-3(1- 7v) = 102 How Do To Solve This Problem?

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Solving algebraic equations can seem challenging at first glance, especially when they involve variables and parentheses. The equation *-3(1 - 7v) = 102* is a typical example that requires understanding the order of operations and applying algebraic principles systematically. If you're wondering how to approach this problem step-by-step, you're in the right place. In this article, we'll walk through the process of solving this equation, providing clear explanations and tips to improve your algebra skills. Whether you're a student preparing for tests or someone looking to sharpen your math abilities, this guide will help you understand the method behind solving such equations.

Understanding the Equation: What Are We Dealing With?

Before diving into solving the equation, it's essential to understand its components and what the problem asks us to find.

Breaking Down the Equation

- The equation is: *-3(1 - 7v) = 102*
- It involves a variable, *v*.
- The expression inside parentheses: *1 - 7v*.
- The entire parentheses is multiplied by -3.

What is the Goal?

- The primary goal is to find the value of *v* that makes the equation true.
- To do this, we need to isolate *v* on one side of the equation.

Step-by-Step Guide to Solve -3(1 - 7v) = 102

Let's break down the solving process into manageable steps.

Step 1: Eliminate the Parentheses

- Use the distributive property to remove the parentheses.
- Multiply each term inside the parentheses by -3.

Applying Distributive Property

- Multiply -3 by 1: *-3 1 = -3*
- Multiply -3 by -7v: *-3 -7v = 21v*

After distribution, the equation becomes:

- **-3 + 21v = 102**

Step 2: Isolate the Variable Term

- The next step is to get all variable terms on one side and constants on the other.
- Add 3 to both sides to move constants to the right side.

Performing the Addition

- Equation: *-3 + 21v = 102*
- Add 3 to both sides:

- **-3 + 21v + 3 = 102 + 3**
- **21v = 105**

Step 3: Solve for the Variable

- Now, isolate *v* by dividing both sides by the coefficient of *v*, which is 21.

Division Step

- Equation: *21v = 105*
- Divide both sides by 21:

- **v = 105 / 21**

Step 4: Simplify the Result

- Simplify the fraction:

- **v = 5**

Final Answer and Verification

The solution to the equation *-3(1 - 7v) = 102* is *v = 5*. To ensure the solution is correct, substitute *v = 5* back into the original equation and verify.

Verification Process

- Original equation: *-3(1 - 7v) = 102*
- Substitute *v = 5*:

  - Calculate inside parentheses: 1 - 7 5 = 1 - 35 = -34

  - Multiply by -3: -3 -34 = 102

- Since the left side equals the right side (102), the solution is verified.

Additional Tips for Solving Similar Equations

To become more confident in solving algebraic equations like *-3(1 - 7v) = 102*, consider the following tips:

1. Always Apply the Order of Operations

- Remember PEMDAS (Parentheses, Exponents, Multiplication and Division, Addition and Subtraction).
- Distribute before combining like terms.

2. Be Careful with Negative Signs

- When multiplying or dividing by negative numbers, remember to flip the inequality or keep track of signs.

3. Isolate the Variable Step-by-Step

- Perform inverse operations systematically.
- Avoid skipping steps to prevent errors.

4. Check Your Solution

- Substitute your answer back into the original equation to verify.

Practice Problems to Reinforce Your Skills

Work through these problems to practice solving equations similar to *-3(1 - 7v) = 102*:

1. 2(3x + 4) = 20
2. -5(2y - 3) = 15
3. 4(1 - 2z) = 8
4. -6(5a + 2) = 18
5. 7(2b - 1) = 35

Try solving each, following the steps of distributing, isolating the variable, and verifying your answer.

Conclusion: Mastering the Art of Solving Algebraic Equations

Understanding how to solve equations like *-3(1 - 7v) = 102* is a fundamental skill in algebra. The key steps involve distributing to eliminate parentheses, isolating the variable through inverse operations, and verifying your solution. With practice, you'll become more confident in tackling various algebraic problems, building a strong foundation for more advanced math topics. Remember to take your time, double-check your work, and practice regularly to improve your problem-solving skills. Algebra may seem complex at first, but with systematic steps, you'll find that solving equations becomes much more manageable and even enjoyable.

Frequently Asked Questions

How do I start solving the equation -3(1 - 7v) = 102?

Begin by distributing the -3 across the parentheses: -3 1 and -3 -7v, which gives -3 + 21v = 102.

What is the first step to isolate the variable v in the equation -3(1 - 7v) = 102?

The first step is to distribute and then move constants to the other side: add 3 to both sides to get 21v = 102 + 3.

After distributing, how do I solve for v in -3 + 21v = 102?

Add 3 to both sides to isolate the term with v: 21v = 105.

What do I do once I have 21v = 105?

Divide both sides by 21 to solve for v: v = 105 / 21.

What is the value of v after solving the equation -3(1 - 7v) = 102?

v = 5, since 105 divided by 21 equals 5.

Are there any common mistakes to avoid when solving this type of equation?

Yes, avoid forgetting to distribute the -3 correctly, and ensure you perform the same operation to both sides when isolating v.

Can I verify the solution v = 5? How?

Yes, substitute v = 5 back into the original equation to check if both sides are equal: -3(1 - 75) should equal 102.

What is the simplified form of the original equation after distribution?

The simplified form is -3 + 21v = 102.

Is it necessary to simplify the equation before solving?

Yes, simplifying through distribution makes it easier to isolate the variable and solve accurately.

What is the key concept behind solving equations like -3(1 - 7v) = 102?

The key concept is distribution and inverse operations—distribute to remove parentheses and then perform inverse operations to isolate the variable.

Additional Resources

-3(1 - 7v) = 102 How Do To Solve This Problem?

Mathematics often presents learners with equations that, at first glance, seem complex or intimidating. One such equation is -3(1 - 7v) = 102. While it may look daunting, understanding how to approach and solve this problem can enhance your algebra skills and boost your confidence in

handling similar equations. In this article, we'll break down the steps involved in solving this equation, explore the underlying concepts, and provide practical tips for mastering such problems.

Understanding the Equation: What Are We Dealing With?

Before diving into the solution process, it’s important to understand the structure of the given equation:

-3(1 - 7v) = 102

This is a linear algebraic equation involving a single variable, v. The key components here are:

- A coefficient -3 multiplying a binomial (1 - 7v)
- An equal sign indicating the relationship between the expression on the left and the constant 102

Our goal is to isolate v — find its value that makes the equation true.

Breaking Down the Solution Process

Step 1: Apply the Distributive Property

The first step in solving the equation is to eliminate the parentheses by distributing the coefficient -3 across the terms inside the parentheses.

Distributive property states:

a(b + c) = a b + a c

Applying this to our equation:

-3 1 + (-3) (-7v) = 102

Calculating each term:

- -3 1 = -3

- -3 -7v = +21v (since a negative times a negative yields a positive)

So, the equation becomes:

-3 + 21v = 102

Step 2: Isolate the Variable Term

Next, we aim to get all terms involving v on one side, and constants on the other. Currently, the equation is:

-3 + 21v = 102

To isolate 21v, add 3 to both sides:

-3 + 3 + 21v = 102 + 3

Simplifies to:

21v = 105

Step 3: Solve for the Variable

Now, divide both sides of the equation by 21 to solve for v:

v = 105 / 21

Simplify the fraction:

v = 5

Confirming the Solution: Verify Your Answer

It's always good practice to verify the solution by substituting the value of v back into the original equation:

Original equation:

-3(1 - 7v) = 102

Substitute v = 5:

-3(1 - 7 5) = 102

Calculate inside the parentheses:

-3(1 - 35) = 102

Simplify:

-3(-34) = 102

Multiply:

102 = 102

The left side equals the right side, confirming v = 5 is indeed the correct solution.

Deep Dive into Key Concepts

The Distributive Property

- Fundamental to algebra, this property allows you to remove parentheses by multiplying each term inside by the factor outside.
- Essential for simplifying expressions and solving equations efficiently.

Combining Like Terms

- When simplifying, combine constants and variable terms separately.
- Helps to reduce complex equations to a single-variable form.

Maintaining Balance

- Whatever operation you perform on one side of the equation, perform it on the other.
- Ensures the equality is preserved throughout the solving process.

Common Mistakes and How to Avoid Them

1. Misapplying the Distributive Property

- Ensure you multiply each term inside the parentheses by the coefficient outside.

2. Sign Errors

- Pay close attention to negative signs during distribution and simplification.

3. Incorrect Algebraic Operations

- When dividing both sides, confirm the division applies to all terms involved.

4. Skipping Verification

- Always substitute your solution back into the original equation to verify correctness.

Additional Practice Problems

To reinforce your understanding, try solving similar equations:

1. $-2(3x + 4) = 16$

2. $4(2 - x) = 12$

3. $-5(2y - 3) = 25$

4. $-3(2a + 7) = -21$

5. -6(5 - 2b) = 36

Working through these problems will solidify your grasp of distributing, isolating variables, and verifying solutions.

Tips for Success in Solving Algebraic Equations

- Read carefully: Understand what the equation asks before jumping into calculations.
- Write step-by-step: Break down the process to avoid mistakes.
- Check your work: Always verify your solution by substituting back.
- Practice regularly: The more equations you solve, the more intuitive the process becomes.
- Seek clarity: If a step confuses you, revisit fundamental concepts or consult additional resources.

Final Thoughts

Solving equations like -3(1 - 7v) = 102 may initially seem challenging, but by systematically applying algebraic principles such as distribution, combining like terms, and maintaining balance, you can unlock the solution efficiently. Mastering these techniques enhances your problem-solving toolkit, making complex-looking equations manageable and reinforcing your overall mathematical confidence.

Remember, persistence is key. With consistent practice and attention to detail, you'll find yourself solving similar equations with ease and precision. Happy solving!

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