

Algebra II
Compound Inequalities

$-1 \cdot 6 > 4 \cdot 7$
 $\frac{-6}{-2} < \frac{-4}{-2} \quad 3 > 2$

Review

When multiplying or dividing by a negative number
FLIP the inequality symbol!!!

Closed dot = \geq, \leq •
Open dot = $>, <$ ○

Flip inequality symbol if changing sides of variable & number

$3 > x \rightarrow x < 3$

Inequality Review

1. $-x + 5 > 3$
 $\quad \quad \quad -5 \quad \quad -5$

$\frac{-x}{-1} > \frac{-2}{-1} \leftarrow \text{flip it}$



2. $-2x - 4 < 8$
 $\quad \quad \quad +4 \quad \quad +4$

$\frac{-2x}{-2} < \frac{12}{-2}$



Compound Inequality:

2 separate inequalities joined by "and" or "or"

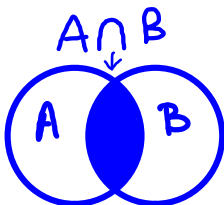
Conjunction:

When two or more statements are joined by the word **and**.

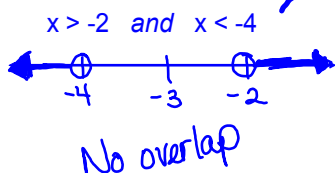
ALL statements must be True.

The moon is red **and** the night is cold
 $x > -2$ **and** $x < 1$
 $-2 < x < 1$

Intersection: The set of common elements of two or more sets.



Empty Set: If the set has **no** common members.



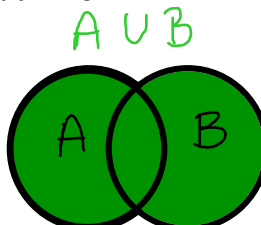
Disjunction:

When two or more statements are joined by the word **OR**.

AT LEAST ONE statement must be true.

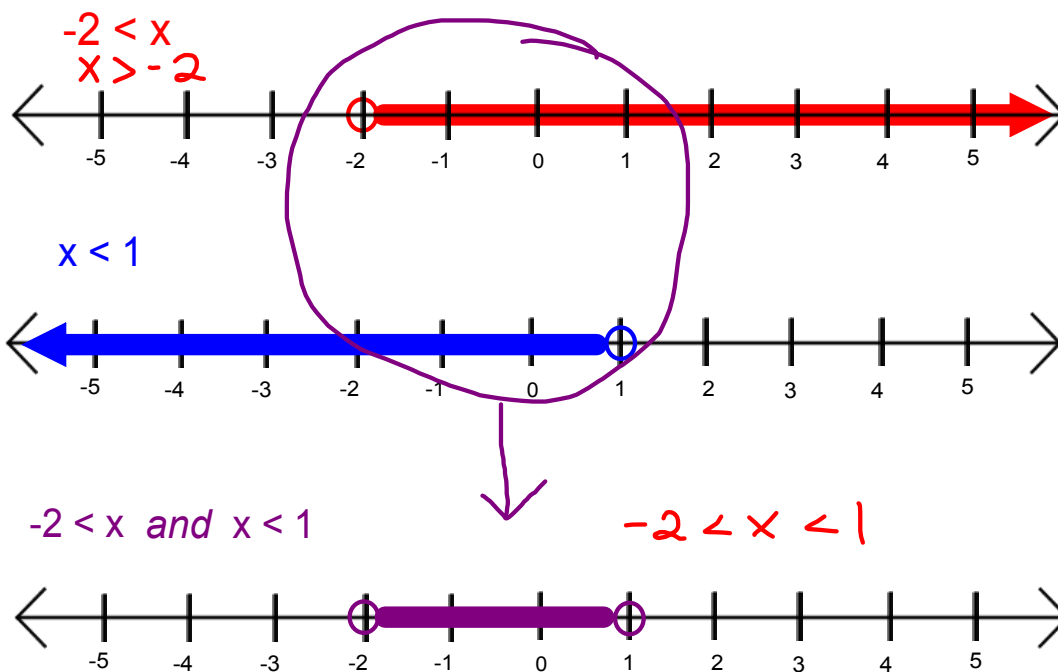
It is raining **or** the wind is blowing.
 $x < -3$ **or** $x > 3$

Union: The set obtained by joining two or more sets.



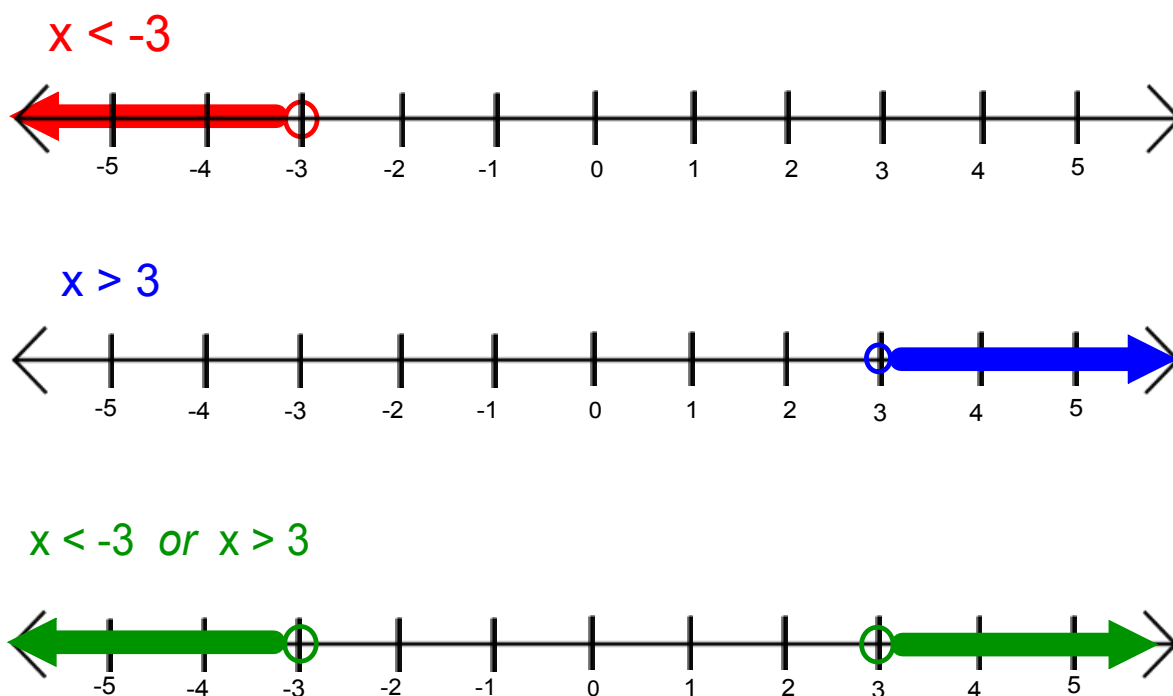
Conjunction - "and" - overlap

$-2 < x$ and $x < 1$ also written as $-2 < x < 1$



Disjunction - "or" - everything

$x < -3$ or $x > 3$



Rewrite 2 "and" statements as one.

$$-5 < x \text{ and } x < 6$$

$$-5 < x < 6$$

You Try:

Rewrite the compound inequality then graph.

$$x > 9 \text{ and } x < 15$$

$$9 < x < 15$$

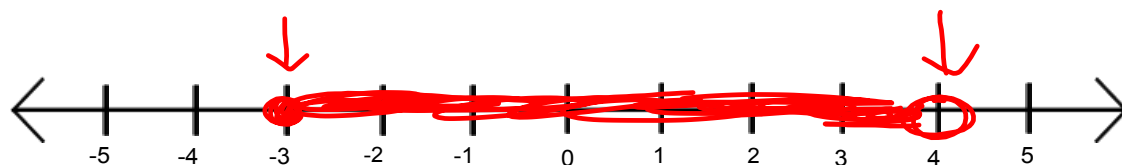
Ex 1) Graph

$$-3 \leq x < 4$$

"and"
conjunction

$$\begin{aligned} -3 \leq x \\ x \geq -3 \end{aligned}$$

$$x < 4$$



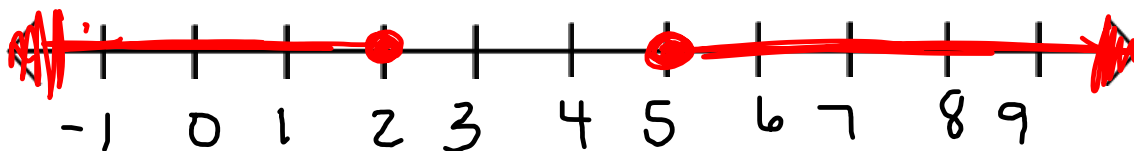
Ex 2) Solve & Graph

$$\boxed{-3 < 2x+5 < 7}$$

-5 -5 -5

$$\frac{-8}{2} < \frac{2x}{2} < \frac{2}{2}$$

$$\boxed{-4 < x < 1}$$

Ex 3) Graph $x \leq 2$ OR $x \geq 5$ 

Ex 4) Solve & Graph

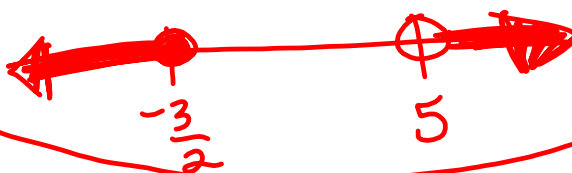
$$\underline{-2x-5 \geq -2} \text{ OR } \underline{x-3 > 2}$$

+5 +5 +3 +3

$$\frac{-2x}{-2} \geq \frac{3}{-2}$$

$$x > 5$$

$$x \leq -\frac{3}{2} \text{ OR } x > 5$$



Worksheet