Section 4.2 Compound Inequalities

Two inequalities joined by the words **and** or **or** are called **compound inequalities**.

# Objective 1: Solving Compound Inequalities Containing “and”

A value is a solution of a compound inequality containing **and** if it is a solution of both inequalities. For example, the solution set of the compound inequality $x\leq 5$ and $x\geq 3$ contains all values of $x$ that make both statements true. The first graph shown below is the graph of $x\leq 5$. The second graph is the graph of $x\geq 3$. The third graph shows the intersection of the two graphs. This graph shows the solution set of the compound inequality $x\leq 5$ and $x\geq 3$.



This compound inequality can also be written as $3\leq x\leq 5$.

Solve the compound inequality. Graph the solution set on the number line.

a.$ -2<2x-8<6$



b. $-1\leq \frac{2}{3}x+3<4$



c. $0\leq \frac{4-x}{5}\leq 2$



# Objective 2: Solving Compound Inequalities Containing “or”

A value is a solution of a compound inequality containing **or** if it is a solution of either inequality. For example, the solution set of the compound inequality $x\leq 1$ or $x\geq 3$ contains all values of $x$ that make the inequality $x\leq 1$ a true statement or the inequality $x\geq 3$ a true statement. The first graph shown below is the graph of $x\leq 1$. The second graph is the graph of $x\geq 3$. The third shows the union of the two graphs. This graphs shows the solution set of the compound inequality $x\leq 1$ or $x\geq 3$.



Solve the compound inequality. Graph the solution set on the number line.

a.$ 5x-3\leq 10$ or $x+1\geq 5$



b. $5\left(x-2\right)<5$ or $x+9>10$

