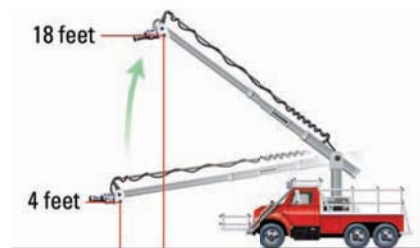


EXAMPLE 2 Write and graph a real-world compound inequality

CAMERA CARS A crane sits on top of a camera car and faces toward the front. The crane's maximum height and minimum height above the ground are shown. Write and graph a compound inequality that describes the possible heights of the crane.



Solution

Let h represent the height (in feet) of the crane. All possible heights are greater than or equal to 4 feet *and* less than or equal to 18 feet. So, the inequality is $4 \leq h \leq 18$.



SOLVING COMPOUND INEQUALITIES A number is a solution of a compound inequality with *and* if the number is a solution of *both* inequalities. A number is a solution of a compound inequality with *or* if the number is a solution of *at least one* of the inequalities.

EXAMPLE 3 Solve a compound inequality with *and*

Solve $2 < x + 5 < 9$. Graph your solution.

Solution

Separate the compound inequality into two inequalities. Then solve each inequality separately.

$$2 < x + 5 \quad \text{and} \quad x + 5 < 9 \quad \text{Write two inequalities.}$$

$$2 - 5 < x + 5 - 5 \quad \text{and} \quad x + 5 - 5 < 9 - 5 \quad \text{Subtract 5 from each side.}$$

$$-3 < x \quad \text{and} \quad x < 4 \quad \text{Simplify.}$$

The compound inequality can be written as $-3 < x < 4$.

► The solutions are all real numbers greater than -3 *and* less than 4.



✓ GUIDED PRACTICE for Examples 2 and 3

3. INVESTING An investor buys shares of a stock and will sell them if the change c in value from the purchase price of a share is less than $-\$3.00$ or greater than $\$4.50$. Write and graph a compound inequality that describes the changes in value for which the shares will be sold.

Solve the inequality. Graph your solution.

4. $-7 < x - 5 < 4$

5. $10 \leq 2y + 4 \leq 24$

6. $-7 < -z - 1 < 3$