

Lesson 6-1

Solving Inequalities by Addition and Subtraction

Main Ideas

Solve linear inequalities by using addition.

Solve linear inequalities by using subtraction.

New Vocabulary

set-builder notation



Standard 5.0 Students solve multi-step problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step. (Key, CAHSEE)



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KEY CONCEPT

Addition Property of Inequalities

Words If any number is added to each side of a true inequality, the resulting inequality is also true.

Symbols For all numbers a , b , and c , the following are true.

1. If $a > b$, then $a + c > b + c$.
2. If $a < b$, then $a + c < b + c$.

This property is also true when $>$ and $<$ are replaced with \geq and \leq .



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Solve by Adding

1 Solve $s - 12 > 65$. Check your solution.

$$s - 12 > 65 \quad \text{Original inequality}$$

$$s - 12 + 12 > 65 + 12 \quad \text{Add 12 to each side.}$$

$$s > 77 \quad \text{Simplify.}$$

Check To check, substitute 77, a number less than 77, and a number greater than 77.

Answer: The solution is the set {all numbers greater than 77}.



KEY CONCEPT

Subtraction Property of Inequalities

Words If any number is subtracted from each side of a true inequality, the resulting inequality is also true.

Symbols For all numbers a , b , and c , the following are true.

1. If $a > b$, then $a - c > b - c$.
2. If $a < b$, then $a - c < b - c$.

This property is also true when $>$ and $<$ are replaced with \geq and \leq .



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Variables on Each Side

3 Solve $12n - 4 \leq 13n$. Graph the solution.

$$12n - 4 \leq 13n$$

Original inequality

$$12n - 4 - 12n \leq 13n - 12n$$

Subtract $12n$ from each side.

$$-4 \leq n$$

Simplify.

Answer: Since $-4 \leq n$ is the same as $n \geq -4$, the solution set is $\{n \mid n \geq -4\}$.

