NAME _____ DATE _____

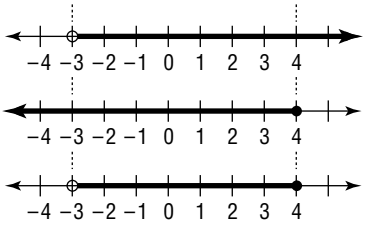
Study Guide

Student Edition
Pages 405–412

Solving Compound Inequalities

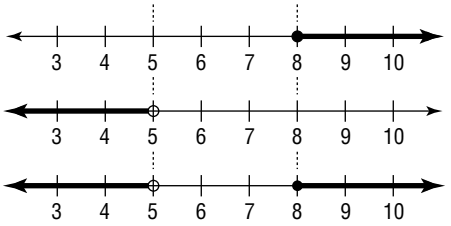
A **compound inequality** consists of two inequalities that are connected by the words *and* or *or*. A compound inequality containing *and* is true only if *both* inequalities are true. Its graph is the **intersection** of the graphs of the two inequalities. A compound inequality containing *or* is 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 $\{t \mid t \geq 8 \text{ or } t < 5\}$.

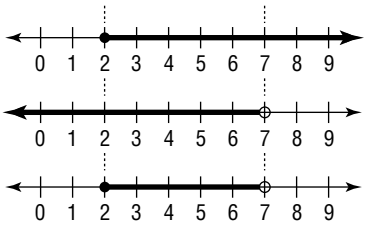
Sometimes it is better to first solve each inequality and then graph the solution. Study the examples below.

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

$-3 \leq p - 5$ and $p - 5 < 2$

$-3 + 5 \leq p - 5 + 5$ $\quad p - 5 + 5 < 2 + 5$

$2 \leq p$ $\quad p < 7$



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

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

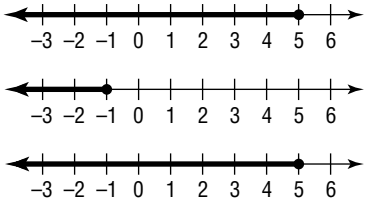
$2a + 1 < 11$ or $a > 3a + 2$

$2a + 1 - 1 < 11 - 1$ $\quad a - 3a > 3a - 3a + 2$

$2a < 10$ $\quad -2a > 2$

$\frac{2a}{2} < \frac{10}{2}$ $\quad \frac{-2a}{-2} > \frac{2}{-2}$

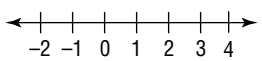
$a < 5$ $\quad a < -1$



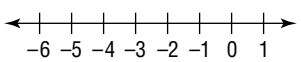
The solution set is $\{a \mid a \leq 5\}$.

Graph the solution set of each compound inequality.

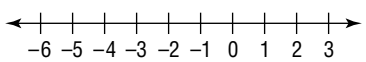
1. $b > -1$ and $b \leq 3$



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

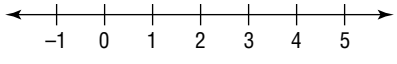


3. $2 \geq q \geq -5$

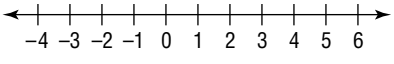


Solve each compound inequality. Then graph the solution set.

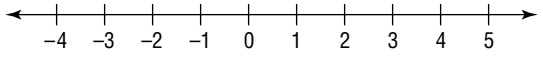
4. $2x + 4 \leq 6$ or $x \geq 2x - 4$



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



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



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