

Section 6.3 Solving Compound Inequalities

There are two types of compound inequalities: and's and or's. The "and" type is normally written as $0 < x < 4$. This means that x is between 0 and 4. It can also be written as $x = 0$ and $x = 4$. The or type would look like $x < -2$ or $x > 1$. The and's and the or's are also called conjunctions and disjunctions respectfully.

To solve compound inequalities we simply do everything we do to one part to the other parts. The examples below will help to clarify this discussion.

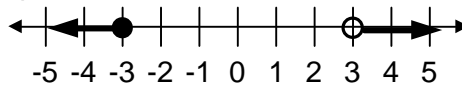
Example 1: Solve $3x - 1 > 5$ or $2x + 3 = -3$

Since this is an or we simply solve each inequality separately.

$$\begin{aligned} 3x - 1 &> 5 \\ 3x &> 6 \\ x &> 3 \end{aligned}$$

$$\begin{aligned} 2x + 3 &= -3 \\ 2x &= -6 \\ x &= -3 \end{aligned}$$

The graph of the solution:



Example 2: Solve the inequality: $-4 < 10 - 2x < 12$

Since this is an "and" we simply do everything to each part as we isolate x .

$$\begin{aligned} -4 &< 10 - 2x < 12 \\ \frac{-10}{-14} &= \frac{-10}{-2x} = \frac{-10}{2} \end{aligned}$$

Subtract 10 from all 3 parts

$$7 < x < -1$$

Divide by -2 and flip both inequalities

We normally write these with the inequality signs only as $<$, so we flip the whole thing to get: $-1 < x < 7$.

Think about this last step to make sure that you understand.

