

21.64 - (3)+(-8.89)-(-2 1/2)

21.64 - (3)+(-8.89)-(-2 1/2) is a complex mathematical expression that involves a variety of operations, including subtraction, addition, and the handling of negative numbers and fractions. Understanding how to evaluate this expression step-by-step can enhance your skills in arithmetic, algebra, and problem-solving. In this article, we will explore the detailed process of solving this expression, discuss the concepts involved, and provide tips for tackling similar problems.

Breaking Down the Expression

Before diving into the calculations, it's essential to understand each component of the expression:

- The number 21.64 is a decimal.
- The term (3) is a positive integer within parentheses.
- The term (-8.89) is a negative decimal.
- The term (-2 1/2) involves a negative mixed number, which combines a negative sign, a whole number, and a fraction.

The expression reads: $21.64 - (3) + (-8.89) - (-2 \frac{1}{2})$. To evaluate it correctly, we'll follow the order of operations (PEMDAS/BODMAS) and carefully handle the signs and mixed numbers.

Understanding the Components

1. Handling Negative Numbers

Negative numbers are numbers with a minus sign in front of them. When adding or subtracting negative numbers, it's important to remember:

- Subtracting a negative number is equivalent to adding its positive counterpart.
- For example, $-(-2 \frac{1}{2})$ becomes $+2 \frac{1}{2}$.

2. Converting Mixed Numbers to Decimals

The mixed number $-2 \frac{1}{2}$ can be converted into an improper fraction or decimal

for easier calculation:

- As fraction: $-(2 + 1/2) = -(2 + 0.5) = -2.5$
- As decimal: -2.5

Using decimal form simplifies the calculation process, especially when working with other decimal numbers.

Step-by-Step Calculation

Let's evaluate the expression systematically:

$$21.64 - (3) + (-8.89) - (-2 \frac{1}{2})$$

Step 1: Simplify parentheses

- The first parentheses contain 3, which is positive.
- The second parentheses contain -8.89, a negative number.
- The last parentheses contain $-2 \frac{1}{2}$, which we convert to -2.5.

Step 2: Rewrite the expression with simplified components

$$21.64 - 3 + (-8.89) - (-2.5)$$

Step 3: Handle subtraction of negatives

- Subtracting -2.5 is the same as adding +2.5.

So, the expression becomes:

$$21.64 - 3 + (-8.89) + 2.5$$

Step 4: Perform arithmetic operations in sequence

$$1. \quad 21.64 - 3 = 18.64$$

$$2. \quad 18.64 + (-8.89) = 18.64 - 8.89 = 9.75$$

$$3. \quad 9.75 + 2.5 = 12.25$$

Final result: 12.25

Interpreting the Result

The evaluated result of the original expression $21.64 - (3) + (-8.89) - (-2\frac{1}{2})$ is 12.25. This indicates that after considering all additions and subtractions, the final value is a positive decimal.

Concepts Highlighted in This Calculation

1. Handling Negative Numbers and Subtraction

Understanding how negative numbers interact with subtraction is crucial. Remember:

- Subtracting a negative number is equivalent to addition.
- Adding a negative number decreases the total.

2. Converting Mixed Numbers to Decimals

Converting mixed numbers like $-2\frac{1}{2}$ into decimal form simplifies calculations, especially when working with other decimals.

3. Order of Operations

Following the order of operations ensures accurate results:

- Parentheses first
- Then addition and subtraction from left to right

Practical Tips for Solving Similar Expressions

- **Always simplify parentheses first:** Convert mixed numbers and evaluate expressions inside parentheses.
- **Handle signs carefully:** Remember that subtracting a negative is addition, and vice versa.
- **Convert mixed numbers to decimals or improper fractions:** This reduces confusion during calculations.

- **Perform operations sequentially:** Follow the left-to-right rule after handling parentheses.
- **Double-check your work:** Revisit each step to confirm accuracy, especially the signs and conversions.

Real-World Applications of Such Calculations

Understanding how to evaluate expressions like $21.64 - (3) + (-8.89) - (-2 \frac{1}{2})$ has practical applications in various fields:

1. Financial Calculations

- Calculating balances, interest adjustments, or budgeting often involves handling multiple positive and negative numbers.

2. Engineering and Science

- Precise measurements and calculations frequently require dealing with decimals, fractions, and negative values.

3. Education and Test Preparation

- Developing skills in evaluating complex expressions prepares students for algebra, calculus, and standardized tests.

Conclusion

The expression $21.64 - (3) + (-8.89) - (-2 \frac{1}{2})$ exemplifies the importance of understanding negative numbers, mixed numbers, and the order of operations. By systematically converting, simplifying, and performing calculations, you arrive at the correct answer of 12.25. Mastering such problems enhances your mathematical proficiency and prepares you for more advanced topics in mathematics and related disciplines. Whether working in academics, professional fields, or everyday life, the skills demonstrated here are fundamental to accurate and efficient problem-solving.

Frequently Asked Questions

What is the result of the expression $21.64 - (3) + (-8.89) - (-2 \frac{1}{2})$?

The result is approximately 12.75.

How do you evaluate the expression $21.64 - (3) + (-8.89) - (-2 \frac{1}{2})$?

First, convert the mixed number $-2 \frac{1}{2}$ to a decimal (-2.5), then perform each operation step by step: $21.64 - 3 = 18.64$; $18.64 + (-8.89) = 9.75$; $9.75 - (-2.5) = 9.75 + 2.5 = 12.25$.

Why do we convert mixed numbers to decimals when solving such expressions?

Converting mixed numbers to decimals simplifies calculations and ensures consistency when performing addition and subtraction.

What is the importance of handling negative signs correctly in this type of expression?

Correctly managing negative signs is crucial to avoid errors, especially with addition and subtraction involving negative numbers or double negatives.

Can you provide a step-by-step solution to evaluate $21.64 - (3) + (-8.89) - (-2 \frac{1}{2})$?

Yes. Convert $-2 \frac{1}{2}$ to -2.5 . Then: $21.64 - 3 = 18.64$; $18.64 + (-8.89) = 9.75$; $9.75 - (-2.5) = 9.75 + 2.5 = 12.25$. The final answer is 12.25.

What is the approximate value of the expression $21.64 - (3) + (-8.89) - (-2 \frac{1}{2})$?

The approximate value is 12.25.

Additional Resources

$21.64 - (3) + (-8.89) - (-2 \frac{1}{2})$

When examining the expression $21.64 - (3) + (-8.89) - (-2 \frac{1}{2})$, it's essential to understand both its numerical components and the broader implications of its calculation. Although at first glance, this expression may seem

straightforward, its layered structure invites a detailed review to appreciate the nuances involved in simplifying and interpreting such mathematical statements. In this article, we will dissect this expression step-by-step, explore its mathematical significance, and discuss the process of handling similar calculations in various contexts.

Breaking Down the Expression

The expression in question is:

$$21.64 - (3) + (-8.89) - (-2 \frac{1}{2})$$

To analyze it effectively, we need to understand each component and the operations involved.

Understanding the Components

- 21.64: A decimal number, representing a positive value.
- (3): A positive integer, enclosed in parentheses but serving as a positive value.
- (-8.89): A negative decimal number.
- (-2 1/2): A mixed number, which combines an integer and a fraction, also negative.

Converting Mixed Numbers to Decimals

A crucial step in simplifying the expression is converting the mixed number $(-2 \frac{1}{2})$ into a decimal form.

Converting $-2 \frac{1}{2}$ to Decimal

- $2 \frac{1}{2}$ as a mixed number equals $2 + \frac{1}{2}$.
- $\frac{1}{2}$ as a decimal is 0.5.
- Therefore, $2 + 0.5 = 2.5$.
- Since the original number is negative, $-2 \frac{1}{2}$ becomes -2.5.

This conversion simplifies the expression to:

$$21.64 - 3 + (-8.89) - (-2.5)$$

Step-by-Step Simplification

Let's now proceed with the calculation in an ordered manner.

Step 1: Simplify the double negatives

Recall that subtracting a negative number is equivalent to addition:

- - (-2.5) becomes + 2.5.

Thus, the expression simplifies to:

$$21.64 - 3 + (-8.89) + 2.5$$

Step 2: Combine like terms

Let's organize the calculation:

- First, combine the positive numbers: $21.64 + 2.5$
- Then, combine the negative number: -8.89
- Finally, subtract 3

Calculations:

- $21.64 + 2.5 = 24.14$
- Now, the expression is: $24.14 - 3 - 8.89$

Step 3: Perform the subtraction operations

- $24.14 - 3 = 21.14$
- $21.14 - 8.89 = 12.25$

Final result: 12.25

Mathematical Significance and Applications

While this particular calculation is straightforward, understanding how to

handle operations involving mixed numbers, negative numbers, and complex expressions is vital across various fields.

Relevance in Real-world Contexts

- Financial calculations: Adjusting balances with credits and debits often involves similar operations.
- Physics and engineering: Calculating net forces, energy changes, or other quantities frequently involves combining positive and negative values.
- Data analysis: Understanding the impact of increases and decreases or gains and losses requires similar arithmetic.

Features and Considerations in Handling Such Expressions

When dealing with complex arithmetic expressions, certain features and best practices emerge.

Features

- Conversion of mixed numbers: Simplifies calculations and reduces errors.
- Handling double negatives: Recognizing that subtracting a negative is equivalent to addition enhances clarity.
- Order of operations: Strict adherence to PEMDAS/BODMAS rules ensures accurate results.
- Use of parentheses: Clarifies the intended grouping, especially in complex expressions.

Considerations and Potential Pitfalls

- Misinterpretation of negatives: Confusing subtraction of negatives with addition can lead to errors.
- Forgetting to convert mixed numbers: Leads to incorrect calculations if not standardized.
- Overlooking parentheses: Changes the order of operations, affecting the final result.
- Decimal precision: Rounding errors can accumulate in more complex calculations.

Pros and Cons of Breaking Down and Simplifying Such Expressions

Pros:

- Enhances understanding of each component.
- Reduces calculation errors.
- Facilitates debugging and verification of results.
- Builds foundational skills useful in advanced mathematics and real-world problems.

Cons:

- Can be time-consuming for very complex expressions.
- Slightly cumbersome when dealing with multiple nested operations.
- Potential for misinterpretation if steps are not carefully documented.

Educational and Practical Recommendations

- Practice conversion: Regularly convert mixed numbers to decimals or improper fractions for consistency.
- Use parentheses liberally: Clarify the order of operations and prevent mistakes.
- Double-check negatives: Always verify the treatment of negative signs, especially double negatives.
- Leverage calculators: For complex calculations, digital tools can minimize human error, but understanding the process remains crucial.

Conclusion

The expression $21.64 - (3) + (-8.89) - (-2 \frac{1}{2})$ exemplifies the importance of meticulous arithmetic handling, especially when mixed numbers and negative values are involved. By converting mixed numbers into decimal form, carefully managing double negatives, and adhering to the order of operations, we arrived at a final value of 12.25. This process underscores fundamental mathematical principles that are applicable across various disciplines, from finance to engineering. Understanding how to break down and simplify such expressions is a vital skill that enhances both academic learning and practical problem-solving capabilities. As mathematical expressions grow in complexity, employing systematic approaches ensures accuracy and confidence in results, making this an essential part of quantitative literacy.

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