# Compound Inequalities

Summary

1. Compound inequalities means solving more than one inequality.

2. The word *and* indicates a number must make <u>both</u> inequalities true.

3. The word *or* indicates a number must make <u>at least one</u> inequality true.

Compound Inequalities – AND

Compound inequalities involve inequalities connected by either the word **and** or the word **or**.

A number is a solution to a compound inequality that involves the word *and* if it is a solution to **<u>both</u>** inequalities.

$$x \geq -1 \textbf{ and } x < 2$$
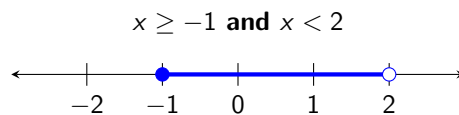
If you graph each individual inequality, the solution is the part of the number where they **overlap**.

Example 1. Solve each. Graph your answers on a number line.

(a) $2x - 7 < 3$ and $5x - 4 \geq 6$

(b) $2x + 7 < 27$ and $5x + 5 < -30$

Sometimes, your variable is between two values, like in

$$-3 < x < 7$$

This really means 2 things:

1. $x > -3$ AND
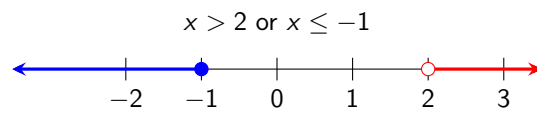
2. $x < 7$

So split it up into 2 inequalities and solve.

Example 2. Solve and graph each.

(a) $-3 < 2x + 1 \le 3$ 　　　　　　　　　　(b) $1 \le 2x + 3 < 11$

Compound Inequalities – OR

The word **or** indicates the solution be in **either** inequality (or both).

$$x > 2 \text{ or } x \le -1$$

With the word OR, you can graph both on the number line at the same time.

Example 3. Solve and graph each.

(a) $2x - 3 < 7$ 　or　 $35 - 4x \le 3$

(b) $x + 10 < 13$ 　or　 $22 > x + 10$

(c) $4x + 2 > -22$ 　or　 $26 \ge 4x + 2$