In 4.2 we discussed what an inequality was and we used/learned more about sets.

Recall: A **Set** is a collection of objects where order does not matter.

Inequalities produce solution sets.

What might happen to the solution set if we had a system of inequalities?

What is the logical difference between “and” and “or”

I do my homework on lined paper and yellow computer paper. (true only if both happen)

Vs

I do my homework on lined paper or yellow computer paper. (True if either one happens or if both happen)

Ex: Find the solution sets:

1. $x<2 \& x\geq 1$
2. $x<2 or x\geq 1$
3. $2x-5\geq -3 and 5x+2\geq 17$

## Intersections of Sets and Conjunctions of Sentences

Def: The **intersection** of two sets A and B is the set of all elements that are common to both A & B. We denote the intersection by $A∩B$.



When you have an “and” statement, this corresponds to an intersection of the two solution sets.

 I DO Ex: $x<5 \& x\geq 1$ Show each inequality on a separate number line. Show the intersection/solution is the overlap.

## Unions of sets and Disjunctions

Def: The **union** of two sets A and B is the collection of all elements belonging to A and/or B. We denote the union by $A∪B$.

The Union is everything from both sets including their overlap/intersection.

Ex: Given the sets A = {1,2,3,4,5}, B = {4,5,6,7,8}, C = {9,0} Find the a) intersection and b) union of

1. A & B
2. B & C
3. A & C

Note:

$$"or" \leftrightarrow ∪ (union)$$

$$and\leftrightarrow ∩(intersection)$$

Ex: Find the domain of the function: $f\left(x\right)=\frac{3x+7}{x-2}$

Ex: If $f\left(x\right)=\sqrt{x} and g\left(x\right)=x-1$ Find the domain of each function and then find the domain of $(f+g)(x)$. How does this domain relate to the two individual domains?