

Lesson 624 Multi-Step Equations with Distributive Property Answer Key

Lesson 624 multi-step equations with distributive property answer key is a fundamental topic in algebra that helps students understand how to solve complex equations involving multiple steps and the application of the distributive property. Mastering these skills is crucial not only for academic success in mathematics but also for developing critical thinking and problem-solving abilities. This article will delve into the concepts associated with multi-step equations, the use of the distributive property, and provide a detailed answer key to facilitate better understanding.

Understanding Multi-Step Equations

Multi-step equations are equations that require more than one operation to solve. These operations can include addition, subtraction, multiplication, and division. The goal is to isolate the variable on one side of the equation to find its value.

Key Concepts of Multi-Step Equations

1. **Combining Like Terms:** This involves simplifying expressions by adding or subtracting terms that have the same variable.
2. **Using Inverse Operations:** To isolate the variable, you can use inverse operations—if a variable is added to a number, subtract that number from both sides, and vice versa.
3. **Distributive Property:** This property allows you to multiply a single term by each term inside a set of parentheses. It is crucial when dealing with equations that present terms in parentheses.
4. **Moving Variables:** Sometimes, you may need to move variables from one side of the equation to the other, which may involve subtracting or adding terms.

The Distributive Property Explained

The distributive property states that for any numbers a , b , and c :

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

This property is particularly useful when solving equations where variables are multiplied by sums or differences. By distributing, you can simplify the equation into a more manageable form.

Examples of Applying the Distributive Property

To illustrate how the distributive property works, consider these examples:

1. Example 1: Solve $3(x + 4) = 21$

- Step 1: Apply the distributive property:

$$\begin{aligned} & 3x + 12 = 21 \end{aligned}$$

- Step 2: Subtract 12 from both sides:

$$\begin{aligned} & 3x = 9 \end{aligned}$$

- Step 3: Divide by 3:

$$\begin{aligned} & x = 3 \end{aligned}$$

2. Example 2: Solve $2(3x - 5) + 4 = 10$

- Step 1: Distribute:

$$\begin{aligned} & 6x - 10 + 4 = 10 \end{aligned}$$

- Step 2: Combine like terms:

$$\begin{aligned} & 6x - 6 = 10 \end{aligned}$$

- Step 3: Add 6 to both sides:

$$\begin{aligned} & 6x = 16 \end{aligned}$$

- Step 4: Divide by 6:

$$\begin{aligned} & x = \frac{8}{3} \end{aligned}$$

Steps to Solve Multi-Step Equations with the Distributive Property

To effectively solve multi-step equations using the distributive property,

follow these structured steps:

1. Identify the Equation: Look for terms that can be simplified using the distributive property.
2. Apply the Distributive Property: Expand any expressions that are being multiplied by a term outside parentheses.
3. Combine Like Terms: After distribution, simplify the equation by combining any like terms.
4. Isolate the Variable: Use inverse operations to move constants to the other side of the equation.
5. Solve for the Variable: Perform the final operation to find the value of the variable.
6. Check Your Work: Substitute the solution back into the original equation to verify correctness.

Common Mistakes to Avoid

1. Neglecting the Negative: When distributing, ensure that negative signs are included, as in $-1(2x + 3) = -2x - 3$.
2. Skipping Steps: It's important to show each step clearly to avoid errors, especially when combining like terms.
3. Incorrectly Moving Variables: Be cautious when moving terms from one side of the equation; always perform the same operation on both sides.

Answer Key for Lesson 624 Multi-Step Equations with Distributive Property

Here are some practice problems related to multi-step equations using the distributive property, along with their solutions.

1. Problem 1: Solve $5(2x + 3) = 40$

- Solution:

$$\begin{aligned} & 10x + 15 = 40 \quad (\text{Distribute}) \\ & 10x = 25 \quad (\text{Subtract 15}) \end{aligned}$$

$$\begin{aligned} & \backslash[\\ & x = 2.5 \quad (\text{\text{Divide by 10}}) \\ & \backslash] \end{aligned}$$

2. Problem 2: Solve $(4(x - 2) + 8 = 24)$

- Solution:

$$\begin{aligned} & \backslash[\\ & 4x - 8 + 8 = 24 \quad (\text{\text{Distribute and Combine}}) \\ & \backslash] \\ & \backslash[\\ & 4x = 24 \quad (\text{\text{Combine like terms}}) \\ & \backslash] \\ & \backslash[\\ & x = 6 \quad (\text{\text{Divide by 4}}) \\ & \backslash] \end{aligned}$$

3. Problem 3: Solve $(3(4x + 1) - 2 = 10)$

- Solution:

$$\begin{aligned} & \backslash[\\ & 12x + 3 - 2 = 10 \quad (\text{\text{Distribute}}) \\ & \backslash] \\ & \backslash[\\ & 12x + 1 = 10 \quad (\text{\text{Combine like terms}}) \\ & \backslash] \\ & \backslash[\\ & 12x = 9 \quad (\text{\text{Subtract 1}}) \\ & \backslash] \\ & \backslash[\\ & x = \frac{3}{4} \quad (\text{\text{Divide by 12}}) \\ & \backslash] \end{aligned}$$

4. Problem 4: Solve $(2(5x - 3) = 4x + 10)$

- Solution:

$$\begin{aligned} & \backslash[\\ & 10x - 6 = 4x + 10 \quad (\text{\text{Distribute}}) \\ & \backslash] \\ & \backslash[\\ & 10x - 4x = 10 + 6 \quad (\text{\text{Move terms}}) \\ & \backslash] \\ & \backslash[\\ & 6x = 16 \quad (\text{\text{Combine like terms}}) \\ & \backslash] \\ & \backslash[\\ & x = \frac{8}{3} \quad (\text{\text{Divide by 6}}) \\ & \backslash] \end{aligned}$$

5. Problem 5: Solve $(6(x + 2) - 4 = 2x + 20)$

- Solution:

```
\[
6x + 12 - 4 = 2x + 20 \quad (\text{Distribute})
\]
\[
6x + 8 = 2x + 20 \quad (\text{Combine like terms})
\]
\[
6x - 2x = 20 - 8 \quad (\text{Move terms})
\]
\[
4x = 12 \quad (\text{Combine like terms})
\]
\[
x = 3 \quad (\text{Divide by 4})
\]
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Conclusion

Understanding lesson 624 multi-step equations with distributive property answer key is essential for students aiming to excel in algebra. This lesson not only equips learners with the tools needed to manipulate complex equations but also fosters a deeper comprehension of mathematical principles. By practicing with the examples and problems provided, students can enhance their problem-solving skills and gain confidence in their mathematical abilities. Through consistent practice and application of these concepts, mastering multi-step equations becomes an achievable goal.

Frequently Asked Questions

What is a multi-step equation?

A multi-step equation is an equation that requires more than one step to solve, involving operations such as addition, subtraction, multiplication, division, and the distributive property.

How do you use the distributive property in multi-step equations?

The distributive property allows you to multiply a single term by each term inside a parenthesis, which helps in simplifying the equation before solving it.

Can you give an example of a multi-step equation using the distributive property?

Sure! An example is $3(x + 4) = 21$. You would first distribute the 3 to get $3x + 12 = 21$, and then solve for x .

What is the first step in solving a multi-step equation involving the distributive property?

The first step is to apply the distributive property to eliminate parentheses, simplifying the equation to a form that can be more easily solved.

Why is it important to follow the order of operations in multi-step equations?

Following the order of operations ensures accuracy in solving equations; it helps prevent errors when performing operations on both sides of the equation.

What common mistakes should students avoid when solving multi-step equations?

Common mistakes include forgetting to distribute correctly, misapplying the order of operations, or making arithmetic errors during simplification.

How can practice with lesson 624 improve my understanding of multi-step equations?

Practicing lesson 624 provides examples and exercises that reinforce the application of the distributive property and the steps involved in solving multi-step equations.

Where can I find the answer key for lesson 624 on multi-step equations?

The answer key for lesson 624 can typically be found in the teacher's edition of the textbook or through the educational platform associated with the lesson.

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