

Evaluate. $\frac{2}{3} - \frac{1}{6}$ Please Show An Explanation.

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Understanding how to evaluate fractions is a fundamental skill in mathematics that applies to various real-life scenarios, from budgeting to cooking, and even in complex scientific calculations. When asked to evaluate an expression like $\frac{2}{3} - \frac{1}{6}$, it's essential to understand the underlying principles of fractions, such as finding common denominators, performing subtraction, and simplifying the result if necessary. This article provides a comprehensive, step-by-step explanation of how to evaluate the expression $\frac{2}{3} - \frac{1}{6}$, along with additional insights into fraction operations, tips for avoiding common mistakes, and practical applications.

Understanding Fractions and Their Operations

Before diving into the specific problem, it's crucial to review some basics about fractions and their operations.

What is a Fraction?

A fraction represents a part of a whole or, more generally, a ratio between two numbers. It consists of a numerator (top number) and a denominator (bottom number). For example, in $\frac{2}{3}$:

- Numerator: 2 (indicates the number of parts)
- Denominator: 3 (indicates how many parts make up the whole)

Adding and Subtracting Fractions

To add or subtract fractions, they must have a common denominator. If they do not, you need to find a common denominator before performing the operation.

Key steps:

1. Find the least common denominator (LCD).
2. Convert each fraction to an equivalent fraction with the LCD.
3. Perform the addition or subtraction on the numerators.
4. Simplify the result if possible.

Step-by-Step Evaluation of $\frac{2}{3} - \frac{1}{6}$

Let's walk through evaluating the expression $\frac{2}{3} - \frac{1}{6}$ with detailed explanations.

Step 1: Identify the fractions involved

- First fraction: $\frac{2}{3}$
- Second fraction: $\frac{1}{6}$

Step 2: Find the least common denominator (LCD)

- Denominators are 3 and 6.
- To find the LCD, list multiples:
 - Multiples of 3: 3, 6, 9, 12, ...
 - Multiples of 6: 6, 12, 18, ...
- The smallest common multiple is 6.
- Therefore, the LCD is 6.

Step 3: Convert fractions to equivalent fractions with the LCD

- For $\frac{2}{3}$:
- Since $3 \times 2 = 6$, multiply numerator and denominator by 2:
- $\frac{2}{3} = \frac{(2 \times 2)}{(3 \times 2)} = \frac{4}{6}$
- For $\frac{1}{6}$:
- Already has denominator 6, so no change needed.

Step 4: Perform the subtraction

- Now, subtract the numerators:
- $\frac{4}{6} - \frac{1}{6} = \frac{(4 - 1)}{6} = \frac{3}{6}$

Step 5: Simplify the result

- $\frac{3}{6}$ can be simplified because numerator and denominator share a common factor of 3:
- $3 \div 3 = 1$
- $6 \div 3 = 2$
- So, $\frac{3}{6} = \frac{1}{2}$

Final answer:

- $\frac{2}{3} - \frac{1}{6} = \frac{1}{2}$

Additional Tips for Evaluating Fractions

Evaluating fractions accurately is essential for solving more complex problems. Here are some

practical tips:

- **Always find the least common denominator:** Using the LCD ensures the fractions are compatible for subtraction or addition.
- **Simplify your answer:** Always reduce the fraction to its simplest form to make it easier to interpret.
- **Double-check your conversion:** Confirm that both fractions are correctly converted to have the same denominator before subtracting or adding.
- **Use prime factorization:** To find the LCD efficiently, factor denominators into primes and identify the least common multiple.
- **Practice with visual aids:** Using pie charts or fraction bars can help in understanding the operation visually.

Common Mistakes to Avoid

While evaluating fractions, learners often encounter some common pitfalls:

1. **Ignoring the need for a common denominator:** Attempting to add or subtract fractions with different denominators without converting first leads to incorrect answers.

2. **Incorrect conversion:** Failing to multiply numerator and denominator by the same number when converting fractions can result in invalid equivalents.
3. **Overlooking simplification:** Leaving your answer as an improper or unsimplified fraction can make further calculations or interpretations more difficult.
4. **Misapplication of rules:** Remember that addition and subtraction of fractions only apply to fractions with the same denominator. Multiplication and division have different rules.

Practical Applications of Fraction Evaluation

Understanding how to evaluate fractions like $\frac{2}{3} - \frac{1}{6}$ has real-world relevance in various contexts:

1. Cooking and Recipes

- Adjusting ingredient quantities often involves fractional calculations.
- For example, if a recipe needs $\frac{2}{3}$ cup of sugar and you want to reduce it by $\frac{1}{6}$ cup, evaluating this subtraction helps determine the new amount.

2. Financial Calculations

- Budgeting and interest calculations often involve fractions and percentages.
- Evaluating fractional differences aids in understanding savings, expenses, or investment returns.

3. Measurement and Construction

- Precise measurements in construction may involve subtracting fractional inches or centimeters.

4. Science and Engineering

- Data analysis and experimental calculations often require manipulating fractions and ratios.

Extensions and Practice Problems

To solidify understanding, consider practicing with similar problems:

1. Evaluate $\frac{3}{4} - \frac{1}{8}$
2. Calculate $\frac{5}{6} - \frac{1}{3}$
3. Simplify the result of $\frac{7}{10} - \frac{2}{5}$
4. Find the difference between $\frac{9}{12}$ and $\frac{1}{4}$

Solutions:

- $\frac{3}{4} - \frac{1}{8}$:
- LCD = 8
- Convert $\frac{3}{4} = \frac{6}{8}$
- $\frac{6}{8} - \frac{1}{8} = \frac{5}{8}$ (already simplified)

- $\frac{5}{6} - \frac{1}{3}$:

- LCD = 6

- $\frac{1}{3} = \frac{2}{6}$

- $\frac{5}{6} - \frac{2}{6} = \frac{3}{6} = \frac{1}{2}$

- $\frac{7}{10} - \frac{2}{5}$:

- LCD = 10

- $\frac{2}{5} = \frac{4}{10}$

- $\frac{7}{10} - \frac{4}{10} = \frac{3}{10}$ (already simplified)

- $\frac{9}{12} - \frac{1}{4}$:

- LCD = 12

- $\frac{1}{4} = \frac{3}{12}$

- $\frac{9}{12} - \frac{3}{12} = \frac{6}{12} = \frac{1}{2}$

Conclusion

Evaluating fractions like $\frac{2}{3} - \frac{1}{6}$ involves understanding the importance of common denominators, converting fractions appropriately, performing the subtraction, and simplifying the final answer. Mastery of this process enhances mathematical fluency and supports problem-solving across diverse fields. Remember to practice regularly, double-check your work, and use visual aids when possible to develop a solid intuition for fraction operations. Whether in academic settings, daily life, or professional tasks, the ability to accurately evaluate fractions is an invaluable skill that underpins many aspects of quantitative reasoning.

Frequently Asked Questions

How do I evaluate the expression $2/3 - 1/6$?

To evaluate $2/3 - 1/6$, find a common denominator (which is 6), convert $2/3$ to $4/6$, then subtract: $4/6 - 1/6 = 3/6$, which simplifies to $1/2$.

Why do I need a common denominator when subtracting fractions like $2/3 - 1/6$?

Fractions need a common denominator to ensure the parts are of the same size, making subtraction straightforward. Without a common denominator, the fractions are not directly comparable.

What is the step-by-step process to evaluate $2/3 - 1/6$?

First, find the least common denominator (6). Convert $2/3$ to $4/6$. Then subtract: $4/6 - 1/6 = 3/6$. Simplify if possible, resulting in $1/2$.

Can I simplify the answer $3/6$ after subtracting $2/3 - 1/6$?

Yes, $3/6$ simplifies to $1/2$ because both numerator and denominator can be divided by 3.

Is the answer to $2/3 - 1/6$ equal to $1/2$?

Yes, after performing the subtraction and simplification, $2/3 - 1/6$ equals $1/2$.

What common mistake should I avoid when subtracting these fractions?

A common mistake is to subtract the numerators directly without finding a common denominator. Always convert to equivalent fractions with the same denominator first.

How can I verify that my answer to $2/3 - 1/6$ is correct?

You can check by converting your answer back to decimals or by adding the result ($1/2$) to $1/6$ to see

if it equals $\frac{2}{3}$, confirming the subtraction was correct.

Are there other methods to evaluate $\frac{2}{3} - \frac{1}{6}$ besides finding a common denominator?

The most straightforward method is finding a common denominator, but you could also convert both fractions to decimals, perform the subtraction, then convert back to a fraction if needed.

Additional Resources

Evaluate. $\frac{2}{3} - \frac{1}{6}$ Please Show An Explanation is a common request among students learning fractions, subtraction, and how to approach mathematical expressions systematically. This phrase encapsulates the desire not just for the answer but also for a thorough understanding of the process involved in solving the problem. In this review, we will explore the step-by-step evaluation of the subtraction problem $\frac{2}{3} - \frac{1}{6}$, providing detailed explanations, breaking down concepts for clarity, and discussing various methods to arrive at the solution. Whether you are a beginner or someone looking to strengthen your fraction skills, this comprehensive guide aims to clarify the process and deepen your understanding.

Understanding the Problem: Why Evaluate $\frac{2}{3} - \frac{1}{6}$?

Before jumping into calculations, it's essential to understand what the problem is asking. The instruction "Evaluate $\frac{2}{3} - \frac{1}{6}$ " involves subtracting two fractions. Fractions represent parts of a whole, and subtracting them involves combining these parts in a way that maintains their proportional relationships.

This problem is a typical example used to teach students how to:

- Find a common denominator
- Convert fractions to equivalent forms
- Perform subtraction accurately
- Interpret the result in context

The phrase "Please Show An Explanation" emphasizes the importance of understanding the process rather than just providing the numerical answer. This approach promotes mathematical reasoning and helps solidify foundational concepts.

Step-by-Step Breakdown of the Evaluation Process

Step 1: Understand the Fractions Involved

- The first fraction is $\frac{2}{3}$ — meaning two parts out of three equal parts.
- The second fraction is $\frac{1}{6}$ — meaning one part out of six equal parts.

Visually, these fractions can be represented as portions of a whole, and recognizing how they compare is crucial for subtraction.

Step 2: Find a Common Denominator

Since the denominators are different (3 and 6), we need to convert both fractions to equivalent fractions with a common denominator. The least common denominator (LCD) of 3 and 6 is 6 because:

- $6 \div 3 = 2$

$$- 6 \div 6 = 1$$

This means:

- Convert $\frac{2}{3}$ into sixths
- $\frac{1}{6}$ already has denominator 6

Step 3: Convert Fractions to Equivalent Fractions with Common Denominator

- To convert $\frac{2}{3}$ to sixths, multiply numerator and denominator by 2:

$$\frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{4}{6}$$

- The second fraction $\frac{1}{6}$ remains unchanged.

Step 4: Perform the Subtraction

Now that both fractions have the same denominator, subtract the numerators:

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

Step 5: Simplify the Result

The fraction $\frac{3}{6}$ can be simplified because numerator and denominator share a common factor of 3:

$$\frac{3}{6} = (3 \div 3) / (6 \div 3) = \frac{1}{2}$$

Final answer:

$$\boxed{\frac{1}{2}}$$

Alternative Methods for Evaluation

While the above method is the most straightforward, there are other approaches to evaluate $\frac{2}{3} - \frac{1}{6}$.

Method 1: Cross-Multiplication

This method involves cross-multiplied comparisons but is less common for simple subtraction. It's more useful in addition or subtraction of complex fractions involving mixed numbers. For this problem, converting to common denominators remains the most efficient.

Method 2: Using Decimals

- Convert each fraction to decimal:

$$\begin{aligned} & \left[\right. \\ & \frac{2}{3} \approx 0.666\ldots \\ & \left. \right] \end{aligned}$$

$$\begin{aligned} & \left[\right. \\ & \frac{1}{6} \approx 0.166\ldots \\ & \left. \right] \end{aligned}$$

- Subtract:

$$\begin{aligned} & \left[\right. \\ & 0.666\ldots - 0.166\ldots = 0.5 \\ & \left. \right] \end{aligned}$$

- Convert back to fraction:

$$\begin{aligned} & \left[\right. \\ & 0.5 = \frac{1}{2} \\ & \left. \right] \end{aligned}$$

While this is an effective method, especially with calculators, it's less precise without rounding unless you're careful.

Features and Considerations in Evaluating Fractions

Pros:

- Clarity: Step-by-step approach improves understanding.
- Accuracy: Proper conversion and simplification prevent errors.
- Versatility: Multiple methods adapt to different learning styles.
- Foundational Skills: Reinforces key concepts in fractions, simplifying, and number operations.

Cons:

- Time-consuming: Manual conversion can take longer for complex fractions.
- Potential for mistakes: Incorrect common denominator selection or simplification errors.
- Requires understanding: Assumes familiarity with fractions, multiples, and GCD.

Common Mistakes and How to Avoid Them

- Incorrect common denominator selection: Always find the least common multiple (LCM) to simplify calculations.
- Forgetting to simplify: Don't forget to reduce fractions to their simplest form.
- Miscalculations in conversion: Double-check multiplication when converting to equivalent fractions.
- Ignoring negative results: In subtraction, the result can be negative; always consider the order.

Real-World Applications and Importance of Understanding

Fraction Subtraction

Understanding how to evaluate $\frac{2}{3} - \frac{1}{6}$ is more than an academic exercise; it's a fundamental skill with numerous applications:

- Cooking: Adjusting recipes by subtracting parts.
- Finance: Calculating discounts or differences in proportions.
- Construction: Combining or subtracting measurements.
- Science: Analyzing parts of a whole, such as mixtures or probabilities.

Having a solid grasp ensures confidence in handling more complex problems and real-world scenarios.

Conclusion: Mastering Fraction Subtraction with Clear Explanations

Evaluating $\frac{2}{3} - \frac{1}{6}$ illustrates the importance of understanding fractions, finding common denominators, and simplifying results. The systematic approach—converting to a common denominator, performing the subtraction, and simplifying—serves as a foundational skill in mathematics. By following these steps carefully and considering alternative methods like decimal conversion, learners can develop confidence and flexibility in handling fraction operations.

Remember, the goal isn't just to get the right answer but to understand the process thoroughly. This ensures that you can confidently tackle similar problems in academics or everyday life. So, next time you encounter a fraction subtraction problem, approach it step-by-step as outlined here, and you'll find it becomes much more manageable and even enjoyable to solve.

Final note: Practice makes perfect. Revisit various fraction subtraction problems, experiment with different methods, and always show your work to reinforce your understanding.

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