

Think of 2 numbers with a sum of 10.

$(7,3)$ $7 + 3$ $(6,4)$ $6 + 4$

$(8,2)$ $8 + 2$ $(0,10)$ $0 + 10$

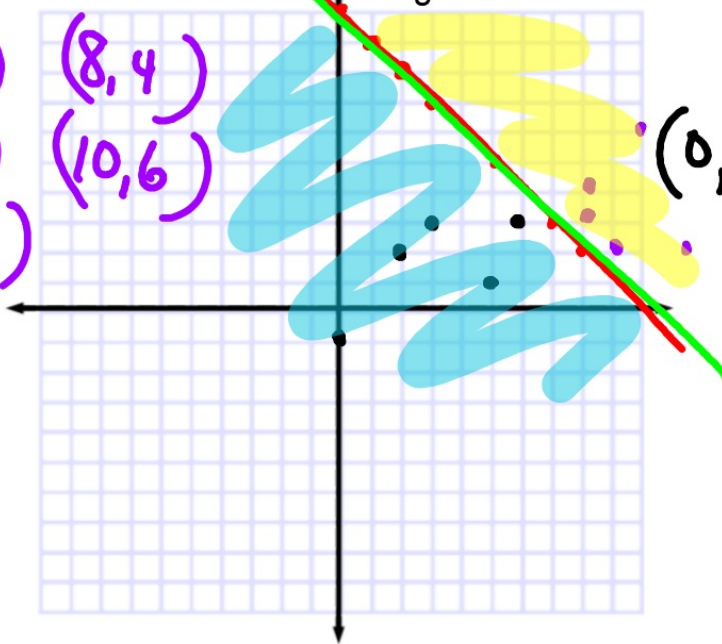
$(5,5)$ $5 + 5$

$x + y = 10$

Think of 2 numbers with a sum that is ~~less~~ ^{more} than 10.
Be original.

$(9,2)$
 $(8,3)$
 $(12,2)$

$(8,4)$
 $(10,6)$



$(2,2)$ $2 + 2$ $(3,3)$ $3 + 3$

$(0,-1)$ $0 + -1$ $6 + 3$

$(5,1)$

$(6,3)$

Algebra 1

5.6

Graph linear inequalities on the coordinate plane

Solve inequalities by graphing

linear

boundary

half-plane

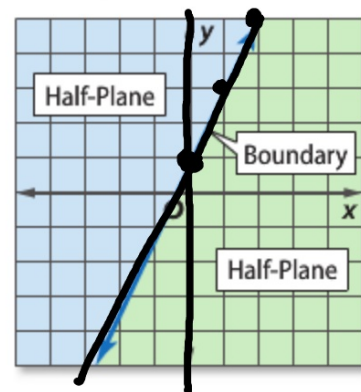
open

closed

test point

whiteboards

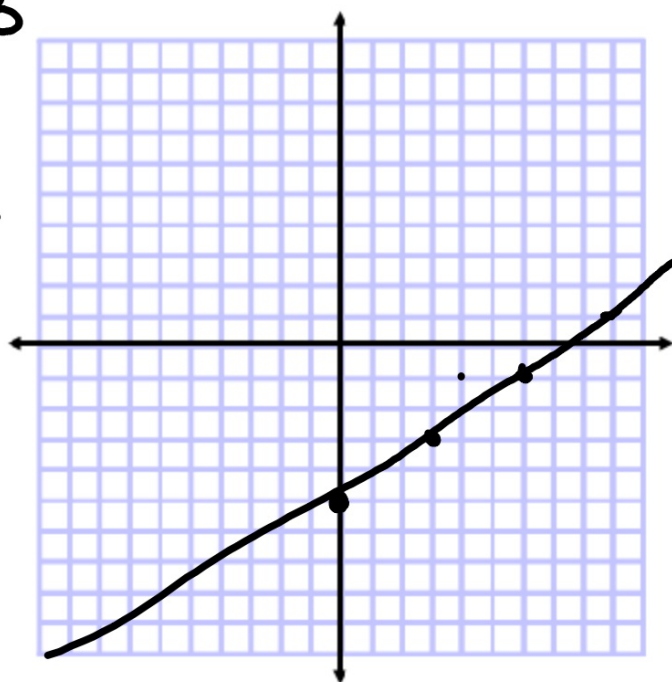
$$y = mx + B$$
$$y = \frac{2}{1}x + 1$$
$$y = 2x + 1$$



$$y = \frac{2}{3}x + 5$$

Graph a linear equation:
use slope-intercept form

$y >$ ~~~~~
 $y <$ ~~~~~



Key Concept Graphing Linear Inequalities

Step 1 Graph the boundary. Use a solid line when the inequality contains \leq or \geq .
Use a dashed line when the inequality contains $<$ or $>$.

Step 2 Use a test point to determine which half-plane should be shaded. T

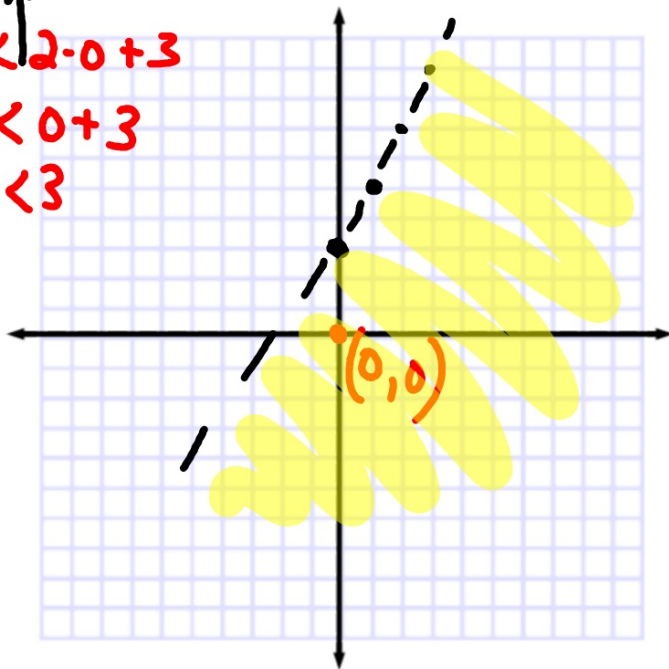
Step 3 Shade the half-plane that contains the solution.

Hint: always use an EQUATION when you graph the boundary.

Graph
 $y < 2x + 3$

$$y = \frac{2}{1}x + 3$$

$0 < 2 \cdot 0 + 3$
 $0 < 0 + 3$
 $0 < 3$



whiteboards

Guided Practice Graph each inequality.

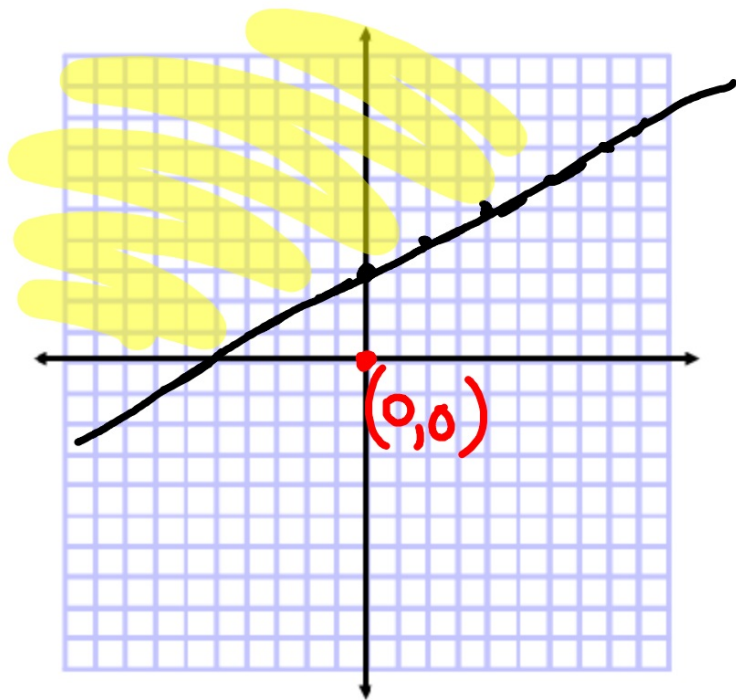
1A. $y > \frac{1}{2}x + 3$

$$0 > \frac{1}{2} \cdot 0 + 3$$

$$y = \frac{1}{2}x + 3$$

$$0 > 0 + 3$$

$$0 > 3$$



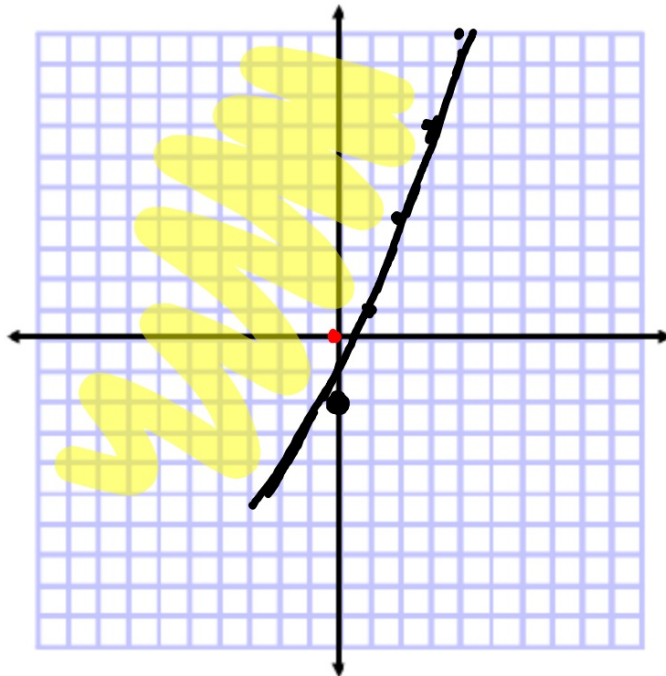
How is this problem different?

Example 1 Graph an Inequality (< or >)

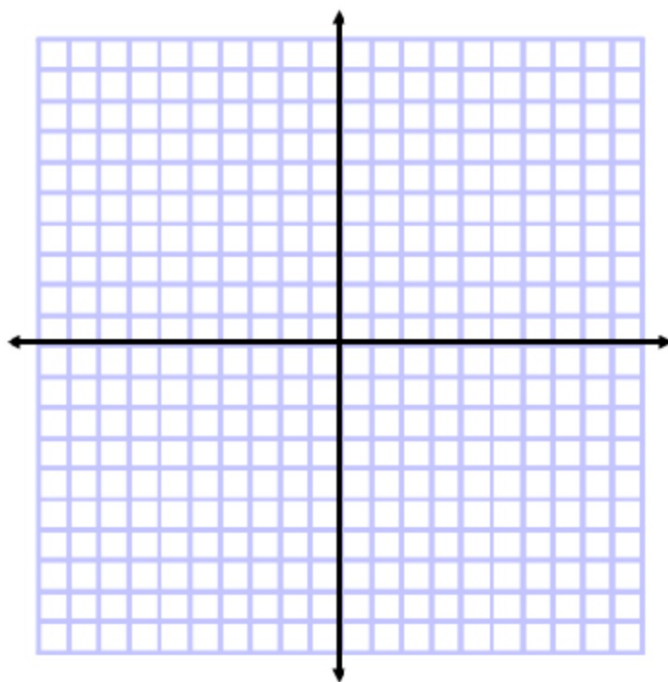
Graph $3x - y \leq 2$.

$$\begin{aligned} & 3 \cdot 0 - 0 < 2 \\ & 0 - 0 < 2 \\ 3x - y &= 2 \\ -3x & \quad -3x \\ -y &= -3x + 2 \\ \frac{-y}{-1} &= \frac{-3x}{-1} + \frac{2}{-1} \\ y &= 3x - 2 \end{aligned}$$

Locate the boundary
(hint: $y =$)

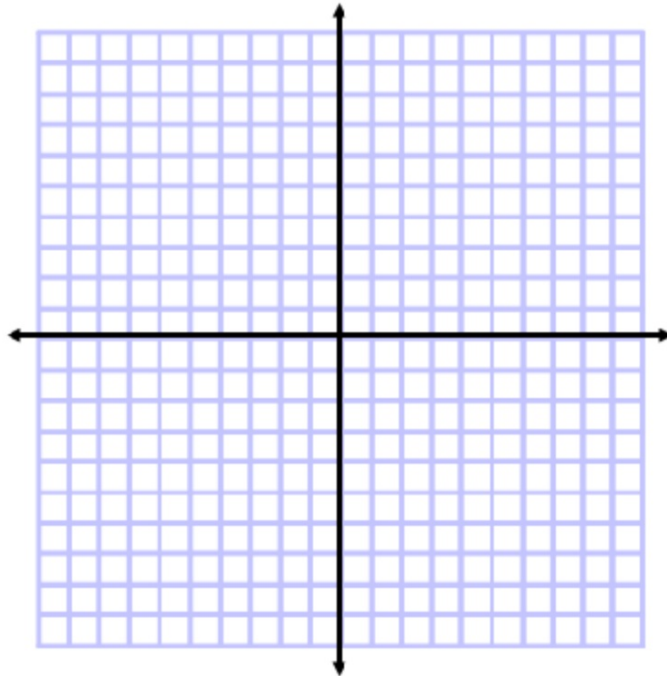


1B. $x - 1 > y$



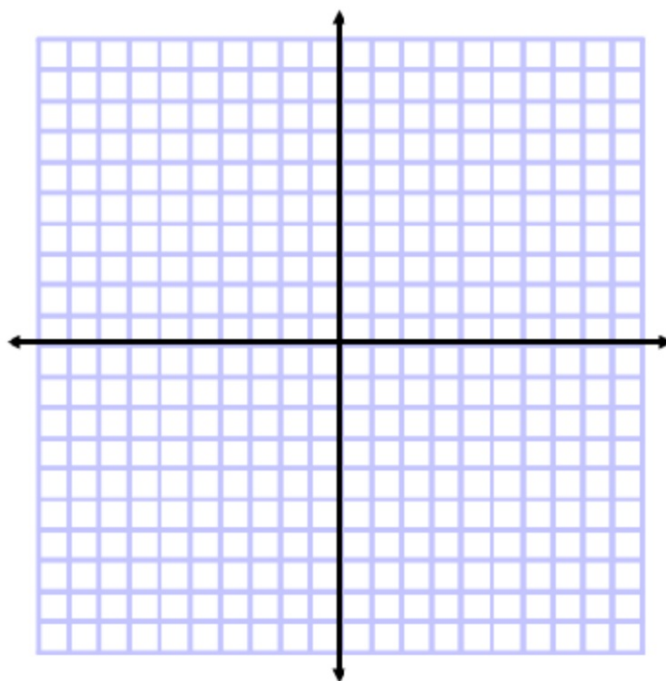
Example 2 Graph an Inequality (\leq or \geq)

Graph $x + 5y \leq 10$.

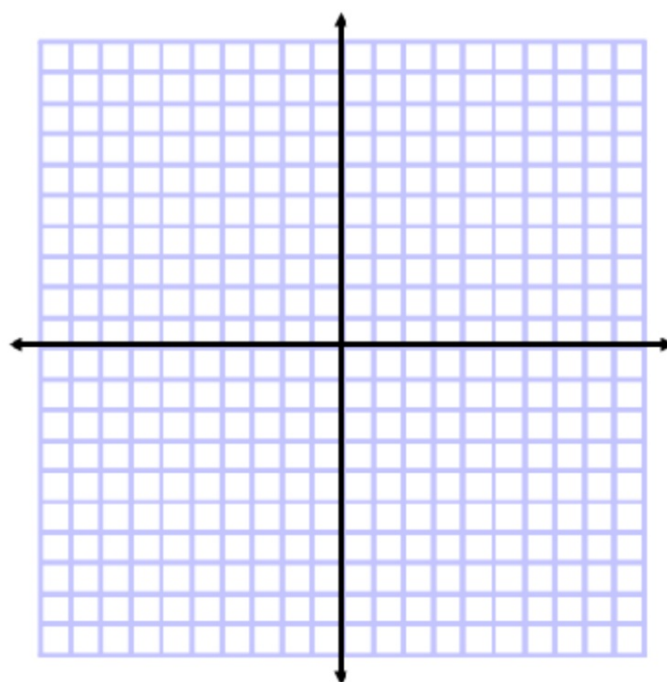


Graph each inequality.

2A. $x - y \leq 3$



2B. $2x + 3y \geq 18$



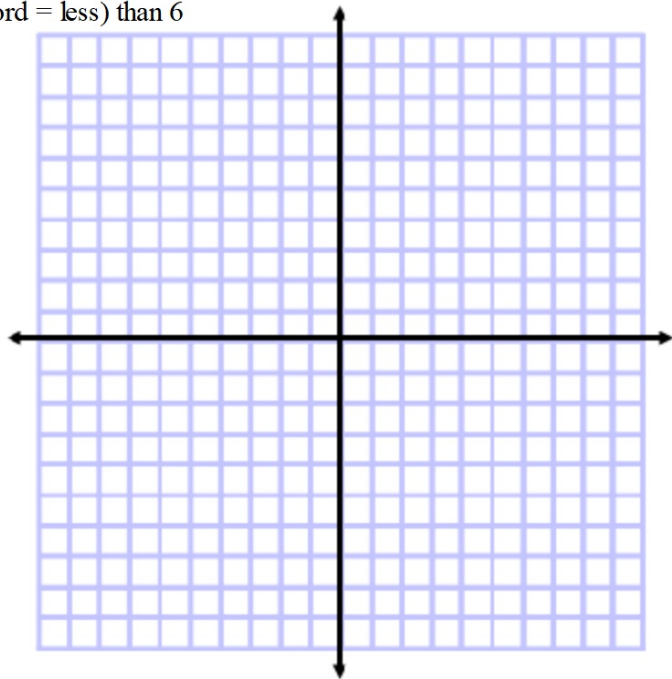
Example 3 Solve Inequalities From Graphs

Use a graph to solve $3x + 5 < 6$

Graph $y=3x + 5$

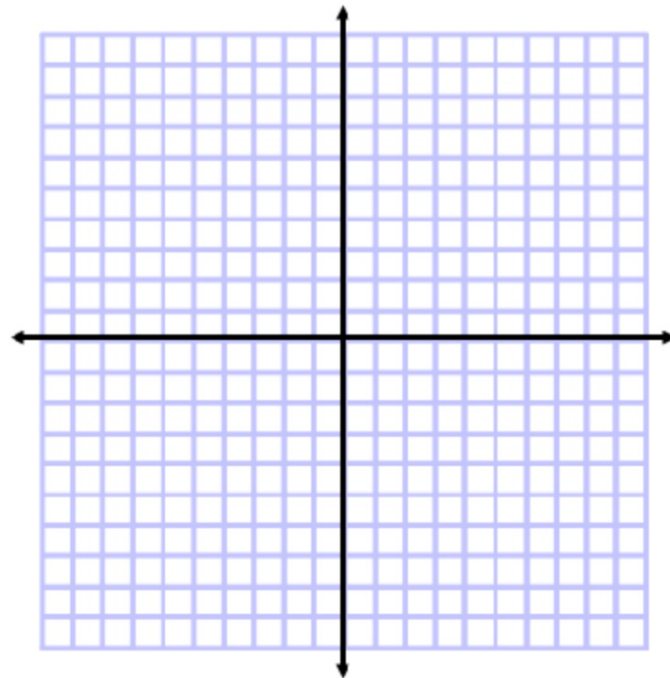
Graph $y=6$

Where is $3x+5$ lower on the graph (smaller y-coord = less) than 6

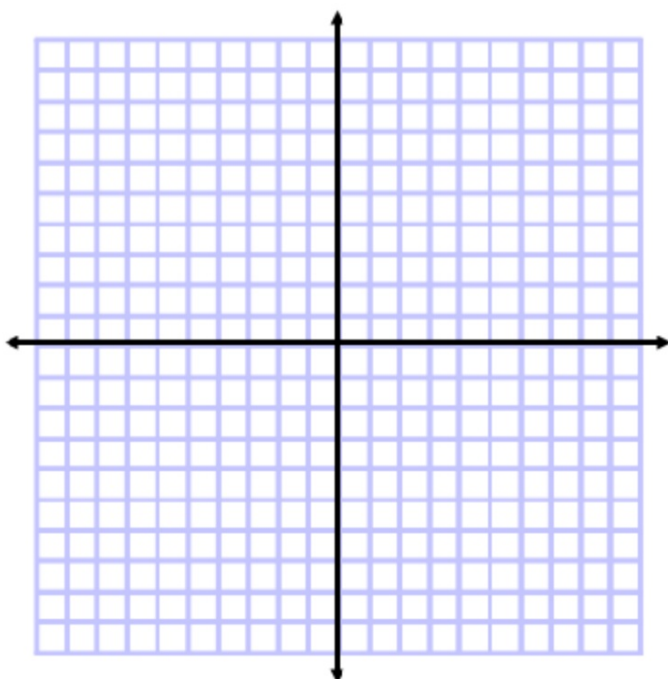


Use a graph to solve each inequality.

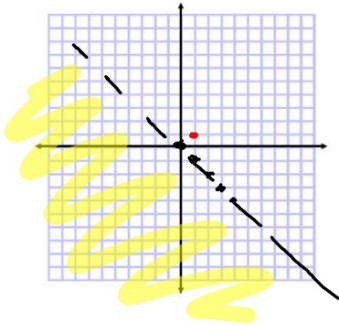
3A. $4x - 3 \geq -7$



3B. $-2x + 6 > 12$



$$y = -x$$



$$\begin{aligned} -x &> y \\ -1 &> 1 \end{aligned}$$

$$\begin{aligned} x - y &\geq 1 \\ 0 - 0 &\geq 1 \\ 0 &\geq 1 \end{aligned}$$

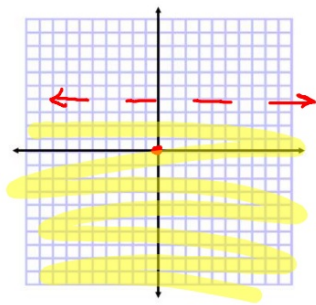
$$\begin{aligned} x - y &= 1 \\ -x - y &= -x \end{aligned}$$

$$\begin{aligned} -y &= -x + 1 \\ \frac{-y}{-1} &= \frac{-x + 1}{-1} \end{aligned}$$
$$y = x - 1$$



$$y < 4$$

$$0 < 4$$



$$x = 1$$

$$x \geq 1$$

$$0 \geq 1$$

