

Study Guide

Solving Inequalities by Using Addition and Subtraction

You can use the addition and subtraction properties for inequalities when solving problems involving inequalities.

Addition and Subtraction Properties for Inequalities

For all numbers a , b , and c ,

1. if $a > b$, then $a + c > b + c$ and $a - c > b - c$;
2. if $a < b$, then $a + c < b + c$ and $a - c < b - c$.

Example: Solve $3a + 5 > 4 + 2a$.

$$\begin{aligned} 3a + 5 &> 4 + 2a \\ 3a - 2a + 5 &> 4 + 2a - 2a \\ a + 5 &> 4 \\ a + 5 - 5 &> 4 - 5 \\ a &> -1 \end{aligned}$$

The solution set is {all numbers greater than -1 }.

To check your solution, choose two numbers, one greater than -1 , and one less than -1 . Substitute both numbers in the original inequality. Only those numbers greater than -1 should yield a true statement.

The solution set in the above example, written in set-builder notation is $\{a \mid a > -1\}$. This is read “The set of all numbers a such that a is greater than -1 .”

Solve each inequality. Then check your solution.

1. $a + 4 < 14$

2. $9k - 12 > 80 + 8k$

3. $-19 + x < 2x - 33$

4. $6y > 14 - 2 + 7y$

5. $3n + 17 < 4n - 6$

6. $\frac{3}{2}q - \frac{25}{5} \geq \frac{2q}{4}$

7. $h + \frac{2}{3} \leq 2 - \frac{2}{3}$

8. $4p - 3.2 \geq 3p + 0.7$

9. $-2\frac{1}{2}z \leq 3\frac{1}{3} + 2\frac{1}{3} - 3\frac{1}{2}z$

10. $\frac{1}{b} + 4 \leq 10 + \frac{1}{b}, b \neq 0$

11. $6r > 10r - r - 3r$

12. $3.2x < 2x - (9 - 1.2x)$