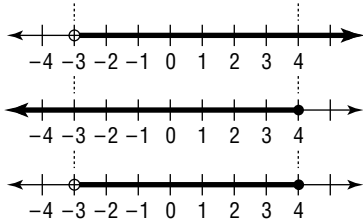


## Study Guide

## Solving Compound Inequalities

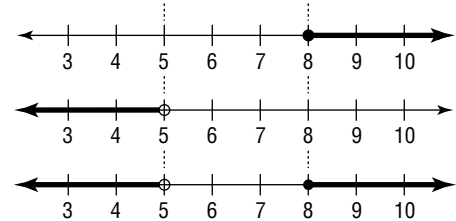
A **compound inequality** consists of two inequalities that are connected by the words *and* or *or*. A compound inequality containing *and* is true only if *both* inequalities are true. Its graph is the **intersection** of the graphs of the two inequalities. A compound inequality containing *or* is true if one or more of the inequalities is true. Its graph is the **union** of the graphs of the two inequalities.

**Example 1:**  $x > -3$  and  $x \leq 4$



The solution set, shown in the bottom graph, is  $\{x \mid -3 < x \leq 4\}$ .

**Example 2:**  $t \geq 8$  or  $t < 5$

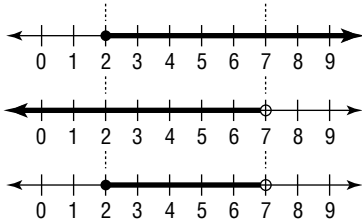


The solution set is  $\{t \mid t \geq 8 \text{ or } t < 5\}$ .

Sometimes it is better to first solve each inequality and then graph the solution. Study the examples below.

**Example 3:**  $-3 \leq p - 5 < 2$

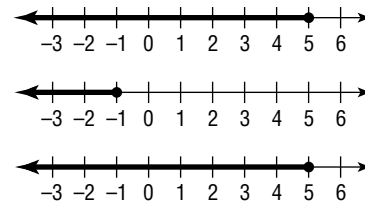
$$\begin{aligned} -3 \leq p - 5 & \quad \text{and} \quad p - 5 < 2 \\ -3 + 5 \leq p - 5 + 5 & \quad p - 5 + 5 < 2 + 5 \\ 2 \leq p & \quad p < 7 \end{aligned}$$



The solution set is  $\{p \mid 2 \leq p < 7\}$ .

**Example 4:**  $2a + 1 < 11$  or  $a > 3a + 2$

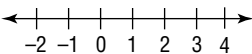
$$\begin{aligned} 2a + 1 < 11 & \quad \text{or} \quad a > 3a + 2 \\ 2a + 1 - 1 < 11 - 1 & \quad a - 3a > 3a - 3a + 2 \\ 2a < 10 & \quad -2a > 2 \\ \frac{2a}{2} < \frac{10}{2} & \quad \frac{-2a}{-2} > \frac{2}{-2} \\ a < 5 & \quad a < -1 \end{aligned}$$



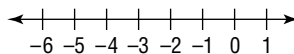
The solution set is  $\{a \mid a < 5\}$ .

**Graph the solution set of each compound inequality.**

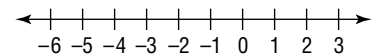
1.  $b > -1$  and  $b \leq 3$



2.  $y \leq -4$  or  $y > 0$

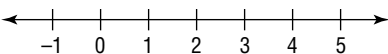


3.  $2 \geq q \geq -5$

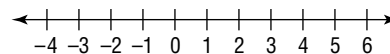


**Solve each compound inequality. Then graph the solution set.**

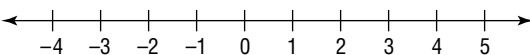
4.  $2x + 4 \leq 6$  or  $x \geq 2x - 4$



5.  $d - 3 < 6d + 12 < 2d + 32$



6.  $4(g - 3) + 2 < 6$  and  $7g > 3(2g - 1)$



7.  $3a + 2 \geq 5$  or  $7 + 3a < 2(a + 3)$

