

# 6.1

## Solve Inequalities Using Addition and Subtraction

**Goal** • Solve inequalities using addition and subtraction.

### Your Notes

#### VOCABULARY

Graph of a linear inequality in one variable **The set of points on a number line that represents all solutions of the inequality**

Equivalent inequalities **Inequalities that have the same solutions**

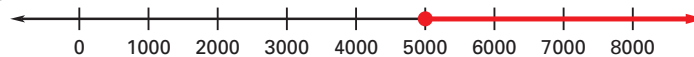
#### Example 1 Write and graph an inequality

**Food Drive** Your school wants to collect at least 5000 pounds of food for a food drive. Write and graph an inequality to describe the amount of food that your school hopes to collect.

#### Solution

Let  $p$  represent the number of pounds of food that the school hopes to collect. The value of  $p$  must be greater than or equal to 5000 pounds. So, an inequality is  $p \geq 5000$ .

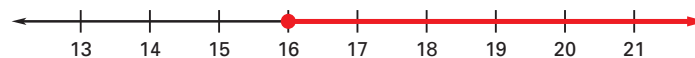
Remember to use an open circle for  $<$  or  $>$  and a closed circle for  $\leq$  or  $\geq$ .



✓ **Checkpoint** Complete the following exercise.

1. You must be 16 years old or older to get your driver's license. Write and graph an inequality to describe the ages of people who may get their driver's license.

$$a \geq 16$$



## Your Notes

### ADDITION PROPERTY OF INEQUALITY

**Words** Adding the same number to each side of an inequality produces an equivalent inequality.

**Algebra** If  $a > b$ , then  $a + c > \underline{b + c}$ .

If  $a < b$ , then  $a + c < \underline{b + c}$ .

If  $a \geq b$ , then  $a + c \geq \underline{b + c}$ .

If  $a \leq b$ , then  $a + c \leq \underline{b + c}$ .

### Example 2 Solve an inequality using addition

Solve  $n - 3.5 < 2.5$ . Graph your solution.

#### Solution

$$n - 3.5 < 2.5$$

Write original inequality.

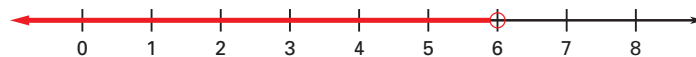
$$n - 3.5 + \underline{3.5} < 2.5 + \underline{3.5}$$

Add 3.5 to each side.

$$\underline{n < 6}$$

Simplify.

The solutions are all real numbers less than 6. Check by substituting a number less than 6 for  $n$  in the original inequality.



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

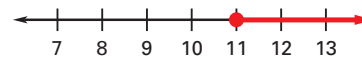
2.  $6 > y - 3.3$

$$y < \underline{9.3}$$



3.  $z - 7 \geq 4$

$$z \geq \underline{11}$$



## Your Notes

### SUBTRACTION PROPERTY OF INEQUALITY

**Words** Subtracting the same number from each side of an inequality produces an equivalent inequality.

**Algebra** If  $a > b$ , then  $a - c > \underline{b - c}$ .

If  $a < b$ , then  $a - c < \underline{b - c}$ .

If  $a \geq b$ , then  $a - c \geq \underline{b - c}$ .

If  $a \leq b$ , then  $a - c \leq \underline{b - c}$ .

### Example 3 Solve an inequality using subtraction

Solve  $3 \leq y + 8$ . Graph your solution.

#### Solution

$$3 \leq y + 8$$

Write original inequality.

$$3 - \underline{8} \leq y + 8 - \underline{8}$$

Subtract 8 from each side.

$$\underline{-5 \leq y}$$

Simplify.

You can rewrite  $\underline{-5 \leq y}$  as  $\underline{y \geq -5}$ . The solutions are all real numbers greater than or equal to  $-5$ .



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

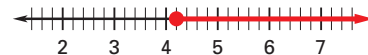
4.  $r + 3\frac{1}{4} < 5$

$$r < 1\frac{3}{4}$$



5.  $3 + m \geq 7.2$

$$m \geq 4.2$$



## Homework