Math-2
Lesson 6-2

Two Variable Inequalities
and
Systems of Inequalities

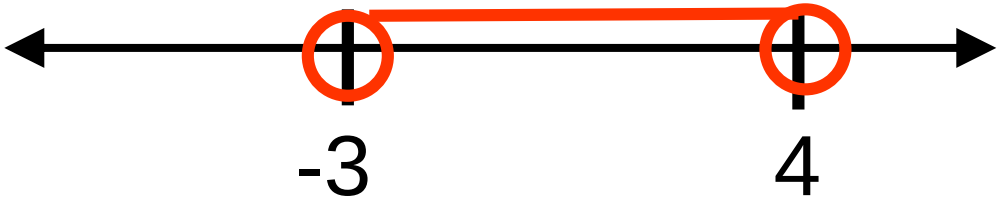
Solve $0 > x^2 - x - 12$

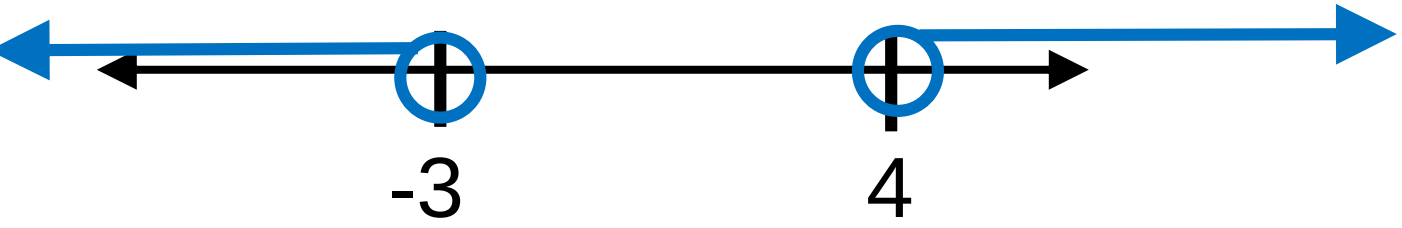
The boundary #'s separate the solution from the non-solution.

$0 = x^2 - x - 12$

$0 = (x - 4)(x + 3)$

$x = 4, \quad -3$

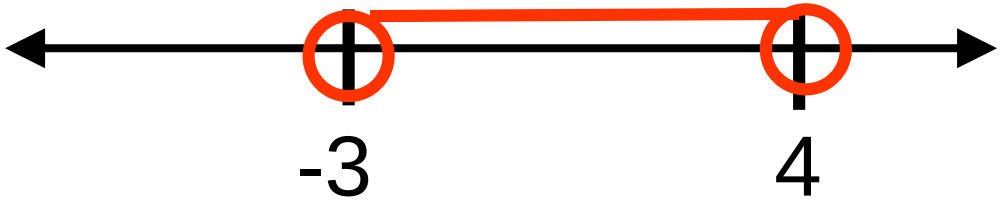




Test one value of 'x' to see if it is a solution. Try x = 0.

$0 > (0)^2 - (0) - 12 \qquad 0 > -12$

→ A True statement.



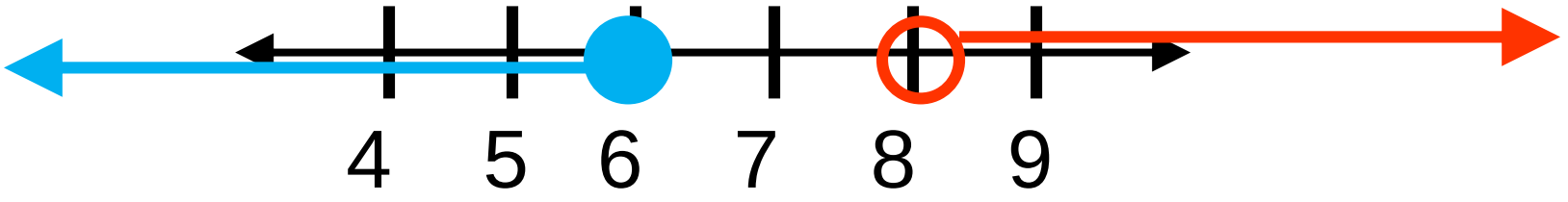
$-3 < x < 4$

$x > -3 \text{ and } < 4$

$(-3,4)$

Graph the solution to the compound inequality:

$x \leq 6$ or $x > 8$



How would you define (in words) what a solution to a single variable compound inequality means?

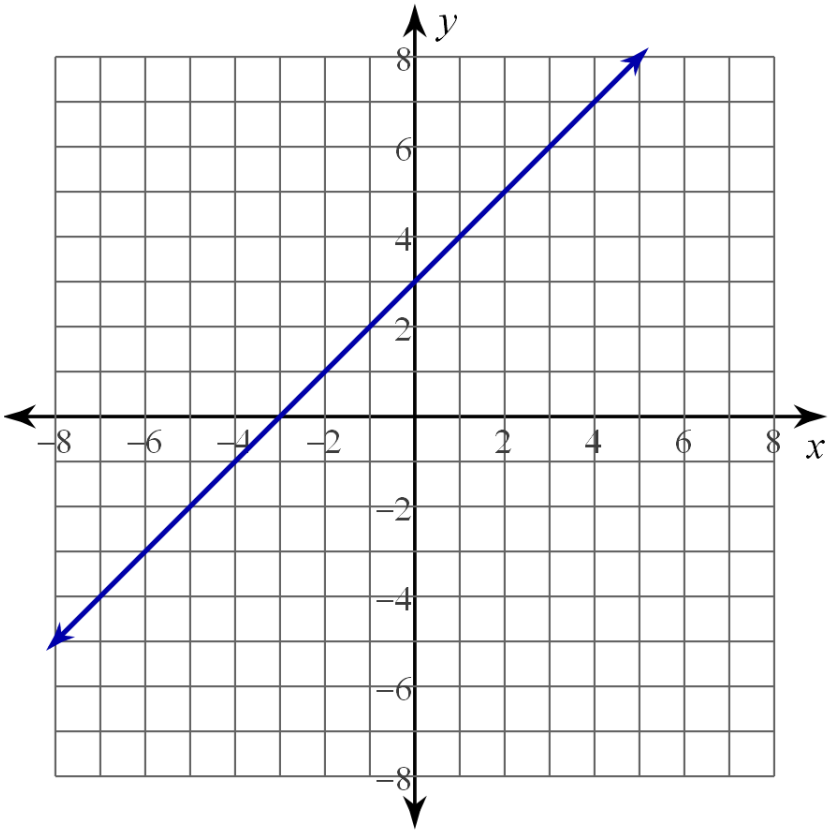
The values of ‘x’ that make the inequality true.

What is the solution to a two-variable equation?

$$y = x + 3$$

The x-y pairs that make the equation true.

When graphed, the solution to the equation is ALL of the points on the graph.

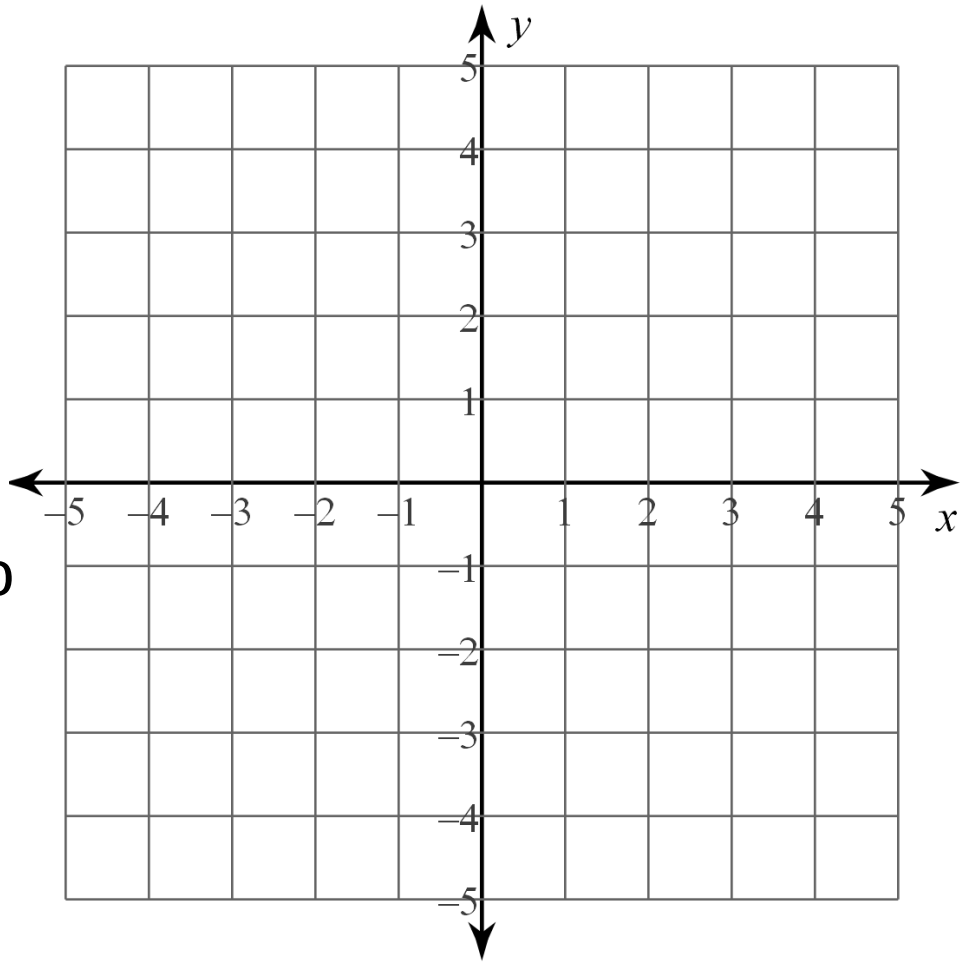


What is the solution to a two-variable inequality

$$y \geq x + 3$$

All x-y pairs that make the inequality true.

When graphed, the solution to the equation is ALL of the points on the graph.



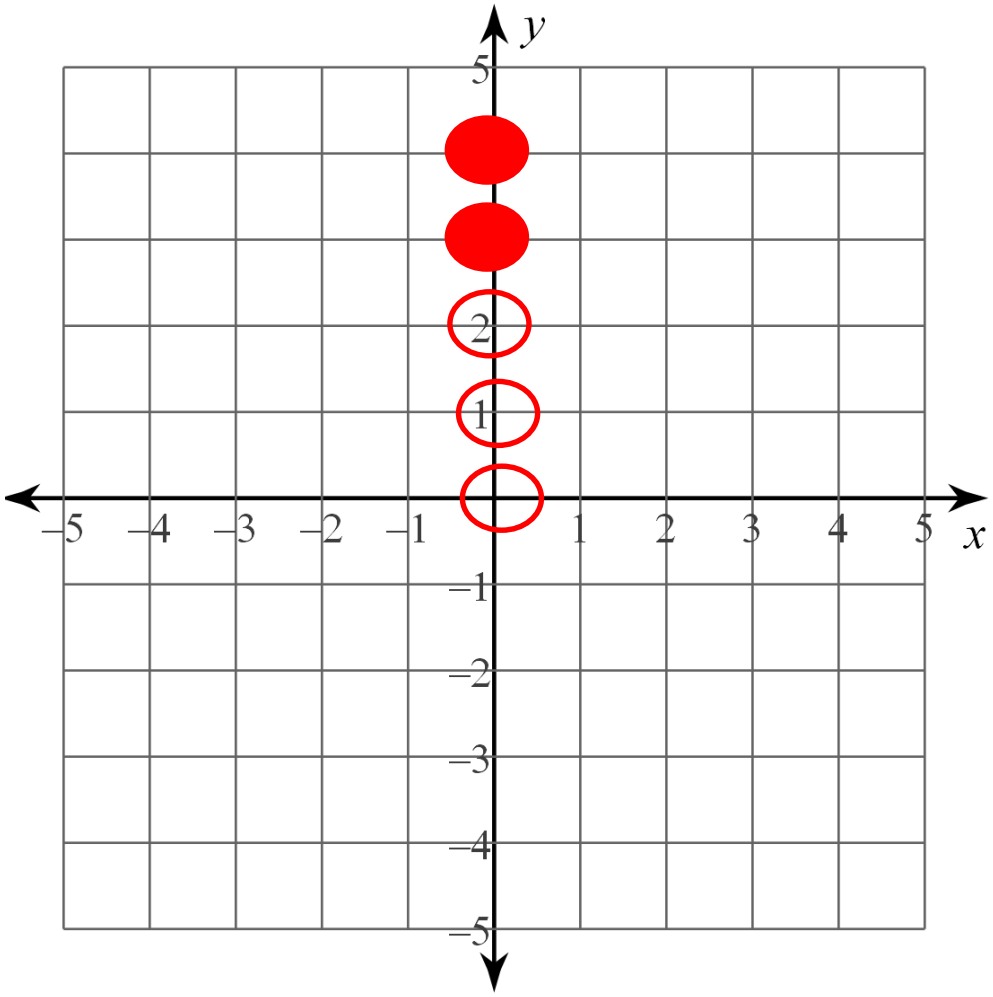
$$y \geq x + 3$$

Is (0, 0) a solution?

$$0 \geq 0 + 3$$

Fill in the table:

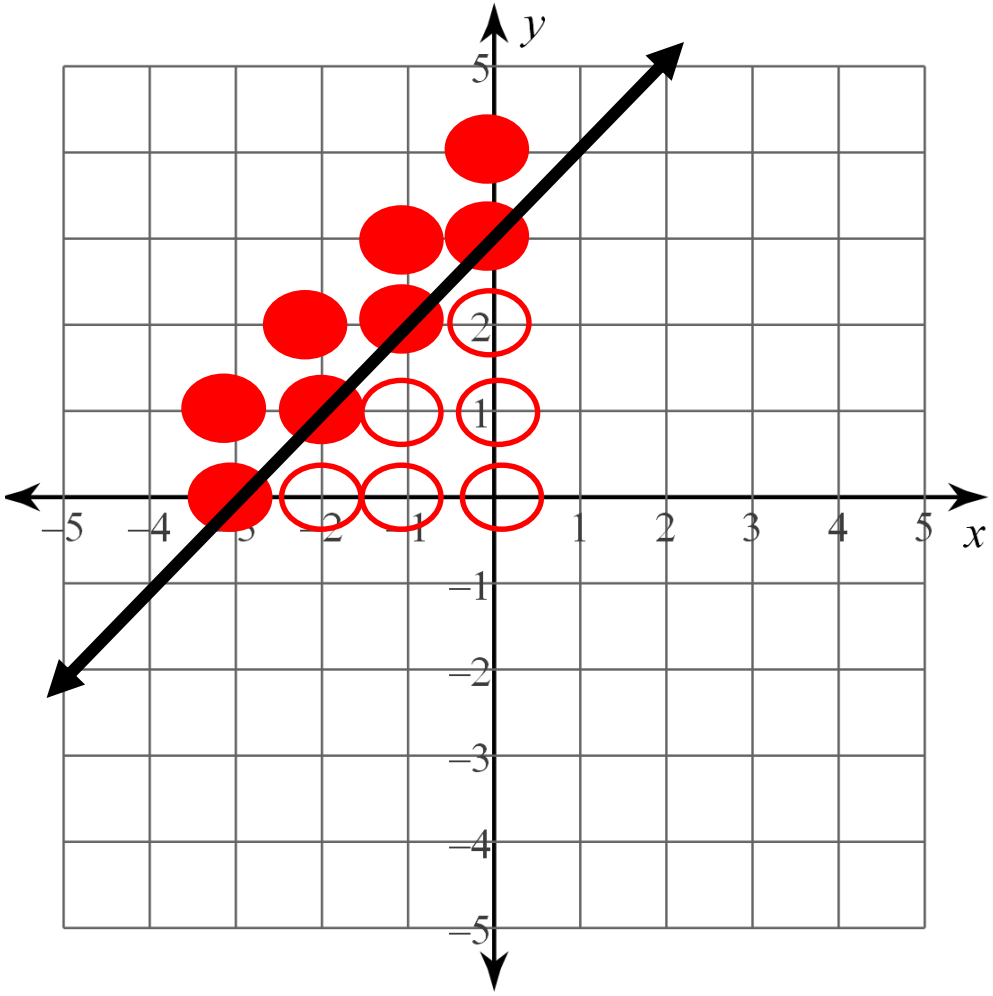
x	y	solution ?
0	0	no
0	1	
0	2	
0	3	
0	4	



$$y \geq x + 3$$

Fill in the table:

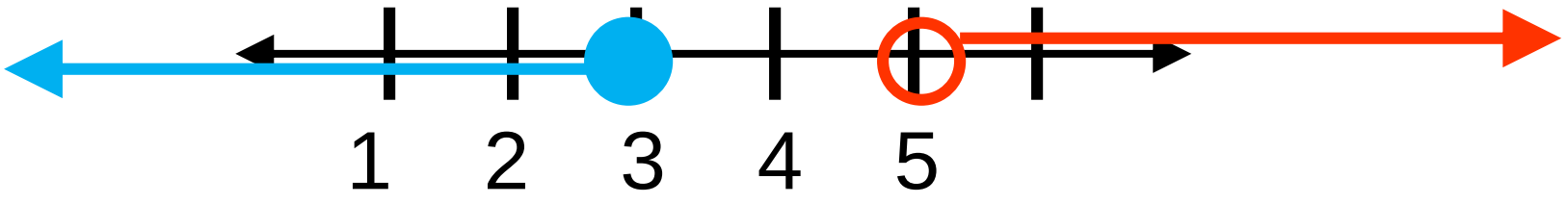
x	y	solution ?
-1	0	
-1	1	
-1	2	
-2	0	
-2	1	
-2	2	
-3	0	
-3	1	



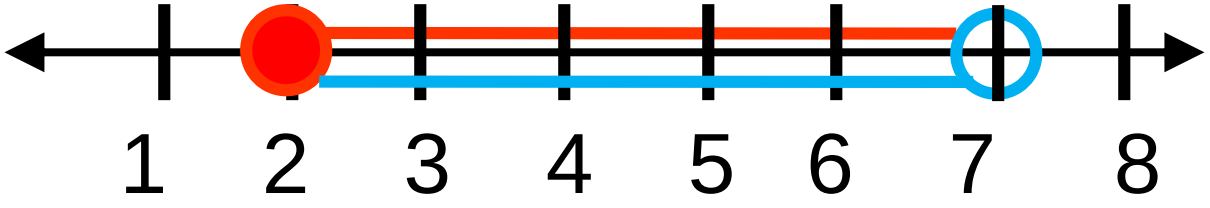
Can you tell what the graph will look like?

Single Variable Inequality: The "boundary numbers" separate the solution from the non-solution.

$x \leq 3$ or $x > 5$



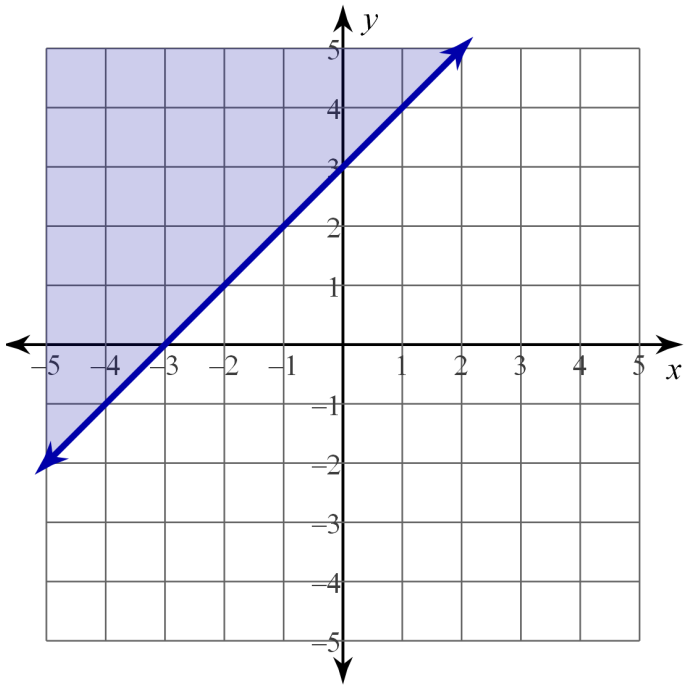
$2 \leq x < 7$



The shaded part of the graph is the solution.

$$y \geq x + 3$$

The line: y = x + 3
Is the boundary between the solution and non-solution.



The line divides the x-y plane into two halves.
The solution to the inequality is all of the x-y pairs in one of the "half planes".

$$y > x + 3$$

Now it is just “>” (not “≥”)

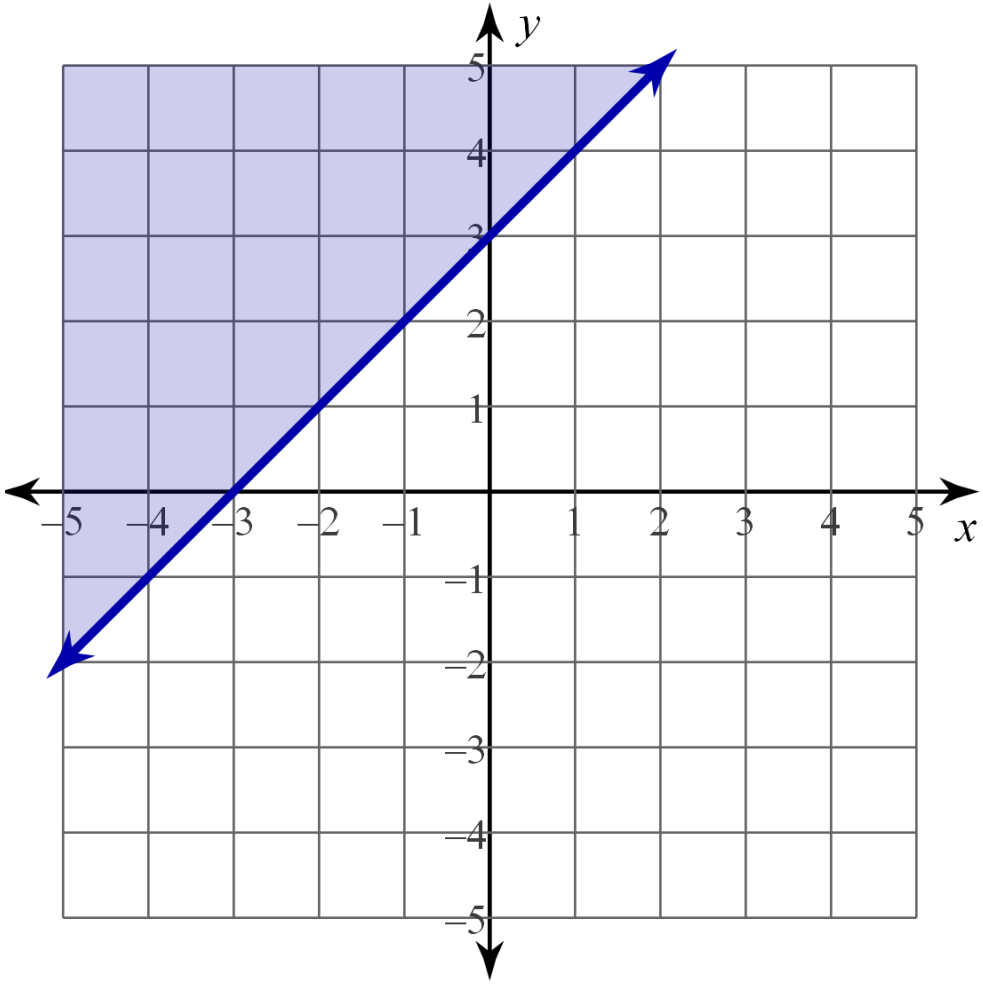
Test a point on the line:
(0, 3)

$$3 > 0 + 3$$

Do the points on the line make the inequality true?

no

How do we show that on the graph?



Don’t shade the line (draw a dotted line).

$$y > x + 3$$

Now it is just “>” (not “≥”)

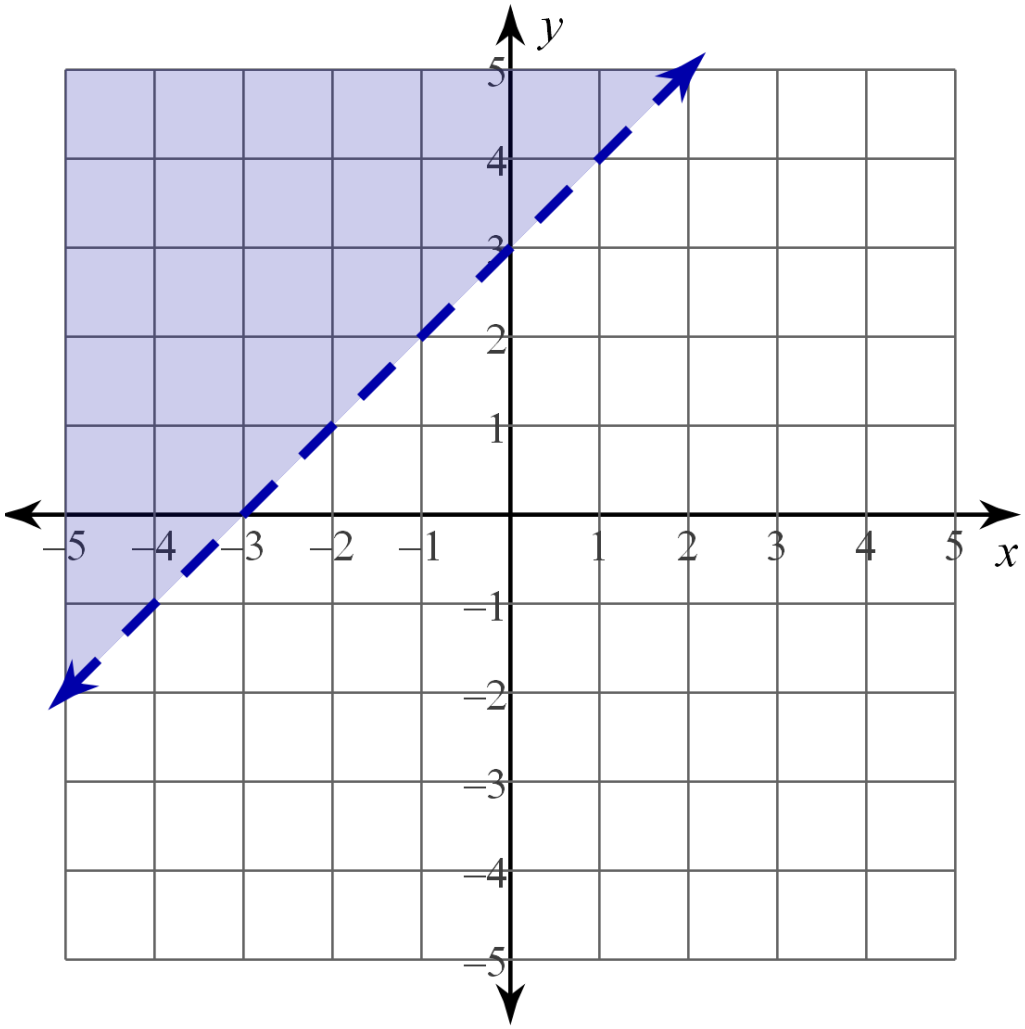
Test a point on the line:
(0, 3)

$$3 > 0 + 3$$

Do the points on the line make the inequality true?

no

How do we show that on the graph?



Don’t shade the line (draw a dotted line).

Let's write a procedure on how to graph 2-variable inequalities.

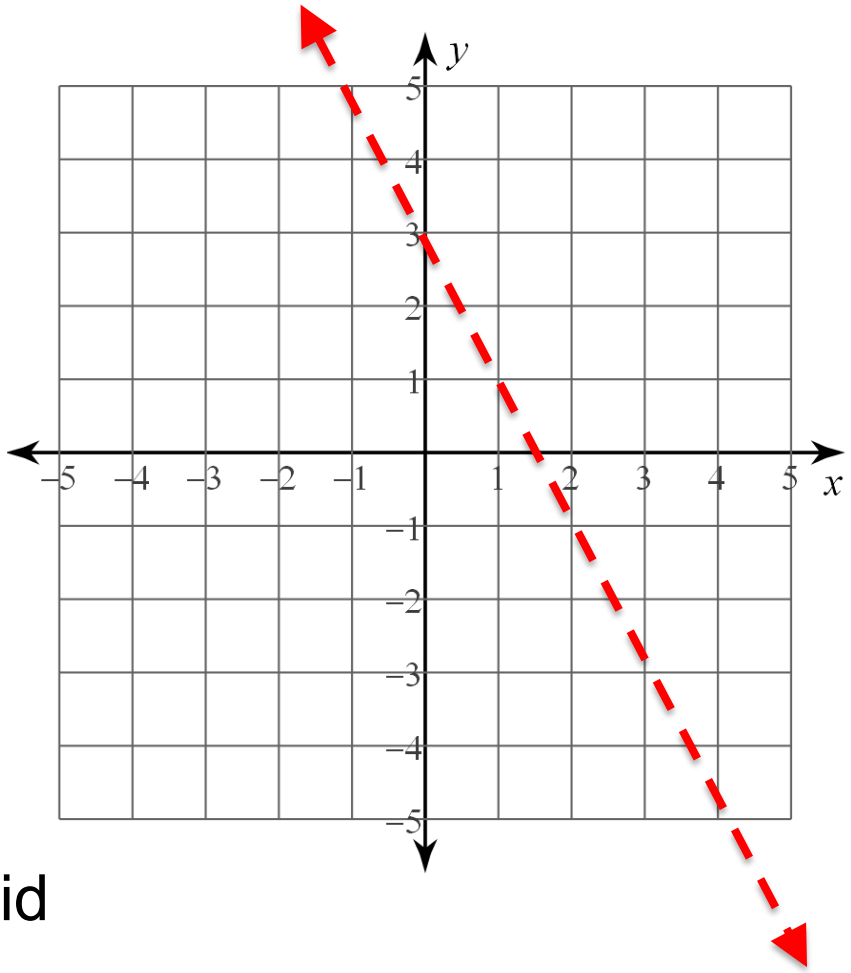
$$y > -2x + 3$$

1. Graph the line.

$$y = -2x + 3$$

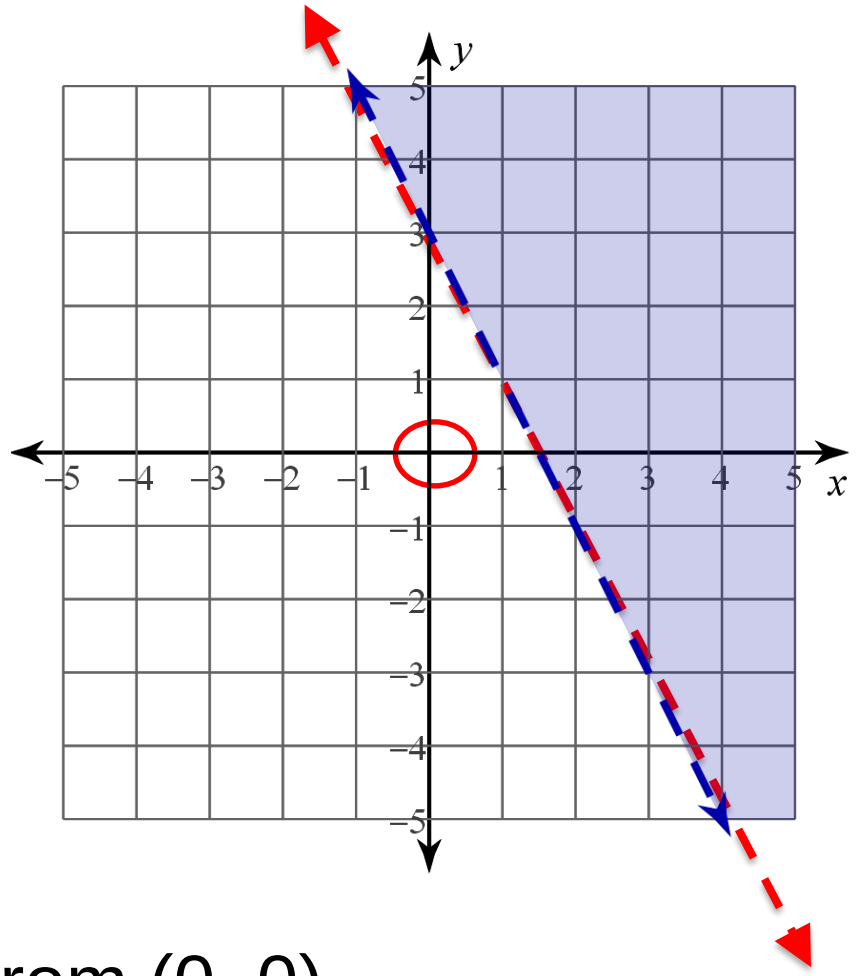
2. If the inequality is ">" (not "≥"), the line will be dotted (not shaded).

3. If it is "≥" the line will be solid (shaded).



$$y > -2x + 3$$

4. Pick a point and see if it is the solution. If so, shade that side of the line, (otherwise shade the other side).



$(0, 0)$

$0 > -2(0) + 3$

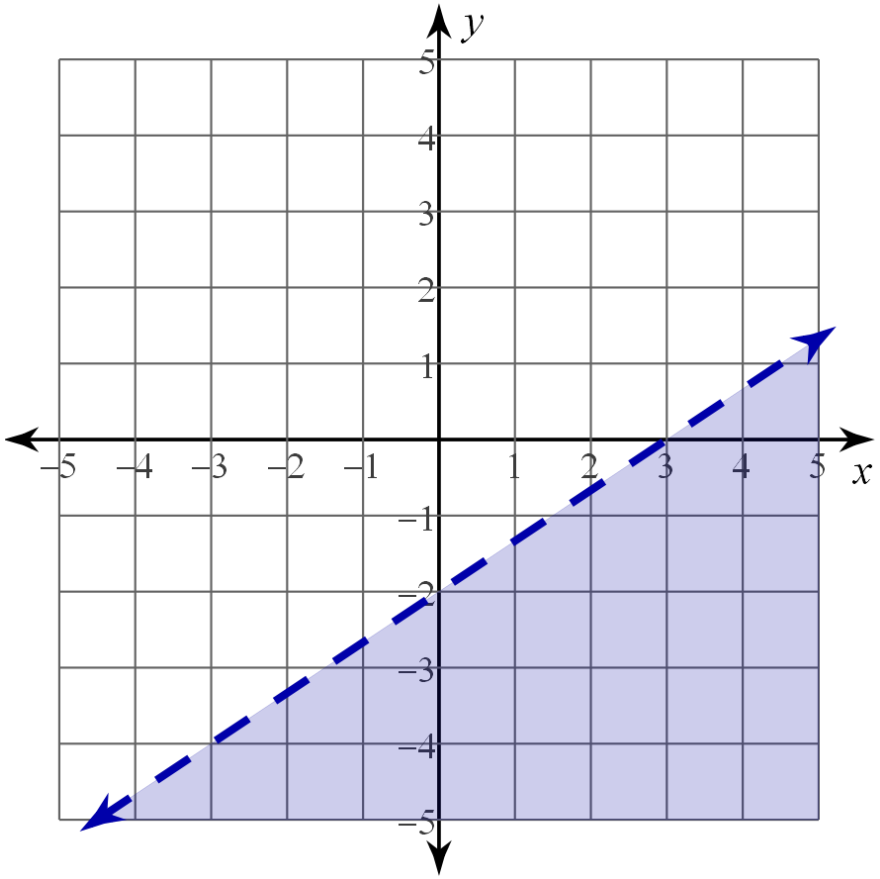
no

Shade other side of line from (0, 0)

Graph the following inequality.

$$2x - 3y > 6$$

Why does “>” end up being shaded below the line?



Non-linear 2 Variable inequality

$$y > x^2 - 2$$

Is the parabola solid or dotted?

Is the solution the region above or below the parabola?