

What Is $25(10 + 50) - 25$?

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When it comes to understanding basic arithmetic expressions, it's crucial to grasp how to interpret and simplify formulas accurately. One such expression that often appears in math exercises or everyday calculations is $25(10 + 50) - 25$. This expression might look complex at first glance, but with a step-by-step approach, it becomes straightforward to evaluate. In this article, we will explore what this expression means, how to interpret it, and the process to simplify it correctly, providing valuable insights into fundamental arithmetic operations.

Understanding the Components of the Expression

Before diving into calculations, it's essential to understand the individual parts of the expression:

- The number 25: This appears twice in the expression, serving as a coefficient and as a standalone term.
- Parentheses $(10 + 50)$: Indicate that the sum of 10 and 50 should be calculated first, following the order of operations.
- Subtraction $(- 25)$: The final step involves subtracting 25 from the previous result.

The expression, written out, is:

$$25(10 + 50) - 25$$

Order of Operations: The Key to Simplification

Mathematics follows a specific set of rules known as the order of operations to ensure consistency in calculations. The standard sequence is:

1. Parentheses (or brackets)
2. Exponents
3. Multiplication and Division (from left to right)
4. Addition and Subtraction (from left to right)

Applying these rules guarantees that everyone interprets and solves expressions consistently.

Step-by-Step Breakdown of the Expression

Let's analyze the expression $25 (10 + 50) - 25$ step-by-step:

1. Calculate Inside the Parentheses

First, evaluate $(10 + 50)$:

$$- 10 + 50 = 60$$

Now, the expression simplifies to:

$$25 \cdot 60 - 25$$

2. Address Multiplication

Next, perform the multiplication $25 \cdot 60$:

$$- 25 \cdot 60 = 1500$$

The expression now becomes:

$$1500 - 25$$

3. Final Subtraction

Finally, subtract 25 from 1500:

$$- 1500 - 25 = 1475$$

Result: 1475

Understanding the Arithmetic in Context

This calculation illustrates how parentheses influence the order of operations and how multiplication distributes over addition when parentheses are involved. Recognizing the importance of parentheses can prevent misinterpretation and errors in calculations.

Alternative Interpretations and Common Mistakes

While the above interpretation is standard, it's worth noting that some might misread the

expression, especially if the formatting isn't clear. For example:

- Misreading the expression as: $25 (10 + 50 - 25)$

In this case, the parentheses contain the entire sum, and the calculation changes:

- $10 + 50 - 25 = 35$
- Then, $25 \cdot 35 = 875$

- Misusing the order of operations: Some might perform subtraction before multiplication, leading to incorrect results.

To avoid such errors:

- Always follow the hierarchy of operations.
- Pay attention to parentheses, which dictate the calculation order.
- Use clear notation to distinguish between different parts of the expression.

Practical Examples of Similar Expressions

Understanding how to evaluate $25 (10 + 50) - 25$ is a stepping stone toward handling more complex expressions. Here are some similar examples:

1. **Example 1:** $30 (20 + 10) - 60$

- Parentheses: $20 + 10 = 30$
- Multiplication: $30 \cdot 30 = 900$
- Subtract: $900 - 60 = 840$

2. **Example 2:** $50 (5 + 15) - 100$

- Parentheses: $5 + 15 = 20$
- Multiplication: $50 \cdot 20 = 1000$
- Subtract: $1000 - 100 = 900$

3. **Example 3:** $10 (8 + 12) - 20$

- Parentheses: $8 + 12 = 20$
- Multiplication: $10 \cdot 20 = 200$
- Subtract: $200 - 20 = 180$

These examples reinforce the importance of following the order of operations and understanding how parentheses influence calculations.

Real-World Applications of such Expressions

Expressions like $25(10 + 50) - 25$ are not just academic exercises—they often appear in real-life scenarios, such as:

- Financial calculations: Computing total costs after applying discounts or taxes.
- Shopping and budgeting: Calculating total expenses considering multiple items and deductions.
- Construction and engineering: Determining measurements, materials estimates, or adjustments.
- Data analysis: Formulating formulas for statistical or scientific data.

Understanding how to evaluate these expressions accurately is crucial for making informed decisions and ensuring precision in various fields.

Tips to Master Evaluating Arithmetic Expressions

To become proficient at solving such expressions, consider these tips:

- Always perform calculations inside parentheses first.
- Follow the order of operations strictly—PEMDAS/BODMAS rules.
- Use parentheses to clarify complex expressions.
- Double-check your calculations at each step.
- Practice with a variety of expressions to build confidence.

Summary and Conclusion

In summary, the expression $25(10 + 50) - 25$ simplifies through a clear understanding of the order of operations:

- Step 1: Evaluate the parentheses: $10 + 50 = 60$
- Step 2: Multiply: $25 \times 60 = 1500$
- Step 3: Subtract: $1500 - 25 = 1475$

Therefore, the value of $25(10 + 50) - 25$ is 1475.

Grasping how to interpret and simplify such expressions enhances your mathematical literacy, helping you solve both academic problems and practical calculations efficiently. Remember, always pay attention to parentheses and follow the established order of operations to ensure accurate results.

Meta Note: This detailed explanation not only answers the initial question but also provides a comprehensive guide for understanding similar expressions, emphasizing clarity, correctness, and practical relevance.

Frequently Asked Questions

What is the value of $25 (10 + 50) - 25$?

First, calculate inside the parentheses: $10 + 50 = 60$. Then multiply by 25: $25 \times 60 = 1500$. Finally, subtract 25: $1500 - 25 = 1475$. So, the value is 1475.

How do I simplify the expression $25 (10 + 50) - 25$?

Simplify inside the parentheses: $10 + 50 = 60$. Multiply by 25: $25 \times 60 = 1500$. Subtract 25 from the result: $1500 - 25 = 1475$.

Is $25 (10 + 50) - 25$ equal to 1475?

Yes, after performing the calculations, $25 (10 + 50) - 25$ equals 1475.

What is the step-by-step process to solve $25 (10 + 50) - 25$?

Step 1: Calculate inside parentheses: $10 + 50 = 60$. Step 2: Multiply by 25: $25 \times 60 = 1500$. Step 3: Subtract 25: $1500 - 25 = 1475$.

Can you explain why the answer to $25 (10 + 50) - 25$ is 1475?

Certainly! The expression applies the order of operations: first, add 10 and 50 to get 60; then, multiply by 25 to get 1500; finally, subtract 25 to arrive at 1475.

Additional Resources

What Is $25 (10 + 50) - 25$? is a compelling mathematical expression that combines basic arithmetic operations—addition, multiplication, and subtraction—into a single calculation. While it may seem straightforward at first glance, understanding how to evaluate this expression step-by-step can deepen your grasp of fundamental math principles. Whether you're a student sharpening your skills, a teacher preparing lesson plans, or a math enthusiast exploring the intricacies of order of operations, this guide will walk you through the process, clarify common pitfalls, and shed light on the importance of each component involved.

Understanding the Expression: Breaking Down the Components

At its core, the expression $25 (10 + 50) - 25$ involves several key elements:

- The number 25
- Parentheses containing $(10 + 50)$
- The subtraction of 25 at the end

Here's a quick overview of what each part signifies:

- $25 (10 + 50)$: This indicates multiplication, where 25 is multiplied by the sum of 10 and 50.
- $(10 + 50)$: Parentheses indicate that addition should be performed before multiplication, following the order of operations.
- $- 25$: After evaluating the multiplication, subtract 25 from the result.

The Importance of Order of Operations

Before diving into the calculation, it's essential to recall the order of operations, often remembered by the acronym PEMDAS:

- P: Parentheses first
- E: Exponents (powers and roots)
- MD: Multiplication and Division (left to right)
- AS: Addition and Subtraction (left to right)

Applying PEMDAS ensures consistency across calculations, especially when expressions become more complex.

Step-by-Step Breakdown of the Expression

Let's analyze $25 (10 + 50) - 25$ systematically:

Step 1: Evaluate the Parentheses

Calculate $(10 + 50)$:

- $10 + 50 = 60$

This is straightforward, and now the expression simplifies to:

$25 \times 60 - 25$

Step 2: Perform the Multiplication

Multiply 25 by 60:

$$- 25 \times 60 = 1500$$

Now, the expression becomes:

$$1500 - 25$$

Step 3: Complete the Subtraction

Subtract 25 from 1500:

$$- 1500 - 25 = 1475$$

Final result: 1475

Alternative Interpretations and Clarifications

While the above interpretation is the most common, some might wonder if the expression could be understood differently. Clarity in notation is vital.

Clarification 1: Is the expression $25 (10 + 50) - 25$ equivalent to $25 \times (10 + 50) - 25$?

Yes, in standard mathematical notation, when a number is placed directly before parentheses, it implies multiplication. So, $25 (10 + 50)$ is read as $25 \times (10 + 50)$.

Clarification 2: Could the expression be interpreted as $(25 (10 + 50)) - 25$?

Yes, but this is essentially the same as the previous interpretation unless parentheses are explicitly added differently. The key is understanding that the initial expression indicates multiplication of 25 and the sum inside parentheses, followed by subtraction.

Clarification 3: What if the expression was written as $(25 (10 + 50)) - 25$?

The evaluation remains the same; the parentheses clarify the order, and the calculation proceeds identically.

Common Mistakes to Avoid

While evaluating such expressions, it's easy to make errors if you're not cautious. Here are some common pitfalls:

Mistake 1: Ignoring the parentheses

- Incorrect: Multiplying 25 by 10 and then adding 50, as in $25 \times 10 + 50$, which is not the same as $25 \times (10 + 50)$.

- Correction: Always perform operations inside parentheses first.

Mistake 2: Performing multiplication before addition inside parentheses

- Incorrect: $25 \times 10 + 50 = 250 + 50 = 300$, which is incorrect in the context of the original expression.
- Correction: Compute inside parentheses first: $(10 + 50) = 60$, then multiply.

Mistake 3: Forgetting to perform the subtraction at the end

- Incorrect: Stopping after multiplication, leaving the final subtraction unperformed.
- Correction: Remember to subtract 25 after multiplication.

Practical Applications and Related Examples

Understanding this expression isn't just an academic exercise—it has practical significance. Here are some scenarios and similar problems:

Application 1: Financial Calculations

Suppose 25 represents a rate (like a per-unit cost), and $(10 + 50)$ represents quantities purchased. The total cost before discounts or adjustments could be calculated using similar expressions.

Application 2: Engineering and Physics

In engineering, combining different factors often involves such calculations, where the order of operations impacts the outcome significantly.

Similar Problems to Practice

1. What is $30(20 + 40) - 30$?
2. Calculate $15(5 + 25) - 15$.
3. Evaluate $50(8 + 12) - 50$.

Practicing these types of problems reinforces the importance of following the order of operations and understanding the structure of algebraic expressions.

Summary and Final Thoughts

The expression $25(10 + 50) - 25$ is a straightforward yet illustrative example of applying basic arithmetic principles with proper attention to the order of operations. Here's a quick recap:

- Step 1: Evaluate inside parentheses: $10 + 50 = 60$
- Step 2: Multiply: $25 \times 60 = 1500$
- Step 3: Subtract: $1500 - 25 = 1475$

Answer: 1475

Mastering such calculations enhances your mathematical fluency and prepares you for tackling more complex algebraic expressions. Always remember to handle parentheses first, then multiplication/division, and finally addition/subtraction. Clear notation and methodical steps are your best tools towards accurate and confident problem-solving.

Final Tips for Success

- Write down each step to avoid missed operations.
- Use parentheses liberally to clarify complex expressions.
- Double-check your work, especially in multi-step problems.
- Practice similar problems regularly to build confidence.

By understanding and practicing the evaluation of $25(10 + 50) - 25$, you're strengthening your foundational math skills and developing a systematic approach to solving expressions—an invaluable ability in academics, professional tasks, and everyday problem-solving.

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