

3-6 Solving Inequalities by Adding or Subtracting

(Pages 146–150)

Solving inequalities that involve addition or subtraction is just like solving equations that involve addition or subtraction.

Addition and Subtraction Properties of Inequalities	<p>Adding or subtracting the same number from each side of an inequality does not change the truth of the inequality.</p> <p>For all numbers a, b, and c:</p> <ol style="list-style-type: none"> If $a > b$, then $a + c > b + c$ and $a - c > b - c$. If $a < b$, then $a + c < b + c$ and $a - c < b - c$. <p>The rules for $a \geq b$ and $a \leq b$ are similar.</p>
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EXAMPLES

A Solve $b + 18 > 53$.

$$\begin{aligned}
 b + 18 &> 53 \\
 b + 18 - 18 &> 53 - 18 && \text{Subtract 18 from each side.} \\
 b &> 35 && \text{Check your solution by} \\
 &&& \text{replacing } b \text{ with a number} \\
 &&& \text{greater than 35 in the original} \\
 &&& \text{inequality.}
 \end{aligned}$$

B Solve $n - 32 \leq 6$.

$$\begin{aligned}
 n - 32 &\leq 6 \\
 n - 32 + 32 &\leq 6 + 32 && \text{Add 32 to each side.} \\
 n &\leq 38 && \text{Check your solution by} \\
 &&& \text{replacing } n \text{ with 38 and a} \\
 &&& \text{number less than 38 in the} \\
 &&& \text{original inequality.}
 \end{aligned}$$

Try These Together

Solve each inequality and check your solution.

- $12 < n - 8$
- $p - 9 \leq 14$
- $c + (-8) > 2$

HINT: Adding the same number to each side or subtracting the same number from each side of an inequality does not change the truth of the inequality.

PRACTICE

Solve each inequality and check your solution.

- $t - (-7) \leq 21$
- $33 \geq 13 + s$
- $-19 < m - (-7)$
- $46 \geq a + 14$
- $r + (-5) > 27$
- $k + 34 \geq 15$
- $y - (-12) > 8$
- $20 \leq x + 3$
- $14 < z + (-8)$

13. Driving To pass the driver's test, you must complete both a written exam and a driving test. Your total score must be 70 or greater. Each portion of the test is worth 50 points. If you get a score of 40 on the written exam, what is the minimum score you must receive on the driving portion to pass the test?



14. Standardized Test Practice Thomas and Jan have saved \$15,000 to buy a house. They have found a house they like that sells for \$129,000. What is the least amount of money Thomas and Jan must borrow to buy the house?

- A** \$144,000 **B** \$114,000 **C** \$100,000 **D** \$500

Answers: 1. $20 < n$ 2. $p \leq 23$ 3. $c > 10$ 4. $t \leq 14$ 5. $s \leq 20$ 6. $-26 < m$ 7. $32 \geq a$ 8. $r > 32$ 9. $k \geq -19$ 10. $y > -4$ 11. $17 \leq x$ 12. $22 < z$ 13. 30 14. B
