

**5-4 Study Guide and Intervention****Solving Inequalities**

**Solve Inequalities by Adding or Subtracting** Use the Addition and Subtraction Properties of Inequalities to solve inequalities. When you add or subtract a number from each side of an inequality, the inequality remains true.

**Example** Solve  $12 + y > 20$ . Check your solution.

$$12 + y > 20 \quad \text{Write the inequality.}$$

$$12 - 12 + y > 20 - 12 \quad \text{Subtraction Property of Inequality}$$

$$y > 8 \quad \text{Simplify.}$$

To check your solution, try any number greater than 8.

**CHECK**  $12 + y > 20$  Write the inequality.

$$12 + 9 > 20 \quad \text{Replace } y \text{ with } 9.$$

$$21 > 20 \quad \checkmark \quad \text{This statement is true.}$$

Any number greater than 8 will make the statement true. Therefore, the solution is  $y > 8$ .

**Exercises**

Solve each inequality. Check your solution.

1.  $-12 < 8 + b$

2.  $t - 5 > -4$

3.  $p + 5 < -13$

4.  $5 > -6 + y$

5.  $21 < n - (-18)$

6.  $s - 4 \leq 3$

7.  $14 > w + (-2)$

8.  $j + 6 \geq -4$

9.  $z + (-4) < -2.5$

10.  $b - \frac{1}{4} < 2\frac{1}{4}$

11.  $g - 2\frac{1}{3} \geq 3\frac{1}{6}$

12.  $-2 + z < 5$

13.  $-10 \leq x - 5$

14.  $-23 \geq a + (-6)$

15.  $20 < m - 6$

16.  $1\frac{1}{2} + b > 7$

17.  $k + 5 \geq -7$

18.  $-\frac{2}{3} \leq w - 2$

# 5-4 Study Guide and Intervention *(continued)*

## Solving Inequalities

**Solve Inequalities by Multiplying or Dividing** Use the Multiplication and Division Properties of Inequalities to solve inequalities.

- When you multiply or divide each side of an inequality by a positive number, the inequality remains true. The direction of the inequality sign does not change.
- For an inequality to remain true when multiplying or dividing each side of the inequality by a negative number, however, you must reverse the direction of the inequality symbol.

**Example 1** Solve  $8x \geq 72$ . Check your solution.

$$8x \geq 72 \quad \text{Write the inequality.}$$

$$\frac{8x}{8} \geq \frac{72}{8} \quad \text{Division Property of Inequality}$$

$$x \geq 9 \quad \text{Simplify.}$$

The solution is  $x \geq 9$ . You can check this solution by substituting 9 or a number greater than 9 into the inequality.

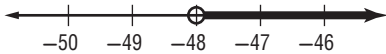
**Example 2** Solve  $\frac{y}{-12} < 4$ . Then graph the solution on a number line.

$$\frac{y}{-12} < 4 \quad \text{Write the inequality.}$$

$$-12\left(\frac{y}{-12}\right) > -12(4) \quad \text{Multiplication Property of Inequality}$$

$$y > -48 \quad \text{Simplify.}$$

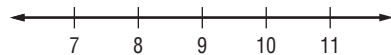
Graph the solution,  $y > -48$ .



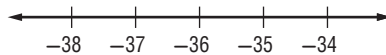
### Exercises

Solve each inequality. Then graph the solution on a number line.

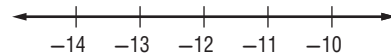
1.  $81 < 9d$



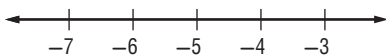
2.  $\frac{p}{3} < -12$



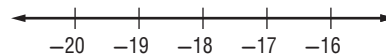
3.  $\frac{h}{-4} \geq 3$



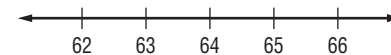
4.  $-20t \leq 100$



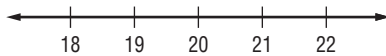
5.  $-\frac{2}{3}x > 12$



6.  $-16 \leq -\frac{1}{4}b$



7.  $-8 < \frac{c}{-2.5}$



8.  $\frac{n}{3} > 0.5$

