lesson 8 skills practice solve two step inequalities answer key

Lesson 8 skills practice solve two-step inequalities answer key is an essential component in mastering algebraic concepts. Understanding how to solve inequalities is a fundamental skill that helps students progress into more complex mathematical topics. This article will delve into the specifics of two-step inequalities, provide illustrative examples, and culminate in an answer key that can serve as a useful study tool.

Understanding Two-Step Inequalities

Two-step inequalities are mathematical expressions that involve a variable, require two operations to solve, and typically have a greater than (>) or less than (<) sign. Solving these inequalities is akin to solving equations, but with the added nuance of directionality that the inequality symbol provides.

What Is an Inequality?

An inequality is a relation that holds between two values when they are not equal. These relationships can be represented using symbols such as:

- Greater than (>)
- Less than (<)
- Greater than or equal to (≥)
- Less than or equal to (≤)

For example, the inequality $x + 3 < 7$ states that the value of $x + 3$ is less than 7.

Why Are Two-Step Inequalities Important?

Two-step inequalities are significant for several reasons:

1. Foundation for Advanced Topics: They serve as a stepping stone to more complex inequalities and functions in algebra.
2. Real-World Applications: Inequalities can be used to describe constraints in various fields such as economics, engineering, and science.
3. Critical Thinking: Solving inequalities enhances problem-solving skills and logical reasoning.

Steps to Solve Two-Step Inequalities

Solving two-step inequalities involves a systematic approach similar to solving equations. Here are the steps:

1. Isolate the variable: Use inverse operations to get the variable on one side of the inequality.
2. Apply operations: Perform arithmetic operations while maintaining the direction of the inequality.
3. Graph the solution: If necessary, represent the solution on a number line to visualize the range of possible values.

Example Problems

To illustrate how to solve two-step inequalities, let’s consider the following examples:

Example 1: Solve $2x + 3 > 7$

1. Subtract 3 from both sides:
$$
2x + 3 - 3 > 7 - 3 \\
2x > 4
$$

2. Divide both sides by 2:
$$
\frac{2x}{2} > \frac{4}{2} \\
x > 2
$$

Example 2: Solve $3x - 5 \leq 4$

1. Add 5 to both sides:
$$
3x - 5 + 5 \leq 4 + 5 \\
3x \leq 9
$$

2. Divide both sides by 3:
$$
\frac{3x}{3} \leq \frac{9}{3} \\
x \leq 3
$$

Example 3: Solve $-4x + 6 < 10$

1. Subtract 6 from both sides:

$$
-4x + 6 - 6 < 10 - 6 \\
-4x < 4
$$

2. Divide both sides by -4 (note that the inequality sign flips):
$$
\frac{-4x}{-4} > \frac{4}{-4} \\
x > -1
$$

Practice Problems

To reinforce the understanding of two-step inequalities, here are some practice problems:

1. $5x + 2 < 17$
2. $-3x - 4 > 2$
3. $4 - 2x \leq 10$
4. $7 + 3x > 1$
5. $-2x + 8 < 0$

Answer Key for Practice Problems

Here is the detailed answer key for the practice problems listed above:

1. Problem: $5x + 2 < 17$
Solution:
- Subtract 2: $5x < 15$
- Divide by 5: $x < 3$

2. Problem: $-3x - 4 > 2$
Solution:
- Add 4: $-3x > 6$
- Divide by -3 (flip the inequality): $x < -2$

3. Problem: $4 - 2x \leq 10$
Solution:
- Subtract 4: $-2x \leq 6$
- Divide by -2 (flip the inequality): $x \geq -3$

4. Problem: $7 + 3x > 1$
Solution:
- Subtract 7: $3x > -6$
- Divide by 3: $x > -2$

5. Problem: $-2x + 8 < 0$
Solution:
- Subtract 8: $-2x < -8$
- Divide by -2 (flip the inequality): $x > 4$

Conclusion

Understanding and practicing two-step inequalities is crucial in developing a strong foundation in algebra. By following the steps outlined and utilizing the provided examples, students can approach these problems confidently. The lesson 8 skills practice solve two-step inequalities answer key serves as a valuable resource for self-assessment and guided learning. As students engage with these inequalities, they not only prepare for future mathematical challenges but also enhance their analytical skills, benefiting them in various academic and real-world contexts.

Frequently Asked Questions

What is a two-step inequality?

A two-step inequality is a mathematical statement that involves a variable, two operations (like addition or multiplication), and a relational symbol (like <, >, ≤, or ≥).

How do you solve a two-step inequality?

To solve a two-step inequality, you first isolate the variable by performing the opposite operations in reverse order, and then you simplify each side of the inequality.

What should you do when multiplying or dividing by a negative number in an inequality?

When you multiply or divide both sides of an inequality by a negative number, you must reverse the direction of the inequality sign.

Can you provide an example of a two-step inequality?

Sure! An example is $3x + 5 < 14$. To solve it, subtract 5 from both sides to get $3x < 9$, then divide by 3 to find $x < 3$.

What is the solution set for the inequality 2x - 1 >

5?

To solve 2x - 1 > 5, add 1 to both sides to get 2x > 6, and then divide by 2 to find x > 3. The solution set is all values greater than 3.

How do you graph a solution to a two-step inequality on a number line?

To graph a two-step inequality solution on a number line, draw a line indicating all possible values of the variable. Use an open circle for inequalities that do not include the endpoint (like < or >) and a closed circle for those that do (like ≤ or ≥).

What is the difference between solving equations and inequalities?

When solving equations, the goal is to find the exact value of the variable. In contrast, solving inequalities provides a range of possible values for the variable based on the relational symbols.

Why is it important to include the correct inequality symbol in your answer?

Including the correct inequality symbol is crucial because it conveys the precise relationship between the variable and the numbers involved, defining the solution set accurately.

What is the first step in solving the inequality 4 - 2x ≤ 10?

The first step is to subtract 4 from both sides, resulting in -2x ≤ 6. Then, divide both sides by -2, remembering to reverse the inequality sign, giving x ≥ -3.

How do you check if your solution to a two-step inequality is correct?

To check if your solution is correct, choose a number from the solution set and substitute it back into the original inequality. If the resulting statement is true, your solution is correct.

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Key

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