Chapter 3-6
Compound Inequalities

Part 1 (Solving & Graphing Compound Inequalities)

Compound Inequalities

- Two simple inequalities joined by the word "and" or the word "or".

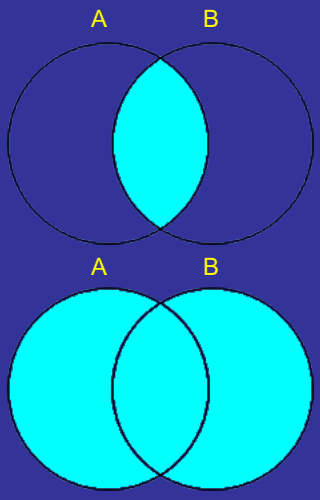
What is the difference between and and or?

AND means intersection

-what do the two items have in common?

OR means union

-if it is in one item, it is in the solution



Conjunction / "AND" Inequality

The solutions of two simple inequalities is where they **overlap** (The solution of one inequality AND the solution to the other inequality. The **INTERSECTION** of two solutions.)

$x > -3 \text{ and } x \leq 1$ $\quad -3 < x \leq 1$

*Sometimes the word "and" is not written, but the "and" is implied.

Conjunction / "AND" Inequality

$$-3 \leq x \leq 1$$

Read as:

- "x" is greater than or equal to -3 and less than or equal to 1
- "x" is in between -3 and 1, inclusive

***Inclusive means that both -3 & 1 are solutions*

Conjunction / "AND" Inequality

Solve

$3 < 2m - 1 < 9$

$3 < 2m - 1$ AND $2m - 1 < 9$

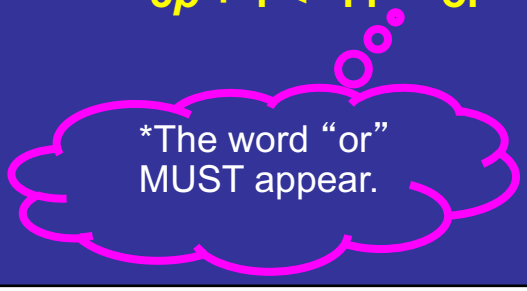
*The in between is SHARED.

Now Solve

Disjunction/ "OR" Inequality

The solution that makes one inequality true OR the other inequality true (The **UNION** of both solutions.)

$-3p + 1 < -11$ or $p \leq -2$



Now Solve

Graphing Compound Inequalities

Steps:

1: Draw your line graph

2: Mark your answer with a open or closed circle

Open Circle: < and > symbols

Closed Circle: ≤ and ≥ symbols

3: Decide which direction your arrows should go to make the inequalities true

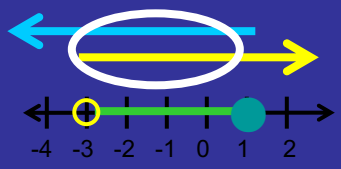
4: If "and"- Where do the lines (arrows) overlap?

If "or"- What are all the possible solutions?

Compound Inequalities

"and"

$-3 < x \leq 1$



Where do the lines overlap?

Conjunction / "AND" Inequality

The general rule is…

if the solutions do NOT contain an "overlap", then there is LIKELY a mistake. (However, it is possible that the solution is an empty set.)

Compound Inequalities

Solve & Graph: $-3p + 1 < -11$ *or* $p \leq -2$

Solution: $p > 4$ ***or*** **$p \leq -2$**

What are all the possibilities?

Compound Inequalities

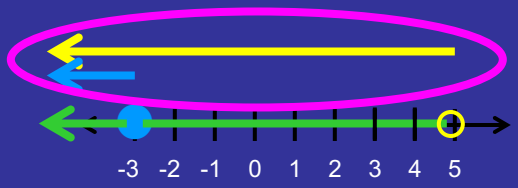
Solve and then graph

2y+2<12

or

y-3 ≥ 2y

y < 5 or -3 ≥ y



What are all the possibilities?

Page 201 & 202

- Review Problem #1, 2, 3 & 4
- Got it? #1, 2, 3 & 4

Writing Compound Inequalities

Steps:

1: Determine directions of arrows

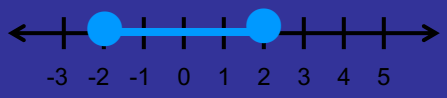
- If the arrows are overlapping then it is an "and" inequality.
- If the arrows are going in different directions (showing all possible answer) then it is an "or" inequality.

2: Mark your answers with a open or closed circle

Open Circle: < and > symbols

Closed Circle: ≤ and ≥ symbols

Examples: Writing Compound Inequalities



"and"

$-2 \leq x$ and $x \leq 2$

$-2 \leq x \leq 2$

"or"

$x \leq -1$ or $x > 3$