

# 3.5

## Solving Inequalities Using Multiplication or Division

**Goal:** Solve inequalities using multiplication or division.

### Multiplication Property of Inequality

**Words** Multiplying each side of an inequality by a *positive* number produces an equivalent inequality.

Multiplying each side of an inequality by a *negative* number and *reversing the direction of the inequality symbol* produces an equivalent inequality.

The multiplication properties of inequality are also true for inequalities involving  $>$ ,  $\leq$ , and  $\geq$ .

**Algebra** If  $a < b$  and  $c > 0$ , then  $ac$    $bc$ .

If  $a < b$  and  $c < 0$ , then  $ac$    $bc$ .

### Example 1 Solving an Inequality Using Multiplication

Solve  $\frac{m}{-4} > 2$ .

$$\frac{m}{-4} > 2$$

Write original inequality.

$$\boxed{\phantom{00}} \left( \frac{m}{-4} \right) \boxed{\phantom{00}} \boxed{\phantom{00}} \cdot 2$$

Multiply each side by .

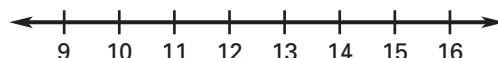
Reverse inequality symbol.

$$m \boxed{\phantom{00}} \boxed{\phantom{00}}$$

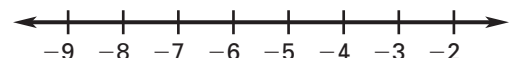
Simplify.

**✓ Checkpoint** Solve the inequality. Graph your solution.

1.  $\frac{t}{5} < 3$



2.  $\frac{b}{-8} \leq 1$



## Division Property of Inequality

**Words** Dividing each side of an inequality by a *positive* number produces an equivalent inequality.

Dividing each side of an inequality by a *negative* number and *reversing the direction of the inequality symbol* produces an equivalent inequality.

The division properties of inequality are also true for inequalities involving  $>$ ,  $\leq$ , and  $\geq$ .

**Algebra** If  $a < b$  and  $c > 0$ , then  $\frac{a}{c} \square \frac{b}{c}$ .

If  $a < b$  and  $c < 0$ , then  $\frac{a}{c} \square \frac{b}{c}$ .

### Example 2 Solving an Inequality Using Division

Solve  $-11t \geq 33$ .

$$-11t \geq 33$$

Write original inequality.

$$\begin{array}{r} -11t \\ \hline \square \\ t \end{array} \square \begin{array}{r} 33 \\ \hline \square \end{array}$$

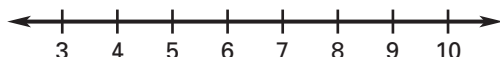
Divide each side by  $\square$ .

Reverse inequality symbol.

Simplify.

✓ **Checkpoint** Solve the inequality. Graph your solution.

3.  $4y \leq 36$



4.  $-3x > 12$

