EXAMPLE 2 **Solve an inequality using multiplication**

Solve $\dfrac{x}{-6} < 7$. Graph your solution.

$$\dfrac{x}{-6} < 7 \qquad \textbf{Write original inequality.}$$

$$-6 \cdot \dfrac{x}{-6} > -6 \cdot 7 \qquad \textbf{Multiply each side by } -6. \textbf{ Reverse inequality symbol.}$$

$$x > -42 \qquad \textbf{Simplify.}$$

AVOID ERRORS
Because you are multiplying by a negative number, be sure to reverse the inequality symbol.

▶ The solutions are all real numbers greater than -42. Check by substituting a number greater than -42 in the original inequality.
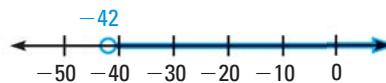
CHECK $\qquad \dfrac{x}{-6} < 7 \qquad \textbf{Write original inequality.}$

$$\dfrac{\mathbf{0}}{-6} \stackrel{?}{<} 7 \qquad \textbf{Substitute 0 for } x.$$

$$0 < 7 \checkmark \qquad \textbf{Solution checks.}$$

USING DIVISION The rules for solving an inequality using division are similar to the rules for solving an inequality using multiplication.

KEY CONCEPT *For Your Notebook*

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.

Algebra If $a < b$ and $c > 0$, then $\dfrac{a}{c} < \dfrac{b}{c}$. $\qquad$ If $a < b$ and $c < 0$, then $\dfrac{a}{c} > \dfrac{b}{c}$.

$\qquad$ If $a > b$ and $c > 0$, then $\dfrac{a}{c} > \dfrac{b}{c}$. $\qquad$ If $a > b$ and $c < 0$, then $\dfrac{a}{c} < \dfrac{b}{c}$.

$\qquad$ This property is also true for inequalities involving $\leq$ and $\geq$.

EXAMPLE 3 **Solve an inequality using division**

Solve $-3x > 24$.

$$-3x > 24 \qquad \textbf{Write original inequality.}$$

$$\dfrac{-3x}{-3} < \dfrac{24}{-3} \qquad \textbf{Divide each side by } -3. \textbf{ Reverse inequality symbol.}$$

$$x < -8 \qquad \textbf{Simplify.}$$

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