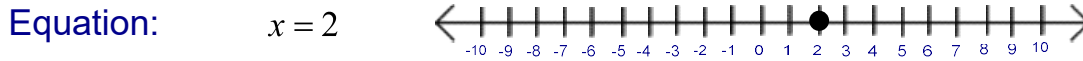


# 4.10 Inequalities

## Part A: One-Variable Inequalities



Ex. 1 Inequalities:

*>* "greater than"

*<* "Less than"

- What numbers satisfy the inequation?
- How many numbers satisfy the inequation?
- What type of numbers does it include?
- List some solutions, then show the solution set on the number line.

● endpoint of the set is included	$\geq$	$\leq$	<i>→ ".... or equal"</i>
○ endpoint of the set is not included	$>$	$<$	

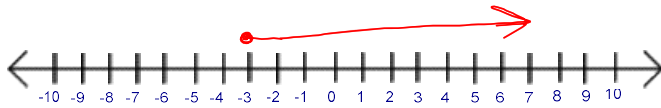
a)  $x > 5$

*↑ open dot*

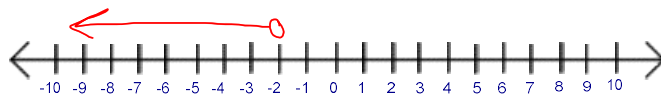


b)  $x \geq -3$

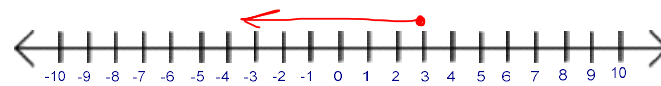
*↑ closed dot*



c)  $x < -2$



d)  $x \leq 3$



### Part B: Two-Variable Inequalities

Ex. 2 Which of the points listed satisfies the inequality?

a)  $x + y < 10$       (3,4) (5,-1) (6,15) (-3, -7) (4,6) (2,9)

b)  $x - y \geq 2$       (4,5) (8,2) (4,-1) (5,3) (-4,-5) (0,2)

c)  $x > -4$       (-3,7) (2,0) (1,-3) (-4,-2) (0,0) (-3,-9)

d)  $xy \leq -6$       (-2,3) (5,-1) (4,-3) (-1,-1) (0,4) (-6,1)

Ex. 3 Generate a set of points that satisfy the inequality. Show the solution set on a graph.

$$x + y \leq 6$$

$$x + y = 6$$

x	y
0	6
6	0

x	y
-7	1
-1	7
3	3
-2	-3
-7	-3

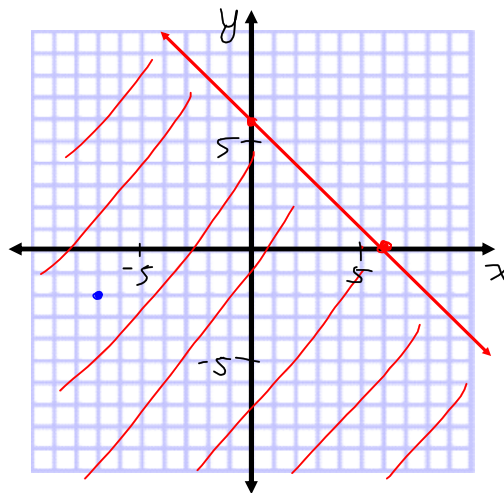
x	y

x	y

How many points work?

What about fractions & decimals?

How do you show "all" solutions on a graph?



the line  $x + y = 6$  is the "boundary"  
 ——— for  $\geq \leq$  (border included)  
 - - - - for  $> <$  (border NOT included)

Ex. 4 Graph the region defined by each inequality.

Step 1

- Graph the line
- Test to find region to shade

- graph the "boundary", then shade the region containing the points that satisfy the inequality

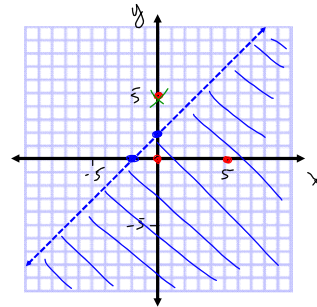
— for  $\geq \leq$  (border included)  
- - - for  $> <$  (border NOT included)

a)  $x - y > -2$

$x - y = -2$  ↖ Dashed line

x	y
0	2
-2	0

x	y
0	0
5	0
0	5

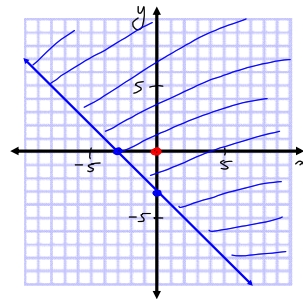


b)  $x + y \geq -3$

$x + y = -3$  ↖ SOLID LINE

x	y
0	-3
-3	0

x	y
0	0



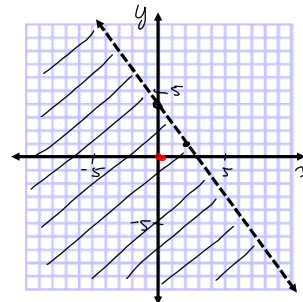
c)  $y < \frac{-3}{2}x + 4$

$y = \frac{-3}{2}x + 4$

x	y
0	0

use the slope and y-int to graph the boundary line

$0 < \frac{-3}{2}(0) + 4$   
 $0 < 4$



d)  $y < 5$

x	y
0	0

