

Plz Help- Solve The Inequality- $-3(1 - Z) < 9$ Use Distributive Property

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If you're struggling with solving inequalities like $-3(1 - Z) < 9$, you're not alone. Many students find such problems challenging at first, especially when they involve the distributive property and require careful step-by-step solving. In this article, we will guide you through the process of solving this inequality using the distributive property, explaining each step clearly to help you understand the concept thoroughly.

Understanding the Inequality: $-3(1 - Z) < 9$

Before diving into solving the inequality, let's understand what it entails.

What is an Inequality?

- An inequality is a mathematical statement that compares two expressions using symbols like $<$, $>$, $\leq$, or $\geq$.
- In our case, $-3(1 - Z) < 9$ indicates that the expression $-3(1 - Z)$ is less than 9.

Goals in Solving the Inequality

- Isolate the variable Z on one side of the inequality.
- Find the range of Z values that satisfy the inequality.

Step-by-Step Solution Using the Distributive Property

The key to solving this inequality is to apply the distributive property correctly and then isolate the variable.

Step 1: Apply the Distributive Property

- The distributive property states that $a(b + c) = ab + ac$.
- Here, $-3(1 - Z)$ can be expanded as:

$$-3 \times 1 + (-3) \times (-Z)$$

- Calculate each term:

$$-3 \times 1 = -3$$

$$-3 \times (-Z) = +3Z$$

- So, the inequality becomes:

$$-3 + 3Z < 9$$

Step 2: Isolate the Variable Term

- To isolate $3Z$, move constants to the other side:

$$3Z < 9 + 3$$

- Simplify:

$$3Z < 12$$

Step 3: Solve for Z

- Divide both sides of the inequality by 3:

$$Z < \frac{12}{3}$$

- Simplify:

$$Z < 4$$

Final Solution and Interpretation

- The solution to the inequality $-3(1 - Z) < 9$ is:

$$\begin{array}{l} \backslash \\ Z < 4 \\ \backslash \end{array}$$

- This means any value of Z less than 4 will satisfy the inequality.

Graphical Representation of the Solution

Visualizing inequalities helps in understanding the range of solutions.

Number Line Illustration

- Draw a number line.
- Mark the point 4 on the number line.
- Shade everything to the left of 4, indicating $Z < 4$.
- Use an open circle at 4 to show that Z cannot equal 4.

Additional Tips for Solving Similar Inequalities

1. Always Apply the Distributive Property Correctly

- Remember that $a(b + c) = ab + ac$.
- Be careful with signs, especially negative signs.

2. Keep Track of Inequality Signs When Dividing or Multiplying

- When dividing or multiplying both sides by a negative number, flip the inequality sign.

3. Check Your Solution

- Substitute a value less than 4 into the original inequality to verify it holds true.
- For example, $Z = 3$:

$\backslash$

$$-3(1 - 3) = -3(-2) = 6$$

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$$6 < 9 \quad \text{\texttt{(True)}}$$

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- Substitute $Z = 5$:

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$$-3(1 - 5) = -3(-4) = 12$$

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$$12 < 9 \quad \text{\texttt{(False)}}$$

\]

- This confirms $Z < 4$ is correct.

Practice Problems for Mastery

To strengthen your understanding, try solving these inequalities using the distributive property:

- $2(3 + Z) > 10$
- $-4(2 - Z) \leq 8$
- $5(Z - 2) \geq 15$
- $-7(1 + 2Z) < 0$

Conclusion

Solving inequalities like $-3(1 - Z) < 9$ may seem complicated at first, but breaking down the problem using the distributive property makes it manageable. Remember to expand correctly, isolate the variable, and carefully handle inequality signs. With practice, you'll become proficient at solving such inequalities and understanding their solutions.

If you ever find yourself stuck, revisit the steps outlined here, practice similar problems, and you'll improve your algebra skills in no time!

Keywords: Solve Inequality, Distributive Property, Inequality Solving, Algebra, Inequality Practice, Math Help, Solving for Z, Inequality Examples

Frequently Asked Questions

How do I solve the inequality $3(1 - Z) < 9$ using the distributive property?

First, apply the distributive property: $3 \cdot 1 - 3 \cdot Z < 9$, which simplifies to $3 - 3Z < 9$. Then, subtract 3 from both sides: $-3Z < 6$. Finally, divide both sides by -3, remembering to reverse the inequality sign: $Z > -2$.

What is the step-by-step process to solve $3(1 - Z) < 9$ using the distributive property?

Step 1: Distribute 3 over $(1 - Z)$: $3 - 3Z < 9$. Step 2: Subtract 3 from both sides: $-3Z < 6$. Step 3: Divide both sides by -3, and flip the inequality sign: $Z > -2$. The solution is all Z greater than -2.

Why do I need to flip the inequality sign when dividing by -3 in the inequality $3 - 3Z < 9$?

When dividing both sides of an inequality by a negative number, the inequality sign must be reversed to maintain the correct relationship between the values. In this case, dividing by -3 requires flipping the '<' sign to '>'.

Can I solve $3(1 - Z) < 9$ without using the distributive property?

It's possible to solve the inequality without explicitly using the distributive property, but the distributive step simplifies the process. Alternatively, you could directly isolate Z, but applying the distributive property is the standard approach for clarity and correctness.

What is the solution set for the inequality $3(1 - Z) < 9$ after solving?

The solution set is all real numbers Z such that $Z > -2$. In interval notation, this is written as $(-2, \infty)$.

Additional Resources

Plz Help- Solve The Inequality- $3(1 - Z) < 9$ Use Distributive Property: A Comprehensive Guide

Mathematics, especially algebra, often challenges students with inequalities that require multiple steps of reasoning and application of various properties. The phrase "Plz Help-Solve The Inequality- $3(1 - Z) < 9$ Use Distributive Property" encapsulates a common type of problem that involves understanding and applying the distributive property to solve inequalities efficiently. Whether you're a student facing this problem for the first time or someone looking to deepen your understanding of algebraic techniques, this guide will walk you through the process step-by-step, analyze key concepts, and highlight best practices for solving similar inequalities.

Understanding the Inequality

Before diving into the solution, it's essential to comprehend what the inequality is expressing and why the distributive property is crucial here.

The inequality given is:

$$\boxed{3(1 - Z) < 9}$$

This expression involves a linear combination, with a coefficient of 3 multiplying a binomial $(1 - Z)$. The goal is to find the range of Z values that satisfy this inequality.

Key Concepts:

- The distributive property allows us to eliminate parentheses by multiplying each term inside by the factor outside.**
- Solving inequalities involves similar steps to solving equations, with attention paid to the direction of the inequality, especially when multiplying or dividing by negative numbers.**

Step-by-Step Solution Using the Distributive Property

Step 1: Apply the Distributive Property

The first step is to eliminate parentheses by distributing the multiplication across the terms inside:

$$\begin{aligned} & \backslash[\\ & 3 \times 1 - 3 \times Z < 9 \\ & \backslash] \end{aligned}$$

which simplifies to:

$$\begin{aligned} & \backslash[\\ & 3 - 3Z < 9 \\ & \backslash] \end{aligned}$$

This step is crucial because it transforms the inequality into a simpler linear form, making it easier to isolate Z.

Step 2: Isolate the Variable Term

Next, we want to isolate the term involving Z. To do this, subtract 3 from both sides:

$$\begin{aligned} & \backslash \\ & 3 - 3Z - 3 < 9 - 3 \\ & \backslash \end{aligned}$$

$$\begin{aligned} & \backslash \\ & -3Z < 6 \\ & \backslash \end{aligned}$$

It's important to perform the same operation on both sides to maintain the inequality's balance.

Step 3: Solve for Z

Now, divide both sides by -3 to get Z alone:

$$\begin{aligned} & \backslash \\ & Z > \frac{6}{-3} \\ & \backslash \end{aligned}$$

When dividing by a negative number, the inequality sign reverses:

$$\begin{aligned} & \backslash [\\ & Z < -2 \\ & \backslash] \end{aligned}$$

Result: The solution set is all Z values less than -2.

Interpreting the Solution

The inequality $\backslash (Z < -2 \backslash)$ indicates that any value of Z less than -2 satisfies the original inequality.

Graphical Representation:

- On a number line, this represents all points to the left of -2, not including -2 itself (since the inequality is strict).

Solution Set:

$$\begin{aligned} & \backslash [\\ & \boxed{\text{All real numbers } Z \text{ such that } Z < -2} \\ &] \end{aligned}$$

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Features and Tips for Solving Similar Inequalities

Understanding how to approach inequalities like this is vital. Here are some features and best practices:

- Distributive Property is Fundamental: Always start by expanding expressions to simplify the inequality.**
- Maintain the Inequality Direction: When multiplying or dividing both sides by a negative, flip the inequality sign.**
- Check Your Work: After solving, substitute a value from your solution set into the original inequality to verify correctness.**
- Be Careful with Strict Inequalities: Remember that inequalities like "<" or ">" do not include the boundary point.**

Common Mistakes to Avoid

- **Neglecting to flip the inequality sign when dividing by a negative number:** This is a frequent error that leads to incorrect solutions.
- **Forgetting to distribute properly:** Skipping distribution can cause mistakes in the solution process.
- **Assuming the solution set includes the boundary:** Since the inequality is strict, the boundary point ($Z = -2$) is not included.

Different Types of Inequalities and Their Solutions

While the current example involves a linear inequality, understanding the broader context helps:

- **Linear Inequalities:** As in this case, can be solved similarly to equations, with careful attention to sign changes.
- **Quadratic Inequalities:** Involve second-degree polynomials and often require factoring or graphing.
- **Rational Inequalities:** Involve fractions and require finding common denominators and

analyzing critical points.

- Absolute Value Inequalities: Require considering both positive and negative cases.**

Each type demands a slightly different approach, but the principles of distribution, isolation, and sign management remain central.

Practical Applications of Solving Inequalities

Understanding how to solve inequalities is not just an academic exercise; it has real-world applications:

- Budgeting: Determining acceptable ranges for expenses or income.**
- Physics: Calculating ranges of values such as speed, force, or energy.**
- Business and Economics: Analyzing profit margins, production limits, or investment thresholds.**
- Engineering: Ensuring safety parameters stay within certain bounds.**

Mastering inequalities enhances problem-solving

skills across various disciplines.

Advanced Tips and Tricks

- Use Graphing Tools: Visualize inequalities using graphing calculators or software to better understand solution sets.**
- Practice with Word Problems: Apply concepts to real-world scenarios for better comprehension.**
- Learn to Solve Compound Inequalities: These involve multiple inequalities combined with "and" or "or" logic.**
- Check for Extraneous Solutions: Especially in inequalities involving squares or roots, verify solutions satisfy the original inequality.**

Conclusion

The problem "Plz Help- Solve The Inequality- $3(1 - Z) < 9$ Use Distributive Property" exemplifies fundamental algebraic techniques that are

essential for tackling a wide range of mathematical problems. By systematically applying the distributive property, isolating the variable, and carefully managing the inequality sign, one can arrive at the correct solution efficiently. The key takeaway is that understanding the properties of algebra, especially the distributive property, is crucial for simplifying expressions and solving inequalities accurately.

Remember, practice makes perfect. Work through similar problems, verify your solutions, and develop an intuition for how inequalities behave under various transformations. This not only enhances your algebraic skills but also prepares you for more complex mathematical challenges ahead.

Happy solving!

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