

Complete This Expression Using The Distributive Property: $5(4 + 8) = (5 + 4)(5 + 8)5(4) + 85(4) + 5(8)(5$

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Understanding how to apply the distributive property in algebra is fundamental for students and anyone interested in mathematics. It simplifies complex expressions and makes calculations more manageable. In this article, we will explore the concept of the distributive property, analyze the given expression, and walk through the steps to correctly complete and interpret it. By the end, you will have a comprehensive understanding of the distributive property and its application to similar algebraic expressions.

What Is the Distributive Property?

The distributive property is a basic algebraic principle that states:

$$a(b + c) = ab + ac$$

This means that multiplying a sum by a number is the same as multiplying each addend separately and then adding the results. It is a fundamental property used frequently in algebra to simplify expressions and solve equations.

Why Is the Distributive Property Important?

- Simplification: It allows for easier calculation of complex expressions.
- Factoring: It helps in reversing the process to factor algebraic expressions.
- Solving Equations: Facilitates the process of isolating variables and solving equations.
- Real-World Applications: Used in areas like physics, engineering, and economics where distribution of quantities is necessary.

Analyzing the Given Expression

The expression provided in the prompt appears to be somewhat jumbled or incorrectly formatted:

"Complete This Expression Using The Distributive Property: $5(4 + 8) = (5 + 4)(5 + 8)5(4) + 85(4) + 5(8)(5$ "

Let's break it down and interpret what the intended expression might be.

Identifying the Components

- The initial part, " $5(4 + 8)$ ", is straightforward and applies the distributive property directly.
- The right side seems to be a combination of terms: " $(5 + 4)(5 + 8)$ ", followed by some additional terms " $5(4) + 85(4) + 5(8)(5)$ ".

Given the context, it appears the goal is to:

1. Demonstrate the distributive property starting with $5(4 + 8)$.
2. Possibly compare or relate it to an expanded form involving $(5 + 4)(5 + 8)$.
3. Include the expanded terms resulting from applying the distributive property.

Note: There are some apparent typographical errors, such as " $85(4)$ " which probably should be " $8 \ 5 \ 4$ " or similar, and the expression ending abruptly.

Likely Intended Expression

A plausible corrected version of the expression for educational purposes might be:

"Complete this expression: $5(4 + 8) = (5 + 4)(5 + 8) = 54 + 58 + 45 + 48$ "

This would illustrate the distributive property in a clear way, showing how to expand the product of sums.

Applying the Distributive Property to the Expression

Let's now walk through how to apply the distributive property step by step to the corrected expression.

Step 1: Calculate $5(4 + 8)$

Using the distributive property:

$$5(4 + 8) = 5 \cdot 4 + 5 \cdot 8$$

Calculating each term:

$$- 5 \times 4 = 20$$

$$- 5 \times 8 = 40$$

Adding them:

$$20 + 40 = 60$$

Therefore,

$$5(4 + 8) = 60$$

Step 2: Expand $(5 + 4)(5 + 8)$

The expression $(5 + 4)(5 + 8)$ can be expanded using the distributive property (also known as the FOIL method for binomials):

$$(5 + 4)(5 + 8) = 5 \times 5 + 5 \times 8 + 4 \times 5 + 4 \times 8$$

Calculating each:

$$- 5 \times 5 = 25$$

$$- 5 \times 8 = 40$$

$$- 4 \times 5 = 20$$

$$- 4 \times 8 = 32$$

Adding all together:

$$25 + 40 + 20 + 32 = 117$$

So,

$$(5 + 4)(5 + 8) = 117$$

Understanding the Relationship Between These Expressions

Notice that:

- The expression $5(4 + 8)$ simplifies to 60.
- The expanded product $(5 + 4)(5 + 8)$ simplifies to 117.

This shows that these two expressions are not equal, which indicates a common misconception: expanding a product of sums in different ways yields different results unless the expressions are equivalent.

Clarifying the Goal: Completing the Expression

Given the initial confusion, it's essential to clarify what the task involves:

- Applying the distributive property to expand expressions.
- Understanding how to correctly distribute multiplication over addition.
- Recognizing the difference between the distributive of a single term over a sum versus the product of sums.

Step-by-Step Guide to Completing Similar Expressions

To help readers confidently apply the distributive property in various contexts, here's a step-by-step guide.

1. Recognize the Expression Type

Determine whether you are dealing with:

- A single term multiplied by a sum: $a(b + c)$
- A product of two sums: $(a + b)(c + d)$

2. Apply the Appropriate Method

- For $a(b + c)$, apply the distributive property directly:

$$a(b + c) = ab + ac$$

- For $(a + b)(c + d)$, use the FOIL method:

$$(a + b)(c + d) = ac + ad + bc + bd$$

3. Calculate Each Term

Perform multiplication for each term carefully, following order of operations.

4. Simplify the Expression

Add all the products to get the simplified result.

Practical Examples of the Distributive Property

Let's look at some practical examples to reinforce understanding.

Example 1: Simplify $3(2 + 7)$

Applying the distributive property:

$$3(2 + 7) = 3 \cdot 2 + 3 \cdot 7 = 6 + 21 = 27$$

Example 2: Expand $(4 + 5)(6 + 2)$

Using FOIL:

$$(4 + 5)(6 + 2) = 4 \cdot 6 + 4 \cdot 2 + 5 \cdot 6 + 5 \cdot 2 = 24 + 8 + 30 + 10 = 72$$

Common Mistakes To Avoid When Using the Distributive Property

While applying the distributive property is straightforward, some common errors can lead to incorrect results.

1. Forgetting to Distribute to All Terms

Always remember, when you have $a(b + c)$, you must multiply a by b and a by c .

2. Incorrect Sign Handling

Be cautious with negative numbers; distribute the sign appropriately:

- For $a(b - c)$, ensure to subtract $a \cdot c$.

3. Mixing Up Addition and Multiplication

Always verify whether you are expanding a sum (which involves multiplication) or simplifying a product of sums.

Summary and Final Tips

- The distributive property states that $a(b + c) = ab + ac$.
- It is used to simplify expressions and expand products.
- When expanding binomials, the FOIL method helps systematically multiply each term.
- Always perform calculations carefully to avoid mistakes.
- Recognize the structure of the expression to apply the correct method.

Conclusion

Applying the distributive property is a vital skill in algebra that enables you to manipulate and simplify expressions efficiently. Whether you're solving equations, expanding binomials, or factoring, understanding this property is essential. The key takeaway is to distribute multiplication over each term in the sum or product accurately, ensuring correct calculations and avoiding common pitfalls. Practice with various expressions to build confidence and mastery in this fundamental aspect of algebra.

Remember: Practice makes perfect. Try expanding different expressions and verifying your answers to solidify your understanding of the distributive property.

Frequently Asked Questions

What is the correct way to use the distributive property to simplify $5(4 + 8)$?

Using the distributive property, $5(4 + 8) = 5 \times 4 + 5 \times 8 = 20 + 40 = 60$.

Is the expression $(5 + 4)(5 + 8)$ equivalent to $5(4 + 8)$?

No, $(5 + 4)(5 + 8)$ is not equivalent to $5(4 + 8)$. The first expands to $(9)(13) = 117$, while the second simplifies to 60.

How do you correctly complete the expression using the distributive property?

The correct completion is $5(4 + 8) = 5 \times 4 + 5 \times 8$, which equals $20 + 40 = 60$.

What common mistake might students make when applying the distributive property in this problem?

A common mistake is to incorrectly distribute the addition across multiplication, such as writing $(5 + 4)(5 + 8) = (5 + 4 + 5 + 8)$, which is incorrect.

Can the expression $5(4 + 8)$ be simplified by multiplying 5 with each term inside the parentheses?

Yes, by multiplying 5 with each term inside the parentheses, we get $5 \times 4 + 5 \times 8 = 20 + 40 = 60$.

What is the final simplified value of $5(4 + 8)$ using the distributive property?

The simplified value is 60.

Additional Resources

Complete This Expression Using The Distributive Property: $5(4 + 8) = (5 + 4)(5 + 8)5(4) + 85(4) + 5(8)(5)$

Unraveling the Distributive Property: A Deep Dive into Algebraic Expansion and Expression Completion

In the realm of elementary algebra, the distributive property is often introduced as a fundamental principle that simplifies the process of expanding expressions and solving equations. Its importance extends beyond basic arithmetic, forming the backbone of more advanced algebraic manipulations. The challenge of completing expressions like $5(4 + 8) = (5 + 4)(5 + 8)5(4) + 85(4) + 5(8)(5)$ offers an excellent opportunity to explore the mechanics of distributive property applications, mathematically verifying identities, and understanding how algebraic structures operate.

This comprehensive article aims to dissect the process of completing such expressions, analyze the underlying principles, and provide clarity on applying the distributive property effectively. We'll also explore common misconceptions, instructional strategies, and practical implications for educators and students alike.

The Significance of the Distributive Property in Algebra

The distributive property is one of the core properties in algebra, expressed as:

$$a(b + c) = ab + ac$$

This property states that multiplying a sum by a number is equivalent to multiplying each term within the sum individually by that number, then summing the products. It bridges the gap between addition and multiplication, ensuring consistent manipulation of expressions.

Why Is the Distributive Property Important?

- Simplification of Expressions: It enables breaking down complex expressions into manageable parts.
- Factoring and Expansion: It supports algebraic factoring and expansion, vital for solving equations.
- Foundation for Polynomial Operations: It underpins polynomial multiplication and factoring strategies.
- Mathematical Rigor: It ensures logical consistency in algebraic transformations.

Dissecting the Expression: A Step-by-Step Approach

The expression in question is:

$$5(4 + 8) = (5 + 4)(5 + 8)5(4) + 85(4) + 5(8)(5)$$

At first glance, this appears to be a mixture of algebraic terms, some of which seem improperly formatted or concatenated. Let's break down the components:

- The left side is straightforward: $5(4 + 8)$
- The right side appears to be a combination of product terms, possibly intended as part of an expanded form or an equation to verify.

Clarifying the Expression

Given the formatting, it's likely that the intended expression is:

$$5(4 + 8) = (5 + 4)(5 + 8) = 5(4) + 5(8)$$

or, perhaps, an elaboration involving the distributive property applied to both sides.

Alternatively, it might be a typo or misprint, and the goal is to verify the identity:

$$5(4 + 8) = 5(4) + 5(8)$$

which is the classic application of the distributive property.

Assuming the Goal Is To Complete the Expression

Suppose the task is to complete the expression:

$$5(4 + 8) = ?$$

using the distributive property, and perhaps relate it to the expression:

$$(5 + 4)(5 + 8)$$

Let's analyze both.

Applying the Distributive Property to the Expression

Step 1: Simplify the Left Side

Using the distributive property:

$$5(4 + 8) = 5 \times 4 + 5 \times 8 = 20 + 40 = 60$$

Step 2: Simplify the Right Side

The right side, as per the given, seems to be:

$$(5 + 4)(5 + 8)$$

Using the distributive property (or FOIL method for binomials):

$$(5 + 4)(5 + 8) = 5 \times 5 + 5 \times 8 + 4 \times 5 + 4 \times 8$$

Calculating each term:

$$- 5 \times 5 = 25$$

$$- 5 \times 8 = 40$$

$$- 4 \times 5 = 20$$

$$- 4 \times 8 = 32$$

Sum:

$$25 + 40 + 20 + 32 = 117$$

Hence:

$$(5 + 4)(5 + 8) = 117$$

Step 3: Comparing Both Sides

- Left side: 60

- Right side: 117

They are not equal, indicating that the original expression:

$$5(4 + 8) = (5 + 4)(5 + 8)$$

is not an identity; it's false unless adjusted.

Correct Application of the Distributive Property

What if the goal is to verify the following identity?

$$5(4 + 8) = 5 \times 4 + 5 \times 8$$

which is true, as shown:

$$60 = 20 + 40$$

Similarly, the expansion of $(5 + 4)(5 + 8)$ yields 117, which is not equal to 60. Therefore, the two expressions are not equivalent unless specified as different parts of a larger problem.

Completing the Expression: A Hypothetical Reconstruction

Given the confusion and potential typos in the original question, let's consider a plausible complete expression involving the distributive property:

Example 1: Expanding $5(4 + 8)$

- Step 1: Apply distributive property:

$$5(4 + 8) = 5 \times 4 + 5 \times 8$$

- Step 2: Calculate:

$$20 + 40 = 60$$

- Result: The complete, simplified expression is 60.

Example 2: Expanding $(5 + 4)(5 + 8)$

- Step 1: Use FOIL:

$$(5 + 4)(5 + 8) = 5 \times 5 + 5 \times 8 + 4 \times 5 + 4 \times 8$$

- Step 2: Calculate:

$$25 + 40 + 20 + 32 = 117$$

- Result: The expanded form sums to 117.

Conceptual Clarification: When Do Expressions Equal Each Other?

A critical aspect in algebra is understanding when two expressions are equal. For example, $5(4 + 8) = 60$, while $(5 + 4)(5 + 8) = 117$; these are clearly not equal, which illustrates the importance of careful expansion and verification.

Common Misconceptions and Pitfalls

In the process of applying the distributive property and completing expressions, students often encounter misconceptions:

- Misapplying Distributive Property: Assuming that $a(b + c) = (a + b)(a + c)$, which is incorrect.
- Omitting Terms: Forgetting to distribute a to all terms inside the parentheses.
- Confusing Expansion with Factoring: Not recognizing that expansion and factoring are inverse operations.
- Ignoring Parentheses: Leading to miscalculations, especially in complex expressions.

Instructional Strategies for Effective Learning

To foster a solid understanding of the distributive property and expression completion, educators can implement:

- Visual Aids: Use area models to demonstrate how multiplication distributes over addition.
- Step-by-Step Practice: Break down problems into manageable steps, emphasizing each operation.
- Comparison Exercises: Show incorrect applications to clarify common errors.
- Real-World Contexts: Relate algebra to everyday scenarios, like distributing costs or quantities.
- Interactive Tools: Utilize algebra software or manipulatives for dynamic exploration.

Advanced Applications and Broader Impacts

Understanding the distributive property is foundational for more advanced topics such as:

- Polynomial multiplication
- Factoring quadratic expressions
- Simplifying algebraic fractions
- Solving systems of equations

Moreover, mastery of such properties enhances problem-solving skills, logical reasoning,

and mathematical fluency.

Conclusion

The process of completing and verifying expressions like $5(4 + 8)$ using the distributive property underscores the importance of precision, clear understanding, and methodical application of algebraic principles. While the initial expression in the prompt appears complex and somewhat misformatted, dissecting it reveals core concepts: the correct expansion of expressions, the difference between various algebraic operations, and the significance of verifying identities.

For educators and students alike, emphasizing the logical foundation of the distributive property, practicing proper expansion techniques, and understanding when two expressions are equivalent are crucial steps towards algebraic proficiency. As mathematics continues to evolve, these foundational skills serve as the building blocks for more sophisticated reasoning and problem-solving endeavors.

References

- Blitzer, R. (2014). Algebra and Trigonometry. Pearson.
- Stewart, J. (2015). Precalculus: Mathematics for Calculus. Cengage Learning.
- Van de Walle, J. A., Karp, K. S., & Bay-Williams, J. M. (2016). Elementary and Middle School Mathematics: Teaching Developmentally. Pearson.

Note: This analysis was crafted to clarify the principles underlying the original prompt, emphasizing accurate application of the distributive property and proper expression completion.

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