



Name \_\_\_\_\_ Date \_\_\_\_\_

## Solving Inequalities (Pages 318–321)

You can solve inequalities that have rational numbers in them the same way you solved inequalities with integers.

### Solving Inequalities

Use the same steps to solve an inequality as you use to solve an equation, with this one exception.

- When you **multiply or divide** an inequality by a **negative number**, the solution will have the **opposite inequality sign** from that in the original inequality.

### EXAMPLES

**A** Solve  $-3x < 12$ .

Solve the related equation  $-3x = 12$ .

$$-3x = 12$$

$$\frac{-3x}{-3} = \frac{12}{-3} \quad \text{Divide each side by } -3.$$

$$x = -4$$

Since you divided each side by  $-3$ , the solution to the inequality will contain a  $>$  sign instead of a  $<$  sign. The solution is  $x > -4$ .

**B** Solve  $\frac{y}{2} + 8 > 0$ .

Solve the related equation  $\frac{y}{2} + 8 = 0$ .

$$\frac{y}{2} + 8 = 0$$

$$\frac{y}{2} + 8 - 8 = 0 - 8 \quad \text{Subtract 8 from each side.}$$

$$\frac{y}{2} = -8$$

$$2\left(\frac{y}{2}\right) = 2(-8) \quad \text{Multiply each side by 2.}$$

$$y = -16$$

The solution to the inequality is  $y > -16$ .

### Try These Together

1. Solve  $-7c > -21$ .

*HINT: Will the solution have a  $>$  sign or a  $<$  sign?*

2. Solve  $j + 0.06 < 4.5$ .

*HINT: Solve the related equation by subtracting 0.06 from each side.*

### PRACTICE

Solve each inequality.

3.  $\frac{6}{5}p \geq 3$

4.  $-15 \leq -\frac{1}{5}x$

5.  $-\frac{8}{3}q > \frac{1}{2}$

6.  $\frac{k-5}{9} \geq -9$

7.  $\frac{m+1}{3} < 9\frac{1}{4}$

8.  $5 + 5v > 52$

9.  $-16a + 19 \geq 17\frac{1}{3}$

10.  $-\frac{2}{9}z + \frac{1}{6} \leq \frac{1}{4}$

11.  $\frac{2n-22}{2} > 9$



12. **Standardized Test Practice** Solve  $\frac{1}{3}s - 8 > 4\frac{1}{6}$ .

**A**  $s > 36\frac{1}{2}$

**B**  $s < 36\frac{1}{2}$

**C**  $s > -36\frac{1}{2}$

**D**  $s < -36\frac{1}{2}$

Answers: 1.  $c < 3$  2.  $j < 4.44$  3.  $p \geq 2\frac{1}{2}$  4.  $x \leq 75$  5.  $q < -\frac{16}{3}$  6.  $k \geq -76$  7.  $m < 26\frac{4}{3}$  8.  $v > 9\frac{5}{2}$  9.  $a \leq \frac{48}{5}$  10.  $z \geq -\frac{8}{3}$  11.  $n < 20$  12. A