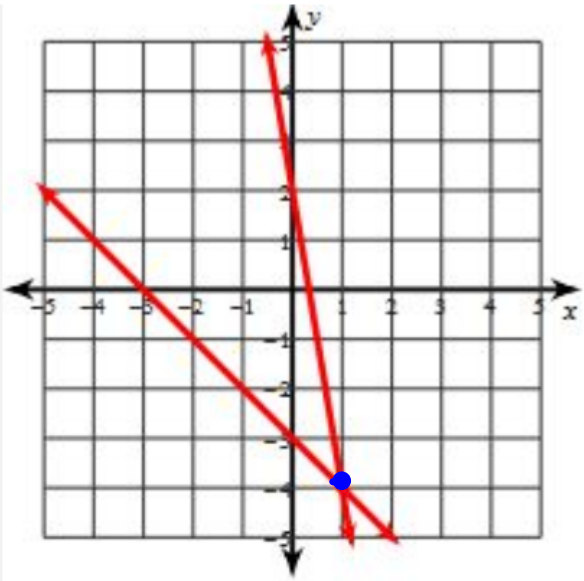
Warm-Up 2/8/2021

1. Buzz graphed two lines in order to find the solution to a given system of equations.
What is the solution?



- (-1, 4)
- (1, -4)
- (-4, 1)
- (4, -1)

2. Does the system have one, none or infinite solutions?

Same slope, different y-int

$y = 2x - 11$

$y = 2x + 5$

- One
- None
- Infinitely many solutions

3. Solve the solution by substitution:

$x = 7 - 2y$

$2x + y = 5$

4. Solve by elimination:

$-x+2y=17$

$2x+2y=-10$

③ $x = 7 - 2y$

$2x + y = 5$

$2(7 - 2y) + y = 5$

$14 - 4y + y = 5$

$14 - 3y = 5$

$-3y = -14 + 5$

$\frac{-3y}{-3} = \frac{-9}{-3}$

$y = 3$

$x = 7 - 2(3)$

$7 - 6 = 1$

$x = 1$

Solution: $(1, 3)$

④ $-x + 2y = 17$

$2x + 2y = -10$ $\times -1$

$-x + 2y = 17$

$+(-2x - 2y = 10)$

$\frac{-3x}{-3} = \frac{27}{-3}$

$x = -9$

$-(-9) + 2y = 17$

$9 + 2y = 17$

$2y = 17 - 9$

$\frac{2y}{2} = \frac{8}{2}$

$y = 4$

Solution: $(-9, 4)$

Essential Questions 2/8/2021

How can I graph linear inequalitie and systems of inequality?

Learning Target(s)

Graph Linear Inequalities and Systems of Inequality.

Graphing Linear Inequalities 2/8/2021

Standard(s):

MGSE9-12.A.REI.12 Graph the solution set to a linear inequality in two variables.

Linear Inequalities

- A **linear inequality** is like an equation, but the equal sign is replaced with an inequality symbol.
- A **solution** to an inequality is any ordered pair that makes the inequality true.

Examples: Tell whether the ordered pair is a solution to the inequality.

(7, 3); $y < 2x - 3$ Yes

x, y

$3 < 2(7) - 3$

$3 < 14 - 3$

$3 < 11$ ✓

(4, 5); $y < x + 1$

x, y

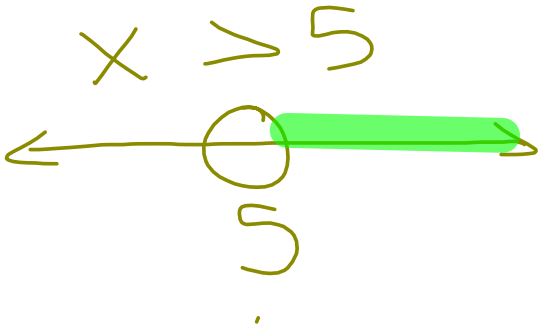
$5 < 4 + 1$ Not a solution!

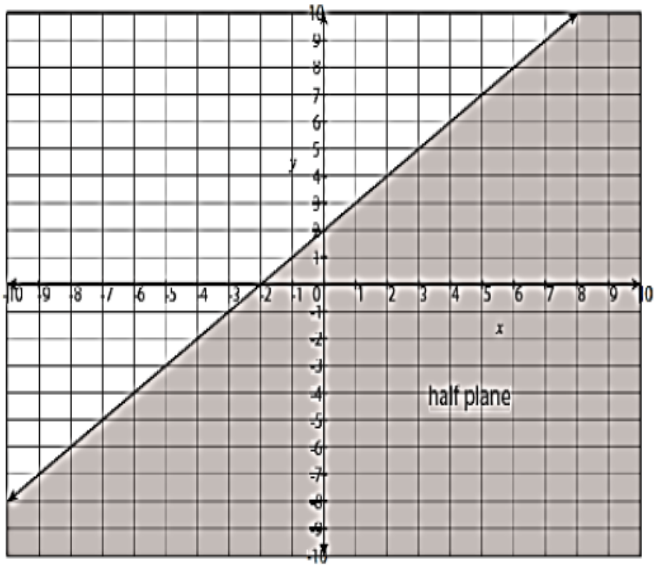
$5 < 5$ X

(4, 5); $y \leq x + 1$ Yes

$5 \leq 5$ ✓

A linear inequality describes a region of a coordinate plane called a half-plane. All the points in the shaded region are solutions of the linear inequality. The boundary line is the line of the equation you graph.





Symbol	Type of Line	Shading
<	Dashed	Below boundary line
>	Dashed	Above boundary line
≤	Solid	Below boundary line
≥	Solid	Above boundary line

Steps for Graphing Inequalities

Graphing Linear Inequalities

Step 1: Solve the inequality for y (if necessary).

Step 2: Graph the boundary line using a solid line for ≤ or ≥ OR a dashed line for < or >.

Step 3:
If the inequality is > or ≥, shade **above** the boundary line
If the inequality is < or ≤, shade **below** the boundary line

OR

Select a test point and substitute it into linear inequality.

- If the test point gives you a **true** inequality, you shade the region where the test point is located.
- If the test point gives you a **false** inequality, you shade the region where the test point is NOT located.

Practice: Graphing Inequalities

a. $y < 3x + 4$

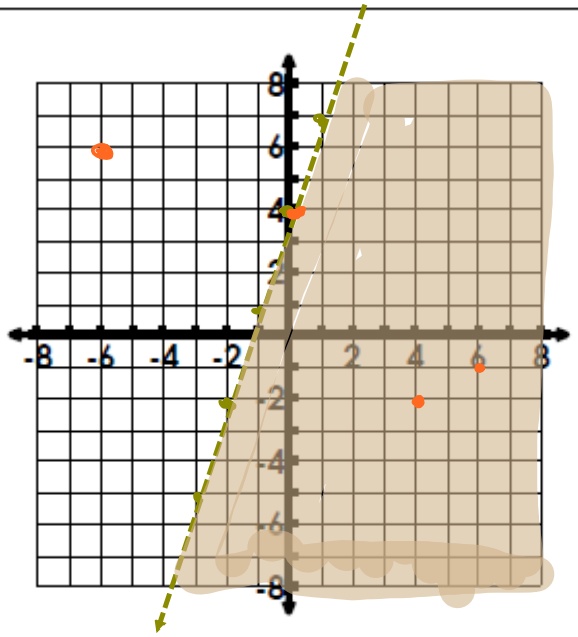
Type of Line: Solid OR Dashed

Shade: Above OR Below

Slope: $\frac{3}{1}$ **Y-Int:** 4

Two Solutions: (4, −2) (6, −1)

Two Non-Solutions: (−6, 6) (0, 4)



Test Point:

Practice - You Try

b. $4x - 3y \leq 12$

0:03:00

$-3y \leq -4x + 12$

$\frac{-3y}{-3} \leq \frac{-4x+12}{-3}$

$y \geq \frac{4}{3}x - 4$

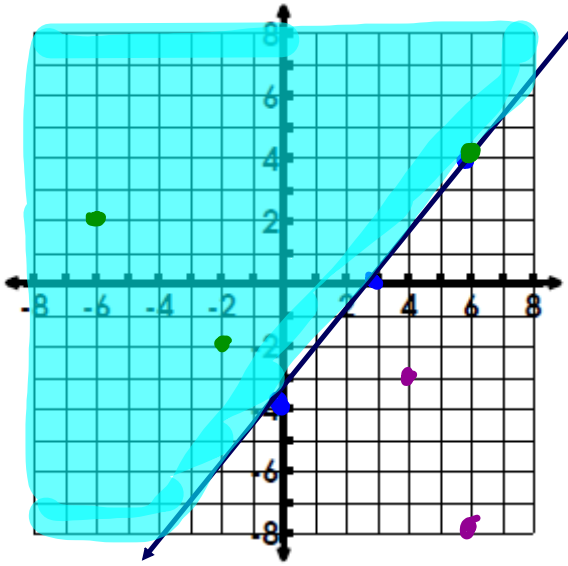
Type of Line: Solid OR Dashed

Shade: Above OR Below

Slope: $\frac{4}{3}$ **Y-Int:** -4

Two Solutions: $(-6,2)$ $(-2,-2)$ $(6,4)$

Two Non-Solutions: $(6,-8)$ $(4,-3)$



Test Point:

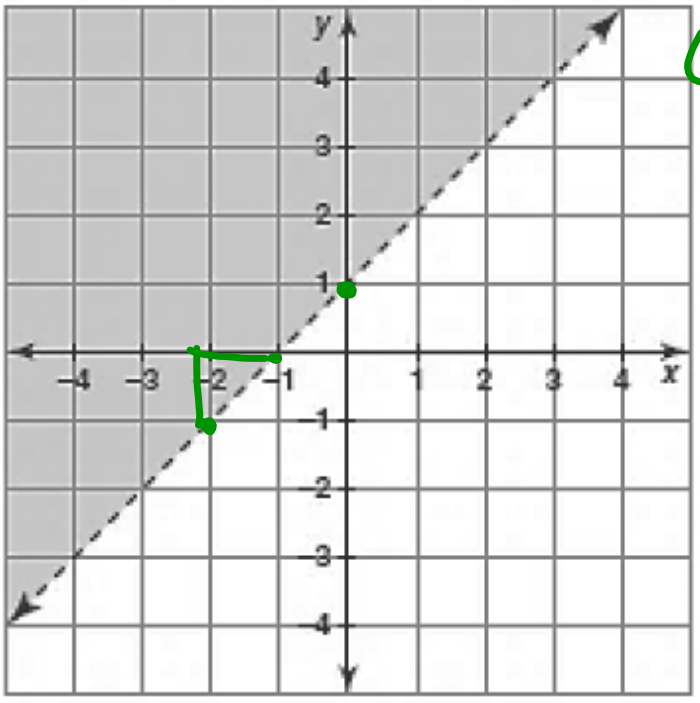
Naming Inequalities

What information do you need to look at to name a linear inequality from a graph?

- $y > |x+1|$
-

Practice: Name each linear inequality from the graph:

a.



dashed line

shade above

$>$

$m: \frac{1}{1}$

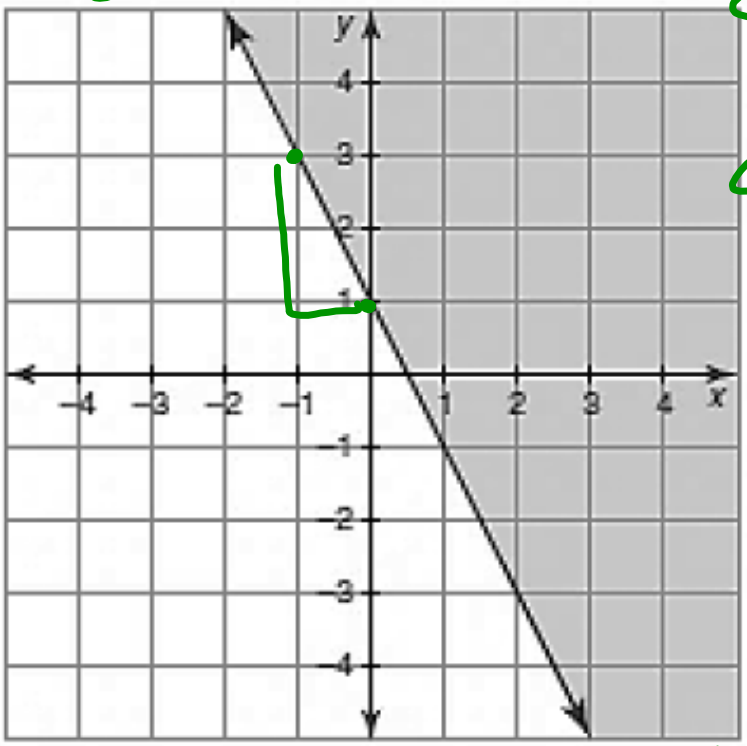
$b = (0, 1)$

Name the linear inequality from the graph

What information do you need to look at to name a linear inequality from a graph?

- _____
- _____

b. $y \geq -2x + 1$



solid line

shade above

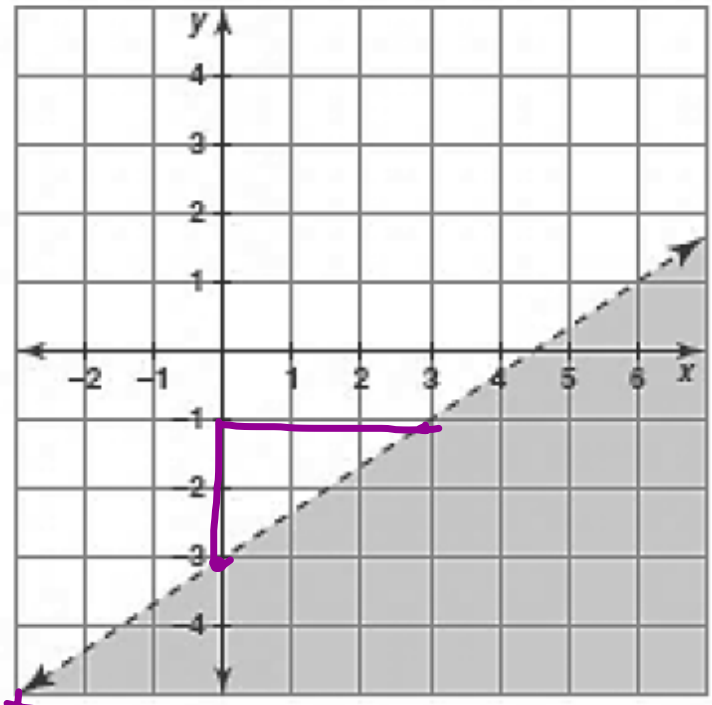
$\geq$

$m = -\frac{2}{1}$

$b = (0, 1)$

Name the linear inequality from the graph

C.



dashed line
shade below
$<$

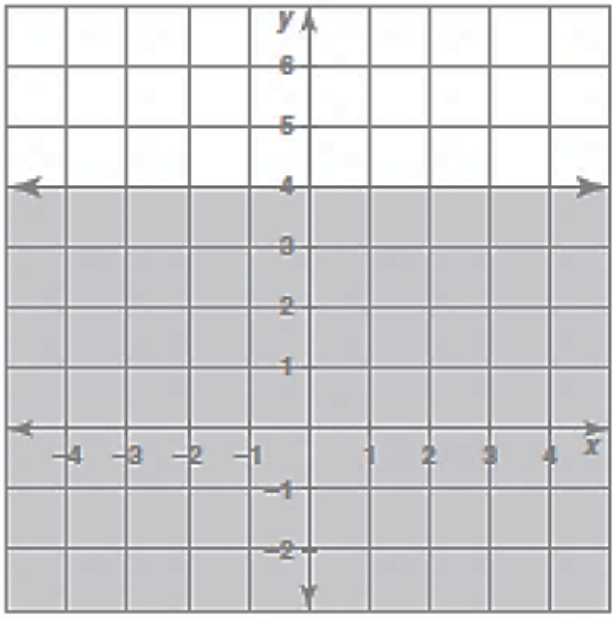
$m = \frac{2}{3}$

$b = (0, -3)$

$y < \frac{2}{3}x - 3$

Name the linear inequality from the graph

d.



Solid line

Shade below

$<$

Slope $= 0$

$b = (0, 4)$

$y < 4$

Horizontal

0 slope

$y = \#$

Vertical

Undefined slope

$x = \#$

Graphing Systems of Inequalities 2/8/2021

Solutions to Inequalities

- The **solution of a system of linear inequalities** is the intersection of the solution to each inequality.
- Every point in the intersection regions satisfies the solution.

Determine if the following points are a solution to the inequality:

$x + 5y < -1$

$2y \geq -3x - 2$

(0, -1)

Yes

x, y

$0 + 5(-1) < -1$

$-5 < -1$ ✓

$2(-1) \geq -3(0) - 2$

$-2 \geq -2$ ✓

(2, 3)

x, y

Not a Solution

$2 + 5(3) < -1$

$2 + 15 < -1$

$17 < -1$ X

$2(3) \geq -3(2) - 2$

$6 \geq -6 - 2$

$6 \geq -8$ ✓

Steps for Graphing Inequalities in Slope Intercept Form

Steps for Graphing Systems of Inequalities

Step 1: Graph the boundary lines of each inequality. Use dashed lines if the inequality is < or >. Use a solid line if the inequality is ≤ or ≥.

Step 2: Shade the appropriate half plane for each inequality.

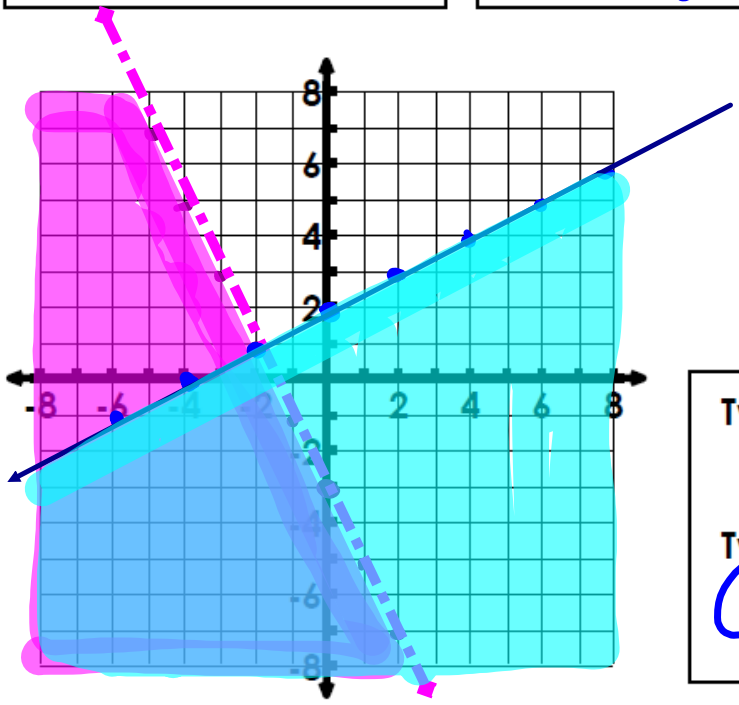
Step 3: Identify the solution of the system of inequalities as the intersection of the half planes from Step 2.

A. $y < -2x - 3$

$y \leq \frac{1}{2}x + 2$

Type of Line:	dashed
Shade:	below
Slope:	$-\frac{2}{1}$
Y-Int:	-3

Type of Line:	solid
Shade:	below
Slope:	$\frac{1}{2}$
Y-Int:	2



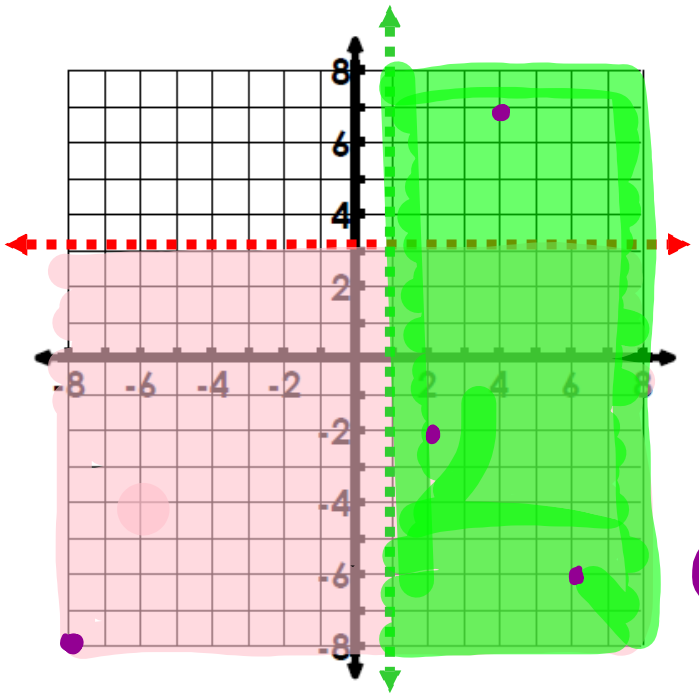
Two Solutions: $(-2, -4)$ $(-4, -4)$

Two Non-Solutions: $(6, 2), (-6, 4)$

B. $y < 3$
$x > 1$

Type of Line:	dashed
Shade:	below
Slope:	zero
Y-Int:	(0, 3)

Type of Line:	dashed
Shade:	above
Slope:	undefined
Y-Int:	none



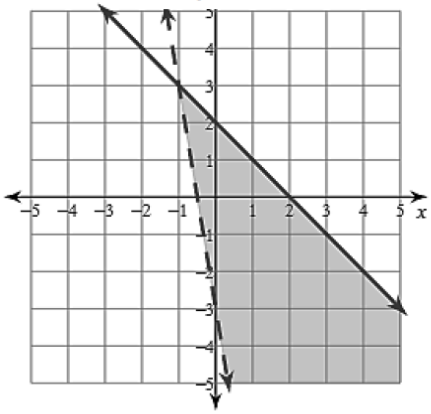
Two Solutions: (2, -2) (6, -6)

Two Non-Solutions: (-8, -8) (4, 7)

Warning!

Warning…Potential Misconception!!!

$x + y \leq 2$
$6x + y > -3$



Do you think the point (-1, 3) is a solution to the inequality?

Determining Solutions Located on a Boundary Line

If a point lies on a **solid** line, it is a solution.

If a point lies on a **dashed** line, it is a nonsolution.

It must be true or a solution for both inequalities/boundary lines to be a solution!

Watch the videos on edpuzzle:

1. Graphing Linear Inequalities
2. Graphing Systems of Linear Inequalities

Edpuzzle Class Codes:

1st Block: fikpape

2nd Block: kusdupi

3rd Block: sirozud