, especially when dealing with multiple fractions.

Are there any common mistakes to avoid when calculating this expression?

Common mistakes include misreading the order of operations, incorrect fraction conversion, or miscalculating the division in $12/357/9$. Always

follow PEMDAS/BODMAS rules.

How do I combine the fractions $\frac{5}{6}$ and $\frac{2}{3}$ in the expression?

Find a common denominator, which is 6. Convert $\frac{2}{3}$ to $\frac{4}{6}$, then add: $\frac{5}{6} + \frac{4}{6} = \frac{9}{6}$ or 1.5.

What is the final step to obtain the exact value of the entire expression?

After converting all fractions to decimals or common denominators, perform the addition and subtraction to get the final value, which is approximately 2.0558.

Additional Resources

Find The Exact Value Of $\frac{5}{6} + \frac{2}{3} - \frac{12}{357/9}$: A Comprehensive Mathematical Breakdown

Introduction

Mathematics is often regarded as the universal language, facilitating precise communication of ideas through numbers and symbols. Whether you're a student, educator, or math enthusiast, understanding how to evaluate complex expressions is fundamental. The expression "Find The Exact Value Of $\frac{5}{6} + \frac{2}{3} - \frac{12}{357/9}$ " exemplifies the importance of careful analysis, proper order of operations, and accurate computation. In this detailed review, we'll dissect each component of the expression, clarify potential ambiguities, and guide you through the process of deriving the exact value with thorough explanations.

Clarifying the Expression

Before delving into calculations, it's crucial to interpret the given expression correctly. As it stands:

$$> \frac{5}{6} + \frac{2}{3} - \frac{12}{357/9}$$

There is some ambiguity, particularly with the segment " $\frac{12}{357/9}$ ". It could be interpreted in multiple ways:

1. As a chain of divisions:
 $12 / 357 / 9$

which implies $(12 / 357) / 9$

2. As a combined numerator over a denominator:

This is less likely given standard notation, but sometimes expressions are written with implied grouping.

3. Typographical error or omission:

Possibly, the expression was intended as:

$$5/6 + 2/3 - (12/357) / 9$$

Given typical mathematical conventions and clarity, the most logical interpretation is:

$$> 5/6 + 2/3 - (12/357) / 9$$

To proceed systematically, we'll assume this interpretation. If the original intent differs, the calculation approach can be adapted accordingly.

Understanding the Components of the Expression

Let's break the expression into manageable parts:

1. First term: $5/6$
2. Second term: $2/3$
3. Third term: $(12/357) / 9$

Our goal is to evaluate:

$$(5/6) + (2/3) - [(12/357) / 9]$$

Step 1: Simplify the Fractions

Simplify $5/6$ and $2/3$

- $5/6$: Already in simplest form.
- $2/3$: Already in simplest form.

But to add or subtract, they need a common denominator.

Find common denominator for $5/6$ and $2/3$

- Denominator 6 and 3: Least common denominator (LCD) is 6.

Express $2/3$ with denominator 6:

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

Now, the expression becomes:

$$(5/6) + (4/6) - [(12/357) / 9]$$

Step 2: Combine Like Terms

Adding the fractions:

$$(5/6) + (4/6) = (5 + 4)/6 = 9/6$$

Simplify 9/6:

$$9/6 = (3 \times 3)/(2 \times 3) = 3/2$$

So, the sum of the first two fractions is 3/2.

Now, the expression reduces to:

$$3/2 - [(12/357) / 9]$$

Step 3: Simplify the Division in the Third Term

Evaluate:

$$(12/357) / 9$$

Division of fractions:

$$(12/357) \div 9 = (12/357) \times (1/9)$$

Multiplying fractions:

$$(12/357) \times (1/9) = (12 \times 1) / (357 \times 9) = 12 / (357 \times 9)$$

Calculate denominator:

$$357 \times 9$$

$$- 357 \times 9 = (300 + 50 + 7) \times 9$$

Calculate step-by-step:

$$- 300 \times 9 = 2700$$

$$- 50 \times 9 = 450$$

$$- 7 \times 9 = 63$$

Sum:

$$2700 + 450 + 63 = 3213$$

Thus,

$$(12/357) / 9 = 12 / 3213$$

Now, check if numerator and denominator can be simplified.

Step 4: Simplify $12 / 3213$

Find the greatest common divisor (GCD) of 12 and 3213.

Prime factorization:

- $12 = 2^2 \times 3$
- 3213

Prime factorization of 3213:

- $3213 \div 3 = 1071$

Further factor 1071:

- $1071 \div 3 = 357$

Further factor 357:

- $357 \div 3 = 119$

Factor 119:

- $119 = 7 \times 17$

Putting it all together:

- $3213 = 3 \times 3 \times 3 \times 7 \times 17 = 3^3 \times 7 \times 17$

Recall:

- $12 = 2^2 \times 3$

Common factors:

- Both divisible by 3

GCD:

- 3

Divide numerator and denominator by 3:

- Numerator: $12 \div 3 = 4$
- Denominator: $3213 \div 3 = 1071$

Now, the fraction simplifies to:

$$4 / 1071$$

Step 5: Final Expression

Recall the expression:

$$3/2 - (4/1071)$$

To subtract these fractions, find a common denominator.

Step 6: Find Common Denominator and Subtract

Denominators:

- 2 and 1071

Find LCD:

- 2 is prime
- 1071 factors as $3^3 \times 7 \times 17$ (from earlier)

Since 2 has no common prime factors with 1071, the LCD is:

$$2 \times 1071 = 2142$$

Express each fraction with denominator 2142:

- For $3/2$:

Multiply numerator and denominator by 1071:

$$3/2 = (3 \times 1071) / (2 \times 1071) = (3213) / 2142$$

- For $4/1071$:

Multiply numerator and denominator by 2:

$$4/1071 = (4 \times 2) / (1071 \times 2) = 8 / 2142$$

Now, perform the subtraction:

$$(3213 / 2142) - (8 / 2142) = (3213 - 8) / 2142 = 3205 / 2142$$

Step 7: Simplify the Final Fraction

Check if 3205 and 2142 share any common factors.

Prime factorization:

- 3205:

Divisible by 5? 3205 ends with 5, so yes.

$$3205 \div 5 = 641$$

- 641:

Is 641 prime?

Check divisibility for primes up to $\sqrt{641}$ (~25.3):

- 2: no (odd)
- 3: sum digits $6+4+1=11$; 11 not divisible by 3
- 5: no (not ending with 0 or 5)
- 7: $7 \times 91=637$; $641-637=4$; no
- 11: $11 \times 58=638$; $641-638=3$; no
- 13: $13 \times 49=637$; $641-637=4$; no
- 17: $17 \times 37=629$; $641-629=12$; no
- 19: $19 \times 33=627$; $641-627=14$; no
- 23: $23 \times 27=621$; $641-621=20$; no

No divisors found; 641 is prime.

So, prime factors of numerator:

$$3205 = 5 \times 641$$

Now, check denominator 2142:

- 2142:

Is divisible by 2? Yes: $2142 \div 2=1071$

Previously, 1071 factors as $3^3 \times 7 \times 17$.

Therefore:

$$2142 = 2 \times 3^3 \times 7 \times 17$$

Since numerator factors are 5 and 641 (prime), and denominator factors are 2,

3, 7, 17, no common factors.

Thus, the fraction $3205 / 2142$ is in simplest form.

Final Result:

```
\[
\boxed{
\frac{3205}{2142}
}
\]
```

This is the exact value of the original expression, based on the interpreted structure.

Summary of the Calculation Process

- Interpreted the ambiguous part as $(12/357)/9$.
- Simplified each component step-by-step.
- Used common denominators to combine fractions.
- Factored and simplified fractions where possible.
- Arrived at the simplest form of the exact value: $3205/2142$.

Additional Insights and Considerations

Why Precise Interpretation Matters

Mathematical expressions can often be ambiguous, especially when written informally or without parentheses. Clarifying the intended grouping is essential for accurate computation. For complex expressions, always:

- Clarify the order of operations.
- Use parentheses to specify grouping.
-

[Find The Exact Value Of 5 6 2 3 12 357 9](#)

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