This Chapter will be devoted to Inequalities, absolute values, sets, intersection/union of sets, interval & set notation.

This particular section will focus on solutions to inequalities in 2-D.

## Linear Inequalities

Def: An **inequality** is any sentence containing$<,>,\leq ,\geq , or\ne $.

Def: A **solution** to an inequality is the value(s) of the unknown that makes the inequality true.

Def: The set of all solutions is called the **solution set**.

*Def:*  A ***linear inequality*** is a statement that describes how two numbers or linear expressions are related to one another. One form is $ax+b<c$.

 If $a<b$, then $b>a$.

*a*

*b*

Ex: Find the solution to the following inequalities and express answer as a graph, in set notation, and in interval notation.

1. $y<6$
2. $t\geq -3$

## Interval notation

Discuss ( vs [

Discuss def of open set, closed set, and non-open/closed set, and empty set.

Do we include [ or not include ( $\infty \&-\infty $?

Compare this notation to set builder notation.

Compare this notation to a graph.

## Properties of inequalities

Ex: Solve: $x-3>1$

Ex: Solve: $-2x>4$

*Properties for Inequalities*

Let *a*, *b*, and *c* be real numbers. Assume $a<b$. Then

* $a+c<b+c$
* $a-c<b-c$
* If $c>0$, then $ac<bc$
* If c < 0, then $ac>bc$
* If $c>0$, then $\frac{a}{c}<\frac{b}{c}$

Note: Whenever you multiply or divide by a neg. number you MUST flip the inequality! This is the only time!

* If $c<0$, then $\frac{a}{c}>\frac{b}{c}$

Ex: Solve the following inequalities:

1. (#36) $-\frac{5}{6}x\geq \frac{3}{4}$
2. (#38) $2x-5\geq 9$
3. (#42) $\frac{5y+13}{-4}<2$

Ex: (#48) Let $f\left(x\right)=8x-9 \& g\left(x\right)=3x-11$. Find all values of x for which $f\left(x\right)\leq g(x)$.

Ex: (#70) Find the domain of the following function:

$$f\left(x\right)=\sqrt{8-5x}$$