

Subtract $1\frac{3}{4}$ From $2\frac{7}{10}$

Subtract $1\frac{3}{4}$ From $2\frac{7}{10}$: A Comprehensive Guide to Subtracting Mixed Numbers

Understanding how to subtract mixed numbers like $2\frac{7}{10}$ and $1\frac{3}{4}$ is an essential skill in mathematics. Whether you're a student working on homework, a teacher preparing lesson plans, or someone looking to brush up on basic arithmetic, mastering this process can enhance your number sense and problem-solving abilities. In this guide, we'll explore the step-by-step process of subtracting $1\frac{3}{4}$ from $2\frac{7}{10}$, along with tips, tricks, and practice problems to solidify your understanding.

Understanding Mixed Numbers and Their Components

Before diving into the subtraction process, it's important to clarify what mixed numbers are and how they are structured.

What Are Mixed Numbers?

Mixed numbers combine a whole number with a proper fraction. They are written in the form:

- Whole number + Fraction

For example:

- $2\frac{7}{10}$ consists of the whole number 2 and the fraction $\frac{7}{10}$.
- $1\frac{3}{4}$ consists of the whole number 1 and the fraction $\frac{3}{4}$.

Converting Mixed Numbers to Improper Fractions

To perform subtraction efficiently, it's often easier to convert mixed numbers into improper fractions.

Conversion steps:

1. Multiply the whole number by the denominator of the fraction.
2. Add the numerator to this product.
3. Place the result over the original denominator.

Example:

- Convert $2\frac{7}{10}$:
 - Multiply 2 (whole part) by 10 (denominator): $2 \times 10 = 20$
 - Add numerator 7: $20 + 7 = 27$
 - The improper fraction is $\frac{27}{10}$
- Convert $1\frac{3}{4}$:
 - Multiply 1 by 4: $1 \times 4 = 4$
 - Add numerator 3: $4 + 3 = 7$
 - The improper fraction is $\frac{7}{4}$

Step-by-Step Process to Subtract $1 \frac{3}{4}$ From $2 \frac{7}{10}$

Let's now proceed to subtract $1 \frac{3}{4}$ from $2 \frac{7}{10}$ systematically.

1. Convert Both Mixed Numbers to Improper Fractions

- $2 \frac{7}{10} \rightarrow \frac{27}{10}$
- $1 \frac{3}{4} \rightarrow \frac{7}{4}$

2. Find a Common Denominator

- Denominators: 10 and 4
- Least Common Denominator (LCD): 20

Convert both fractions to have denominator 20:

- $\frac{27}{10}$:
 - Multiply numerator and denominator by 2: $(27 \times 2) / (10 \times 2) = \frac{54}{20}$
- $\frac{7}{4}$:
 - Multiply numerator and denominator by 5: $(7 \times 5) / (4 \times 5) = \frac{35}{20}$

3. Perform the Subtraction of the Improper Fractions

- $\frac{54}{20} - \frac{35}{20} = \frac{(54 - 35)}{20} = \frac{19}{20}$

4. Convert the Result Back to a Mixed Number (if necessary)

- Since $\frac{19}{20}$ is less than 1, the result is a proper fraction.
- Final answer: $\frac{19}{20}$

Final Result and Interpretation

Subtracting $1 \frac{3}{4}$ from $2 \frac{7}{10}$ yields $\frac{19}{20}$. This is a proper fraction less than 1, indicating that the difference is just slightly less than 1.

Expressed as a mixed number, $\frac{19}{20}$ remains the same because it's already a proper fraction. If you prefer, you can write it as:

- $0 \frac{19}{20}$

or approximately 0.95 when expressed as a decimal.

Additional Tips for Subtracting Mixed Numbers

To successfully subtract mixed numbers in various contexts, keep these tips in mind:

1. Always Convert to Improper Fractions First

Converting simplifies the subtraction process, especially when denominators differ.

2. Find the Least Common Denominator (LCD)

The LCD ensures fractions are compatible for subtraction.

3. Simplify the Result

If the resulting fraction can be simplified, reduce it to its lowest terms.

4. Convert Back to a Mixed Number If Needed

Sometimes, presenting the answer as a mixed number (whole number + fraction) is more meaningful.

5. Use Visual Aids and Models

Drawing fraction bars or using pie charts can help visualize the subtraction process.

Practice Problems for Mastery

Practicing similar problems can reinforce your understanding. Here are some exercises:

1. Subtract $2\frac{1}{2}$ from $4\frac{3}{4}$
2. Subtract $3\frac{2}{5}$ from $5\frac{1}{3}$
3. Subtract $1\frac{7}{8}$ from $3\frac{1}{4}$
4. Subtract $2\frac{3}{7}$ from $4\frac{2}{3}$
5. Subtract $5\frac{9}{10}$ from $8\frac{1}{2}$

Solutions Approach:

- Convert mixed numbers to improper fractions.
- Find the LCD.

- Convert fractions to equivalent fractions with the LCD.
- Perform subtraction.
- Simplify and convert back to mixed numbers if desired.

Common Mistakes to Avoid

To ensure accuracy, watch out for these common errors:

- **Forgetting to find a common denominator:** Always ensure fractions have the same denominator before subtracting.
- **Incorrect conversion:** Double-check improper fraction conversions.
- **Subtracting fractions directly without converting:** If denominators differ, direct subtraction isn't possible without conversion.
- **Not simplifying the final answer:** Always reduce fractions to lowest terms when possible.

Conclusion

Subtracting mixed numbers like $1 \frac{3}{4}$ from $2 \frac{7}{10}$ involves converting to improper fractions, finding a common denominator, performing the subtraction, and then simplifying the result. This process, although seemingly detailed, becomes more intuitive with practice. Remember to double-check your conversions and calculations to avoid common pitfalls. Mastering these steps not only helps in academic settings but also strengthens your overall math skills, making everyday calculations more manageable.

Whether you're solving homework problems or applying math in real-life scenarios, understanding how to subtract mixed numbers is a valuable skill. Keep practicing with different examples, and you'll become confident in handling all kinds of fractional subtraction tasks!

Frequently Asked Questions

How do I subtract $1 \frac{3}{4}$ from $2 \frac{7}{10}$?

Convert both mixed numbers to improper fractions: $1 \frac{3}{4}$ becomes $\frac{7}{4}$, and $2 \frac{7}{10}$ becomes $\frac{27}{10}$. Find a common denominator (20), convert both fractions, subtract, and simplify the result.

What is the step-by-step process to subtract $1 \frac{3}{4}$ from 2

7/10?

First, convert $1 \frac{3}{4}$ to $\frac{7}{4}$ and $2 \frac{7}{10}$ to $\frac{27}{10}$. Find a common denominator (20), rewrite fractions as $\frac{35}{20}$ and $\frac{54}{20}$, then subtract: $\frac{54}{20} - \frac{35}{20} = \frac{19}{20}$. The answer is $1 \frac{19}{20}$.

Can I use a calculator to subtract $1 \frac{3}{4}$ from $2 \frac{7}{10}$?

Yes, by converting mixed numbers to improper fractions or decimals first, then performing the subtraction. For example, converting to decimals: $1 \frac{3}{4}$ is 1.75, and $2 \frac{7}{10}$ is 2.7; subtracting gives 0.95, which is $\frac{19}{20}$ as a fraction.

What is the simplified result of subtracting $1 \frac{3}{4}$ from $2 \frac{7}{10}$?

The simplified result is $1 \frac{19}{20}$.

Are there any common mistakes to avoid when subtracting $1 \frac{3}{4}$ from $2 \frac{7}{10}$?

Yes, common mistakes include not converting mixed numbers properly, forgetting to find a common denominator, or incorrectly subtracting fractions. Always convert to improper fractions with a common denominator before subtracting.

Additional Resources

Subtract $1 \frac{3}{4}$ From $2 \frac{7}{10}$: An In-Depth Mathematical Investigation

Mathematics, often regarded as the language of the universe, offers endless avenues for exploration—particularly when it involves understanding and performing operations with mixed numbers. One such intriguing problem that often appears in educational settings and recreational math puzzles is: Subtract $1 \frac{3}{4}$ from $2 \frac{7}{10}$. While seemingly straightforward, this problem reveals layers of procedural nuances, conceptual understanding, and potential pitfalls that merit a comprehensive examination. This article aims to dissect this problem thoroughly, exploring not just the steps to arrive at the solution but also the underlying principles, common misconceptions, and real-world applications.

The Core Problem: Restating the Question

At its heart, the problem asks us to perform the subtraction:

$$2 \frac{7}{10} - 1 \frac{3}{4}$$

This involves mixed numbers, which combine whole numbers and fractions. To accurately perform this operation, we need to understand the nature of mixed numbers, how to convert and manipulate fractions, and the procedures for subtraction involving mixed numbers.

Understanding Mixed Numbers and Fractions

What Are Mixed Numbers?

Mixed numbers are numbers that combine a whole number and a fractional part. They are often used in measurements, recipes, and everyday contexts because they provide a more intuitive understanding of quantities.

For example:

- $2 \frac{7}{10}$ means 2 plus $\frac{7}{10}$.
- $1 \frac{3}{4}$ means 1 plus $\frac{3}{4}$.

Importance of Converting to Improper Fractions

While mixed numbers are convenient for representation, computations are often more straightforward when these are converted into improper fractions—fractions where the numerator exceeds the denominator.

Conversion steps:

- For $2 \frac{7}{10}$:
- Whole number: 2
- Fraction: $\frac{7}{10}$
- Convert to improper fraction: $(\text{whole} \times \text{denominator}) + \text{numerator} / \text{denominator}$
- $(2 \times 10) + 7 = 20 + 7 = 27$
- So, $2 \frac{7}{10} = \frac{27}{10}$

- For $1 \frac{3}{4}$:
- $(1 \times 4) + 3 = 4 + 3 = 7$
- So, $1 \frac{3}{4} = \frac{7}{4}$

Converting both to improper fractions simplifies the subtraction process:

- $2 \frac{7}{10} = \frac{27}{10}$
- $1 \frac{3}{4} = \frac{7}{4}$

Step-by-Step Solution Process

Step 1: Convert Mixed Numbers to Improper Fractions

As shown:

- $2 \frac{7}{10} = \frac{27}{10}$

- $1 \frac{3}{4} = \frac{7}{4}$

Step 2: Find a Common Denominator

To subtract fractions, denominators must be the same. The denominators are 10 and 4. The least common denominator (LCD) is 20.

Calculations:

- Convert $\frac{27}{10}$ to denominator 20:
- Multiply numerator and denominator by 2:
- $(27 \times 2)/(10 \times 2) = \frac{54}{20}$
- Convert $\frac{7}{4}$ to denominator 20:
- Multiply numerator and denominator by 5:
- $(7 \times 5)/(4 \times 5) = \frac{35}{20}$

Step 3: Perform the Subtraction

Now, subtract the fractions:

- $\frac{54}{20} - \frac{35}{20} = (54 - 35)/20 = \frac{19}{20}$

Step 4: Convert the Result Back to a Mixed Number

Since $\frac{19}{20}$ is less than 1, the result is a proper fraction, and the mixed number is just $0 \frac{19}{20}$, which simplifies to $\frac{19}{20}$.

If desired, the answer is approximately 0.95 in decimal form.

Final Result and Interpretation

Subtract $1 \frac{3}{4}$ from $2 \frac{7}{10}$ yields:

- $0 \frac{19}{20}$ or simply $\frac{19}{20}$

This indicates that after removing $1 \frac{3}{4}$ from $2 \frac{7}{10}$, we are left with a fraction just shy of 1.

Deeper Insights and Common Pitfalls

Why Convert to Improper Fractions?

Conversion simplifies the arithmetic process and reduces errors. Working directly with mixed numbers requires additional steps, such as rewriting each number, which can introduce mistakes.

Potential Mistakes to Avoid

- Forgetting to find a common denominator before subtracting fractions.
- Confusing the conversion process, such as miscalculating the numerator during conversion.
- Subtracting mixed numbers directly without converting, leading to incorrect results.
- Forgetting to simplify the final answer.

Handling Borrowing in Subtraction

In cases where the fractional part of the minuend (number being subtracted from) is smaller than that of the subtrahend, borrowing from the whole number part is necessary. For example, if subtracting $\frac{3}{4}$ from $\frac{1}{2}$, you must borrow 1 from the whole number part, converting it to an improper fraction to facilitate subtraction.

In our specific problem, since the fractional parts are straightforward, borrowing isn't necessary, but understanding the process is essential for more complex problems.

Alternative Approaches and Visual Aids

Using Decimals for Easier Calculation

Converting mixed numbers to decimals:

- $2\frac{7}{10} = 2.7$
- $1\frac{3}{4} = 1.75$

Subtract:

- $2.7 - 1.75 = 0.95$

Result:

- 0.95, which matches the fractional result ($\frac{19}{20}$).

Graphical Representations

Using visual models like number lines or pie charts can help learners grasp the subtraction process intuitively, especially for those struggling with fractions.

Real-World Applications and Contexts

Understanding how to subtract mixed numbers has practical implications:

- Cooking and Recipes: Adjusting ingredient quantities.

- Construction and Measurement: Calculating lengths and distances.
- Financial Calculations: Subtracting partial payments or discounts.
- Educational Assessments: Building foundational skills for higher mathematics.

In each case, choosing an appropriate method—fractions or decimals—depends on context, accuracy needs, and personal or curricular preference.

Summary and Key Takeaways

- Converting mixed numbers to improper fractions simplifies subtraction.
- Finding the least common denominator ensures fractions are compatible.
- After subtraction, converting back to mixed numbers or decimals provides an understandable result.
- Awareness of common pitfalls enhances accuracy and confidence in performing these operations.

Performing Subtract $1\frac{3}{4}$ From $2\frac{7}{10}$ is more than an exercise in arithmetic; it exemplifies fundamental concepts in number manipulation, procedural rigor, and problem-solving strategies essential for mathematical literacy.

Final Reflection

While the question appears simple, it encapsulates core principles of rational number operations, conversion techniques, and procedural accuracy. Whether approached through improper fractions, decimals, or visual models, mastery over such problems reinforces broader mathematical comprehension and application skills.

In educational and practical contexts, such detailed investigations highlight the importance of methodical reasoning and the value of precision—principles that extend far beyond this single subtraction problem, underpinning all of mathematics' elegance and utility.

Subtract 1 3 4 From 2 7 10

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