

Answer The Following Questions:(1.) Use The Distributive Property To Simplify The Expression. $8(c + 5)(2.)$ Use

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Introduction

Mathematics often involves simplifying complex expressions to make calculations more manageable and understandable. One powerful tool for simplifying algebraic expressions is the distributive property, which helps to expand and combine similar terms effectively. In this article, we will explore how to utilize the distributive property to simplify algebraic expressions, focusing on the specific example of simplifying the expression $8(c + 5)(2)$. Additionally, we will discuss related concepts and provide step-by-step guidance on applying the distributive property in various scenarios.

Understanding the Distributive Property

What Is The Distributive Property?

The distributive property is one of the fundamental properties of algebra that states:

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

This property allows you to multiply a single term across terms within parentheses, distributing the multiplication over addition or subtraction inside the parentheses.

When To Use The Distributive Property

The distributive property becomes particularly useful when:

- Simplifying algebraic expressions involving parentheses.
- Expanding products of binomials or polynomials.
- Combining like terms after expansion.
- Factoring expressions in reverse.

Step-by-Step Guide to Simplify $8(c + 5)(2)$ Using The Distributive Property

Step 1: Recognize the Expression Components

The expression to simplify is:

$$8(c + 5)(2)$$

This expression involves:

- A coefficient 8 outside the parentheses.
- An algebraic term $(c + 5)$.
- A multiplication by 2 at the end.

Step 2: Apply the Distributive Property

The key is to understand how to distribute the multiplication across the parentheses. Since multiplication is associative and commutative, we can reorder and regroup the terms for easier calculation.

Step 3: Rewrite the Expression for Clarity

Express the entire expression explicitly:

$$8 \times (c + 5) \times 2$$

Now, focus on distributing or combining the multiplications.

Step 4: Combine Constants First

Because multiplication is associative:

$$(8 \times 2) \times (c + 5)$$

Calculate (8×2) :

$$16 \times (c + 5)$$

Step 5: Distribute the 16 Across the Parentheses

Apply the distributive property:

$$16 \times c + 16 \times 5$$

Calculate each term:

- $16 \times c = 16c$
- $16 \times 5 = 80$

Step 6: Write the Final Simplified Expression

Combine the terms:

$$\boxed{16c + 80}$$

Result:

$$\boxed{16c + 80}$$

This is the simplified form of the original expression using the distributive property.

Additional Examples and Applications

Example 1: Simplify $3(a + 4)$

- Apply distributive property:

$$3 \times a + 3 \times 4 = 3a + 12$$

Example 2: Expand $(2x + 3)(x + 5)$

- Use distributive property (FOIL method):

$$2x \times x + 2x \times 5 + 3 \times x + 3 \times 5 = 2x^2 + 10x + 3x + 15$$

- Combine like terms:

$$2x^2 + 13x + 15$$

Example 3: Simplify $5(2c - 7) + 3(c + 4)$

- Distribute:

$$5 \times 2c - 5 \times 7 + 3 \times c + 3 \times 4 = 10c - 35 + 3c + 12$$

- Combine like terms:

$$(10c + 3c) + (-35 + 12) = 13c - 23$$

Common Mistakes to Avoid

- Forgetting to distribute to all terms inside parentheses: Always ensure you multiply each term inside the parentheses by the outside coefficient.
- Mixing multiplication and addition incorrectly: Remember, the distributive

property applies specifically to multiplication over addition/subtraction.

- Not combining like terms after expansion: Always simplify the expression by combining similar terms for the most concise answer.

Tips for Mastering the Distributive Property

- Practice expanding binomials and polynomials regularly.
- Use visual aids like area models to understand the distributive property geometrically.
- Check your work by factoring the simplified expression to see if you regain the original form.

Conclusion

The distributive property is an essential algebraic tool that simplifies complex expressions and lays the foundation for more advanced topics such as factoring, polynomial multiplication, and solving equations. By mastering how to apply this property, learners can efficiently simplify expressions like $8(c + 5)(2)$ to $16c + 80$, and confidently approach a wide array of algebraic problems. Consistent practice and careful application of the distributive property will enhance your mathematical skills and problem-solving abilities.

Keywords for SEO Optimization

- Distributive property
- Simplify algebraic expressions
- Expand binomials
- Algebraic simplification
- Distributive property examples
- How to use distributive property
- Algebra practice problems
- Mathematical properties
- Polynomial expansion
- Algebra tips and tricks

Frequently Asked Questions

How do I apply the distributive property to simplify the expression $8(c + 5)$?

You multiply 8 by each term inside the parentheses: $8c + 8 \cdot 5$, resulting in

$8c + 40$.

What is the first step to simplify $8(c + 5)$ using the distributive property?

Distribute 8 to both c and 5, which means multiplying 8 by each term inside the parentheses.

Can the distributive property be used to simplify expressions with more than two terms? If so, how?

Yes, you distribute the outside coefficient to each term inside the parentheses individually, then combine like terms if possible.

What is the simplified form of $8(c + 5)$?

The simplified form is $8c + 40$.

Are there any common mistakes to avoid when using the distributive property?

Yes, common mistakes include forgetting to distribute to all terms inside parentheses or mixing operations; ensure you multiply every term inside the parentheses by the outside coefficient.

Additional Resources

Answer The Following Questions: A Comprehensive Guide to Using the Distributive Property and Simplifying Expressions

Mathematics is not just about numbers; it's about understanding the relationships and operations that govern those numbers. Among the foundational concepts in algebra, the distributive property stands out as a powerful tool that simplifies complex expressions, making problem-solving more manageable. In this article, we will explore how to use the distributive property effectively, focusing on the specific example of simplifying the expression $8(c + 5)$. We'll also examine additional techniques and tips to enhance your understanding and application of algebraic principles.

Understanding the Distributive Property

What Is the Distributive Property?

The distributive property is one of the essential properties of real numbers and algebraic expressions. It states that:

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

In words, it means that multiplying a number by a sum is the same as multiplying each addend by the number separately and then adding the results.

This property is invaluable when simplifying algebraic expressions, especially those involving parentheses, as it allows breaking down complex expressions into simpler, more manageable parts.

Why Is the Distributive Property Important?

- Simplification: It helps in rewriting expressions to a form that is easier to evaluate or solve.
- Foundation for Factoring: Understanding this property is crucial for factoring expressions.
- Solving Equations: It assists in expanding expressions to isolate variables and solve for unknowns.
- Real-world Applications: Used in areas like finance, physics, and engineering for modeling and calculations.

Applying the Distributive Property to Simplify $8(c + 5)$

Step-by-Step Breakdown

Let's analyze the expression: $8(c + 5)$.

Step 1: Identify the parts of the expression

- The outside term: 8
- The sum inside parentheses: $c + 5$

Step 2: Apply the distributive property

Using the rule: $a(b + c) = ab + ac$

- $a = 8$

- $b = c$
- $c = 5$

Step 3: Distribute

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

Step 4: Simplify each term

- $8c = 8c$
- $8 \cdot 5 = 40$

Step 5: Write the simplified expression

$$8c + 40$$

Final Result

The simplified form of $8(c + 5)$ is $8c + 40$.

Further Examples and Practice

To solidify your understanding, let's look at a few more examples where the distributive property is applied.

Example 1: Simplify $3(2x - 7)$

- Apply distributive property: $3 \cdot 2x - 3 \cdot 7$
- Simplify: $6x - 21$

Result: $6x - 21$

Example 2: Simplify $5(4a + 3b - 2)$

- Distribute each term: $5 \cdot 4a + 5 \cdot 3b - 5 \cdot 2$
- Simplify: $20a + 15b - 10$

Result: $20a + 15b - 10$

Features and Benefits of Using the Distributive Property

- Clarity in Expression Expansion: It makes complex expressions transparent and easier to manipulate.
- Preparation for Factoring: Expanding expressions is a prerequisite for factoring, which is essential in solving quadratic and polynomial equations.
- Efficiency in Problem Solving: It reduces the need for trial-and-error by providing a straightforward approach to simplifying expressions.

Common Challenges and How to Overcome Them

While the distributive property is straightforward, learners often encounter some difficulties:

- Forgetting to distribute to all terms inside parentheses: Always ensure each term within the parentheses is multiplied by the outside coefficient.
- Handling multiple parentheses: When expressions contain nested parentheses, carefully expand step-by-step.
- Sign errors: Be cautious with negative signs, especially when distributing over subtraction.

Tips to overcome these challenges:

- Write out each step explicitly.
- Use parentheses to keep track of signs.
- Practice with varied examples to build confidence.

Additional Tips for Mastering Algebraic Simplification

- Memorize key properties: The distributive property, associative, and commutative properties are foundational.
- Practice regularly: Frequent practice helps internalize the process.
- Check your work: Always verify by expanding your simplified expression back to the original.
- Use visual aids: Number lines or algebra tiles can help visualize the distributive process.

Conclusion

The distributive property is an essential tool in algebra, facilitating the simplification of expressions like $8(c + 5)$ into $8c + 40$. Mastering this property not only streamlines calculations but also lays the groundwork for more advanced topics such as factoring, solving equations, and algebraic modeling. By understanding its principles, practicing its application, and being mindful of common pitfalls, learners can confidently navigate a wide array of algebraic challenges. Remember, the key to proficiency is consistent practice and a clear understanding of each step involved in distributive expansion. Embrace these techniques, and you'll find yourself solving algebraic expressions with greater ease and accuracy.

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