Which Are Correct Representations Of The Inequality 3(2x 5) < 5(2 X)? Select Two Options.x < 56x

Understanding the Inequality: Which Are Correct Representations Of the Inequality 3(2x + 5) < 5(2x)? Select Two Options: x < 56x

Which Are Correct Representations Of The Inequality 3(2x + 5) < 5(2x)? Select Two Options: x < 56x

Mathematics often involves translating word problems or algebraic expressions into inequalities that can be analyzed and solved. The inequality *3(2x + 5) < 5(2x)* is one such expression, and understanding its correct algebraic representations is essential for solving it accurately. In this article, we will explore the process of rewriting this inequality, identify the correct forms among various options, and provide a comprehensive explanation of how to arrive at these correct representations.

Breaking Down the Inequality: Step-by-Step Approach

Step 1: Expand Both Sides

To analyze the inequality, the first step is to expand both sides of the inequality to eliminate parentheses:

- Left side: 3(2x + 5) = 3 2x + 3 5 = 6x + 15
- Right side: 5(2x) = 5 2x = 10x

Step 2: Rewrite the Inequality

After expansion, the inequality becomes:

6x + 15 < 10x

Step 3: Isolate the Variable x

To solve for x, we need to bring all x terms to one side and constants to the other:

1. Subtract 6x from both sides:

$6x + 15 - 6x < 10x - 6x$

$15 < 4x$

1. Divide both sides by 4 (assuming $4 \neq 0$):

$15/4 < x$

Correct Algebraic Representation of the Inequality

Understanding the Solution

The key step here is recognizing that the inequality simplifies to:

- **x > 15/4**

This indicates that x should be greater than 3.75 for the original inequality to hold true. Notice that the inequality sign flips when dividing or multiplying by a negative number, but in this case, we're dividing by a positive number, so the sign remains the same.

Expressing the Solution in Different Forms

Based on the simplified solution, the correct representations include:

- Representation in inequality form: **x > 15/4**
- In decimal form: **x > 3.75**

Analyzing the Given Options and Their Validity

Option 1: x < 56x

Let's analyze whether this is a correct representation of the original inequality.

Starting with the original inequality:

$$3(2x + 5) < 5(2x)$$

$$6x + 15 < 10x$$

Subtract 6x from both sides:

$$15 < 4x$$

Divide both sides by 4:

$$15/4 < x$$

This simplifies to:

$$x > 3.75$$

Now, check the option:

$$x < 56x$$

This inequality can be rearranged as:

$$x - 56x < 0$$

$$-55x < 0$$

If we divide both sides by -55 (remember, dividing by a negative flips the inequality sign):

```
x > 0
```

Therefore, the inequality $x < 56x$ simplifies to $x > 0$. Since our original inequality's solution is $x > 3.75$, this means $x > 3.75$ implies $x > 0$. So, $x < 56x$ is a broader inequality that includes all x greater than 0, which also includes all solutions of the original inequality ($x > 3.75$). Therefore, this inequality is consistent with the original inequality in terms of the solution set, but it is not an exact or precise representation of the original inequality itself. Instead, it is a different inequality that encompasses a wider range of x-values.

Option 2: x > 15/4

This is the exact solution derived from the original inequality after simplification:

```
6x + 15 < 10x
```

```
15 < 4x
```

```
x > 15/4
```

Hence, this is a correct representation of the solution to the original inequality.

Summary of Correct Representations

- **x > 15/4** — the exact algebraic form of the solution.
- **x > 3.75** — the decimal form of the solution.
- While $x < 56x$ simplifies to $x > 0$, it does not precisely represent the original inequality, but it is compatible in terms of the solution set since it includes all $x > 3.75$.

Conclusion: Identifying the Correct Options

Based on the detailed analysis, the two correct options that accurately represent the inequality are:

1. **x > 15/4**
2. **x > 3.75**

These options directly reflect the solution obtained after expanding, simplifying, and isolating x in the original inequality *3(2x + 5) < 5(2x)*. The option involving *x < 56x* is more of an inequality that encompasses the solution set but does not serve as a precise representation of the original inequality.

Final Remarks on Solving Inequalities

When working with inequalities, it is crucial to:

- Expand expressions carefully to eliminate parentheses.
- Bring variables to one side and constants to the other.
- Divide or multiply both sides by positive numbers to solve for the variable without flipping the inequality sign.
- Remember that dividing or multiplying both sides by negative numbers requires flipping the inequality sign.
- Express the solution in both inequality and decimal forms for clarity.

Mastering these steps ensures accurate translation and solution of inequalities, enabling effective problem-solving in algebra and beyond.

Frequently Asked Questions

Which of the following are correct representations of the inequality 3(2x + 5) < 5(2x)?

x < 56x and 6x + 15 < 10x

Is the inequality x < 56x a valid representation of 3(2x + 5) < 5(2x)?

Yes, because simplifying 3(2x + 5) < 5(2x) leads to the inequality x < 56x.

What is the correct simplified form of the inequality 3(2x + 5) < 5(2x)?

6x + 15 < 10x

Among the options, which are correct representations of the original inequality?

x < 56x and 6x + 15 < 10x

Does the inequality x < 56x imply any restrictions on x?

Yes, it suggests that x is less than 56 times itself, which simplifies to x < 56x.

Are both x < 56x and 6x + 15 < 10x valid representations of the inequality 3(2x + 5) < 5(2x)?

Yes, both are correct after simplifying the original inequality.

Additional Resources

Which Are Correct Representations Of The Inequality 3(2x - 5) < 5(2x)? Select Two Options. x < 56x

Understanding inequalities is fundamental in algebra, offering insights into the relationships between variables. Among the common challenges learners face is translating complex algebraic expressions into correct inequality representations. A typical question involves determining which inequalities correctly represent a given statement. In this case, we analyze the inequality: 3(2x - 5) < 5(2x), and identify the two correct options among various choices, including the option: x < 56x. This article provides a detailed, step-by-step breakdown of how to interpret, manipulate, and verify such inequalities, ensuring clarity for students and enthusiasts alike.

The Core Inequality: Understanding the Statement

At the heart of this discussion lies the inequality:

3(2x - 5) < 5(2x)

This expression involves algebraic terms multiplied by constants, and the goal is to find all values of x that satisfy this inequality. To do so, we first need to interpret the expression accurately and then manipulate it to an equivalent, simplified form.

Step 1: Expanding Both Sides

The first logical step in analyzing the inequality is to expand the expressions on both sides:

- Left side: 3(2x - 5)
- Right side: 5(2x)

Expanding:

- Left: 3 2x - 3 5 = 6x - 15
- Right: 5 2x = 10x

So, the inequality becomes:

6x - 15 < 10x

Step 2: Isolating the Variable

To analyze the solution set, gather like terms involving x on one side and constants on the other:

Subtract 6x from both sides:

6x - 15 - 6x < 10x - 6x

Simplifies to:

-15 < 4x

Next, divide both sides by 4 to isolate x:

(-15)/4 < x

Or equivalently:

x > -15/4

This is the solution in its simplest form: x > -3.75.

Step 3: Interpreting the Solution

The inequality x > -3.75 indicates that any real number greater than -15/4 satisfies the original inequality.

Now, let’s examine the options to see which expressions correctly represent this relationship.

Analyzing the Given Options

The question asks to select two options that correctly represent the inequality, including the sample option: x < 56x.

Note: The options are likely in the form of inequalities involving x, and perhaps other expressions derived from the original or manipulated inequality.

Option 1: $x < 56x$

At first glance, this seems unusual because it involves the same variable on both sides, with a large coefficient. Let's analyze whether this inequality is equivalent to the original.

- Starting with: $x < 56x$
- Subtract x from both sides:

$x - x < 56x - x$

Simplifies to:

$0 < 55x$

- Now, divide both sides by 55:

$0 < x$

So, the inequality $x > 0$.

Conclusion: The inequality $x < 56x$ is equivalent to $x > 0$.

Does this match the original solution?
Recall, the original solution was $x > -15/4$ (~ -3.75).
Since $x > 0$ is a stricter condition than $x > -3.75$, it only covers the positive real numbers, which is a subset of the original solution set. Therefore, $x < 56x$ (which simplifies to $x > 0$) is not an exact representation of the original inequality, but it is a valid inequality that is implied by the original (since the original includes all $x > -3.75$, which includes $x > 0$).

However, since the question asks for correct representations of the original inequality, and $x > -15/4$, the inequality $x > 0$ (from $x < 56x$) is a subset of the solution set, but not an exact representation.

Option 2: $x > -15/4$

This directly matches the simplified solution from the original inequality.

Conclusion: This is a correct representation of the original inequality.

Additional Options and Their Validity

Suppose the question provides other options such as:

- x > -3.75 (exact equivalent)
- x ≥ -3.75 (including equality, which is invalid here since the original is strict `<`)
- x < -3.75 (incorrect, as it reverses the inequality)
- x > 0 (valid but more restrictive)

From these, the correct options are:

- x > -15/4 (direct equivalent)
- x > 0 (only if the problem specifies that the inequality can be relaxed, but strictly speaking, it's a subset, not an equivalent)

Given the context, the two options most likely considered correct are:

1. The exact solution: x > -15/4
2. The inequality x < 56x, which simplifies to x > 0, representing a subset of the solution set.

Clarifying the Role of the Inequality x < 56x

The inclusion of x < 56x in the options appears to be a way to test understanding of inequalities involving variable coefficients. As demonstrated, x < 56x simplifies to x > 0, which is a part of the original solution set x > -15/4 but not enough to fully describe it.

Thus, selecting x > -15/4 and x < 56x (which simplifies to x > 0) captures the core solution, with the latter being a subset.

Conclusion: Which Are Correct?

Based on the algebraic analysis, the two correct representations of the inequality 3(2x - 5) < 5(2x) are:

- x > -15/4 — the precise solution derived directly from the inequality.
- x < 56x — which simplifies to x > 0, representing a subset of the solution set.

Note: It's important to recognize that while x > -15/4 fully captures the solution, x < 56x (or x > 0) is a partial, yet valid, representation.

Final Remarks: The Importance of Precise Translation

In algebra, the key to solving inequalities lies in carefully expanding, simplifying, and accurately interpreting the results. This process ensures that the selected representations genuinely reflect the original problem's constraints. When analyzing options, it's crucial to understand whether they are equivalent, subsets, or supersets of the solution set, which impacts their validity.

In educational contexts, exercises like these sharpen students' skills in manipulating inequalities, understanding their solution sets, and expressing them correctly. Mastery of these concepts enhances problem-solving capabilities, essential in higher mathematics and various applied fields.

In summary, the correct representations of the inequality $3(2x - 5) < 5(2x)$ are:

- $x > -15/4$ (the exact, direct solution)
- $x < 56x$, which simplifies to $x > 0$, capturing part of the solution set.

By understanding the algebraic steps and logical implications, students can confidently identify valid inequality representations and deepen their grasp of algebraic reasoning.

Which Are Correct Representations Of The Inequality 3 2x 5 Lt 5 2 X Select Two Options X Lt 56x

Which Are Correct Representations Of The Inequality 3 2x 5 Lt 5 2 X Select Two Options X Lt 56x

Related Articles

- Use The References To Access Important Values If Needed For This Question. For The Following Reaction,
- What Is Sarah's Opportunity Cost Of Buying A Breakfast Combo? The Following Graph Shows Sarah's Budget
- What Are The Similarities And Differences Between The Declaration Of Sentiments And The Declaration Of

Back to Home