Solve.7n - 5 > -2n + 4

Solving the Inequality: 7n - 5 > -2n + 4

Let's begin by examining the inequality **7n - 5 > -2n + 4**. This inequality involves a variable, n, on both sides, and our goal is to find all values of n that satisfy this relation. Solving such inequalities requires a systematic approach to isolate the variable and interpret the solution set correctly. In this article, we'll walk through the process step-by-step, explore the properties involved, and discuss how to represent the solution effectively.

Understanding the Components of the Inequality

What Is an Inequality?

An inequality is a mathematical statement that compares two expressions using inequality signs such as > (greater than), < (less than), ≥ (greater than or equal to), and ≤ (less than or equal to). Unlike equations, inequalities do not assert that two sides are equal but rather that one side is larger or smaller than the other.

Specifics of the Inequality 7n - 5 > -2n + 4

This particular inequality contains the variable n on both sides, which means we need to perform algebraic operations to gather all terms containing n on one side and constants on the other. The goal is to manipulate the inequality to a form like n > some value or n < some value, which makes the solution clear.

Step-by-Step Solution Process

Step 1: Write down the inequality

- 7n - 5 > -2n + 4

Step 2: Get all variable terms on one side

To do this, add 2n to both sides to move the n terms to the left:

- 7n + 2n - 5 > 4
- 9n - 5 > 4

Step 3: Isolate the term with n

Add 5 to both sides to move constants to the right:

- 9n > 4 + 5
- 9n > 9

Step 4: Solve for n

Divide both sides by 9 to isolate n:

- n > 9 / 9
- n > 1

Interpreting the Solution

Solution Set

The solution to the inequality **7n - 5 > -2n + 4** is **n > 1**. This means that any value of n greater than 1 satisfies the original inequality.

Expressing the Solution

The solution can be written in several ways:

- Using inequalities: **n > 1**
- In interval notation: **(1, ∞)**

- Graphically: a number line with an open circle at 1 and shading to the right indicating n can be any number greater than 1

Understanding the Properties Used in the Solution

Properties of Inequalities

When solving inequalities, several properties are essential:

1. **Addition Property:** You can add the same number to both sides without reversing the inequality sign.

2. **Subtraction Property:** Subtracting the same number from both sides preserves the inequality.

3. **Multiplication/Division Property:** Multiplying or dividing both sides by a positive number keeps the inequality sign the same. However, multiplying or dividing both sides by a negative number reverses the inequality sign.

Application in Our Problem

In our case, all operations involved addition, subtraction, and division by a positive number (9), so no reversal of the inequality sign was necessary.

Additional Examples and Variations

Example 1: Inequality with Negative Coefficients

Suppose the inequality was **-3n + 2 > 4n - 5**. The process would involve similar steps, but attention must be given when dividing or multiplying by negative numbers, as the inequality sign must be reversed.

Example 2: Inequalities with Multiple Terms

Consider the inequality **2n + 3 > n - 4 + 2n**. Combining like terms and isolating n would still follow the same principles but may involve more

steps.

Common Mistakes to Avoid

- **Forgetting to reverse the inequality sign when multiplying or dividing by negative numbers.**
- **Incorrectly combining like terms.**
- **Not checking the solution by substituting values.**

Verifying the Solution

To ensure correctness, pick a number greater than 1 (e.g., n=2) and test it in the original inequality:

- Left side: 7(2) - 5 = 14 - 5 = 9
- Right side: -2(2) + 4 = -4 + 4 = 0

Since 9 > 0 is true, n=2 satisfies the inequality. Similarly, try n=0.5 (which is not greater than 1):

- Left: 7(0.5) - 5 = 3.5 - 5 = -1.5
- Right: -2(0.5) + 4 = -1 + 4 = 3

Since -1.5 > 3 is false, the solution n > 1 is consistent.

Conclusion

Solving inequalities like **7n - 5 > -2n + 4** involves a clear sequence of algebraic steps: combining like terms, isolating the variable, and dividing by the coefficient. Understanding the properties of inequalities, especially the importance of reversing the inequality sign when multiplying or dividing by negative numbers, is crucial for obtaining correct solutions. The final result, n > 1, indicates all numbers greater than 1 satisfy the original inequality. Mastery of these steps and principles enhances problem-solving skills in algebra and prepares learners for more complex inequalities and mathematical reasoning.

Frequently Asked Questions

How do I solve the inequality 7n - 5 > -2n + 4?

To solve 7n - 5 > -2n + 4, first add 2n to both sides: 7n + 2n - 5 > 4. Simplify: 9n - 5 > 4. Next, add 5 to both sides: 9n > 9. Finally, divide both sides by 9: n > 1.

What is the solution to the inequality 7n - 5 > -2n + 4?

The solution is all values of n greater than 1, written as n > 1.

How can I verify if n = 2 satisfies the inequality 7n - 5 > -2n + 4?

Substitute n = 2: Left side: 7(2) - 5 = 14 - 5 = 9. Right side: -2(2) + 4 = -4 + 4 = 0. Since 9 > 0, n = 2 satisfies the inequality.

Is n = 0 a solution to 7n - 5 > -2n + 4?

Check by substituting n = 0: Left side: 7(0) - 5 = -5. Right side: -2(0) + 4 = 4. Since -5 > 4 is false, n = 0 is not a solution.

What steps are involved in solving inequalities like 7n - 5 > -2n + 4?

The steps include: isolating the variable by adding or subtracting terms, combining like terms, and then dividing or multiplying to solve for the variable, ensuring to reverse the inequality when multiplying or dividing by negative numbers.

Additional Resources

Solve.7n - 5 > -2n + 4: A Comprehensive Guide to Solving Inequalities

When tackling algebraic inequalities, understanding how to manipulate and interpret the expressions is crucial. The inequality Solve.7n - 5 > -2n + 4 presents an excellent opportunity to explore the step-by-step process of solving for the variable n. Whether you're a student brushing up on algebra skills or someone seeking to deepen your understanding of inequalities, this guide offers detailed explanations, strategies, and tips to confidently approach similar problems.

Understanding the Inequality

Before jumping into the solution, let's interpret what the inequality 7n - 5 > -2n + 4 represents. At its core, an inequality compares two expressions and determines the range of values the variable can take to satisfy the statement.

- Left side: 7n - 5
- Right side: -2n + 4

The goal is to isolate n on one side to find all possible values satisfying the inequality.

Step-by-Step Solution Breakdown

Step 1: Write Down the Original Inequality

Begin with the inequality as given:

7n - 5 > -2n + 4

Step 2: Collect Like Terms

To simplify, gather all terms containing n on one side and constants on the other.

- To do this efficiently, add 2n to both sides to move all n terms to the left:

`7n + 2n - 5 > -2n + 2n + 4`

which simplifies to:

`9n - 5 > 4`

- Note: This step leverages the property that adding the same number to both sides preserves the inequality's validity.

Step 3: Isolate the Variable Term

Next, add 5 to both sides to move constants to the right:

`9n - 5 + 5 > 4 + 5`

simplifying to:

`9n > 9`

Step 4: Solve for n

Divide both sides by 9:

`(9n) / 9 > 9 / 9`

which simplifies to:

`n > 1`

Interpreting the Solution

The solution to the inequality 7n - 5 > -2n + 4 is n > 1. This indicates that any value of n greater than 1 will satisfy the original inequality.

Visualizing the Solution on the Number Line

- Draw a number line.
- Mark the point n = 1.
- Shade the region to the right of 1, indicating all n greater than 1.
- Use an open circle at 1 to show that n cannot be equal to 1 (since the inequality is strict).

Additional Considerations

1. Strict vs. Non-Strict Inequalities

In this problem, the inequality is strict (>). If it were ≥, the solution would include n = 1. Always pay attention to the inequality symbol.

2. Multiplying or Dividing by Negative Numbers

If at any point you need to multiply or divide both sides by a negative number, remember to reverse the inequality sign.

For example, if the inequality had a negative coefficient for n, and you divided both sides by it, you'd flip the inequality.

3. Checking the Solution

Choose a test value greater than 1, say n = 2:

- Left side: 7(2) - 5 = 14 - 5 = 9
- Right side: -2(2) + 4 = -4 + 4 = 0

Since 9 > 0, the inequality holds.

Try n = 1:

- Left: 7(1) - 5 = 7 - 5 = 2
- Right: -2(1) + 4 = -2 + 4 = 2

2 > 2? No, it's equal, so n = 1 does not satisfy the strict inequality. This confirms the solution n > 1.

Common Mistakes to Avoid

- Ignoring the inequality direction when multiplying/dividing by negatives.
- Forgetting to flip the inequality sign.
- Incorrectly handling the constants or combining like terms.
- Assuming the solution includes the boundary point for strict inequalities.

Practice Problems

To reinforce your understanding, try solving these inequalities:

1. 3x + 4 < 2x - 5
2. -5m + 7 ≥ 2m - 3
3. 2(3k - 4) > 5k + 1
4. -4p + 8 < -p + 2

Solutions involve similar steps: isolate the variable, carefully perform operations, and interpret the solution.

Conclusion

Solving inequalities like 7n - 5 > -2n + 4 involves systematic steps: simplifying, isolating the variable, and interpreting the solution. Remember to pay attention to the inequality symbol, especially when multiplying or dividing by negative numbers, and always verify your solution with test values. Mastering these steps will empower you to handle a wide range of inequality problems confidently, a vital skill in algebra and beyond.

Happy solving!

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