LINEAR INEQUALITY

A **linear inequality** is an inequality that can be written in one of the following forms:

$$Ax + By > C \qquad Ax + By \geq C \qquad Ax + By < C \qquad Ax + By \leq C$$

where A and B are not both zero.

Determine whether each ordered pair is a solution to the inequality $y > x + 4$

$<, >$ $\leq, \geq$

open dot   Closed dot

Dotted line   Solid Line

a) (0, 0)	b) (1, 6)	c) (2, 6)	d) (5, 15)	e) (-8, 12)
$0 > 0 + 4$	$6 > 1 + 4$	$6 > 2 + 4$	$15 > -5 + 4$	$12 > -8 + 4$
$0 > 4$	$6 > 4$	$6 > 6$	$15 > -1$	$12 > -4$
No Solution	Yes Solution	Not Solution	Yes Solution	Yes Solution

$Ax + By < C$	$Ax + By \leq C$
$Ax + By > C$	$Ax + By \geq C$
Boundary line is not included in solution.	Boundary line is included in solution.
Boundary line is dashed.	Boundary line is solid.

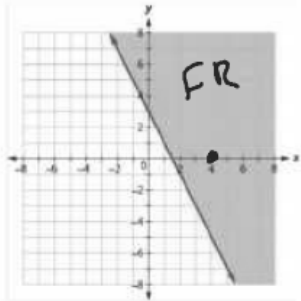The boundary line shown is $y = 2x - 1$. Write the inequality shown by the graph.

$\leq$ or $\geq$
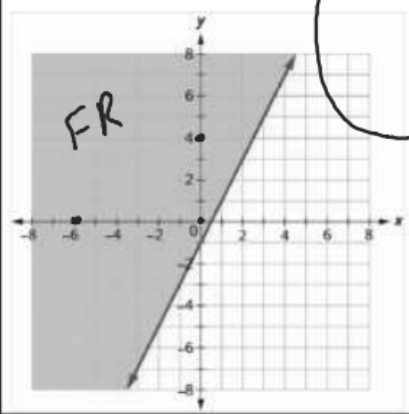
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$0 \qquad 2(0) - 1$

$0 \geq -1$

$y \geq 2x - 1$

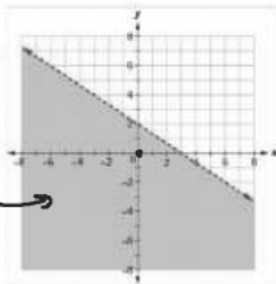The boundary line shown is $y = -2x + 3$. Write the inequality shown by the graph.

$\leq, \geq$ $(4, 0)$

FR

0 $-2(4)+3$

$0 \geq -5$

$y \geq -2x+5$

The boundary line shown is $2x + 3y = 6$. Write the inequality shown by the graph.

$<, >$

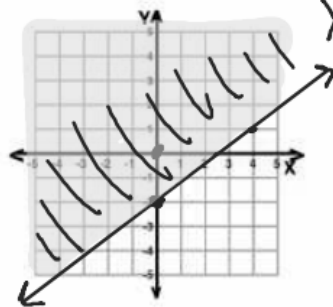$2(0)+3(6)$ 6

$0 < 6$

$2x+3y < 6$

Fesible Region

Linear Inequality
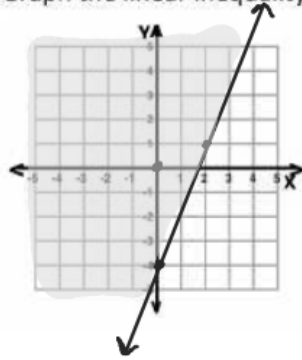Fesible Region

Graph the linear inequality $y \geq \frac{3}{4}x - 2$.

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

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

$0 \geq -2$ ✓
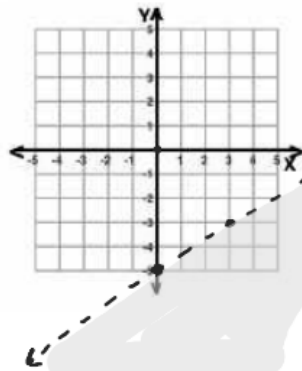
Graph the linear inequality $y \geq \frac{5}{2}x - 4$.

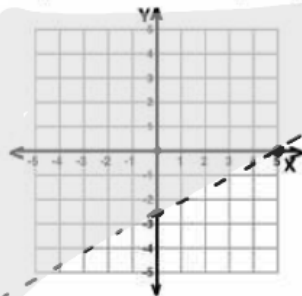$$0 \geq \frac{5}{2}(0) - 4$$
$$0 \geq -4 \quad \checkmark$$

Graph the linear inequality $y < \frac{2}{3}x - 5$.

$$0 < \frac{2}{3}(0) - 5$$
$$0 < -5$$

Graph the linear inequality $x - 2y < 5$.

$X - \frac{C}{A} = \frac{5}{1} = 5 \quad (5,0)$

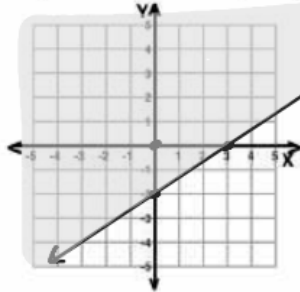$Y = \frac{C}{B} = \frac{5}{-2} = \quad \left(0, \frac{-5}{2}\right)$

$X - 2y < 5$

$-2y < -x + 5$

$y > \frac{1}{2}x - 5$

$$0 - 2(0) < 5$$
$$0 < 5$$

Graph the linear inequality $2x - 3y \leq 6$.
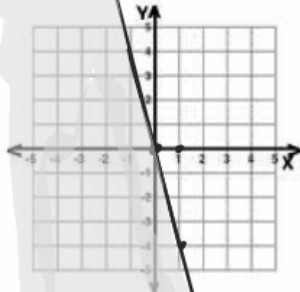
$$x = \frac{C}{A} = \frac{6}{2} = (3,0)$$

$$y = \frac{C}{B} = \frac{6}{-3} = (0,-2)$$

$$2(0) - 3(0) \leq 6$$
$$0 \leq 6$$

Graph the linear inequality $y \leq -4x$.
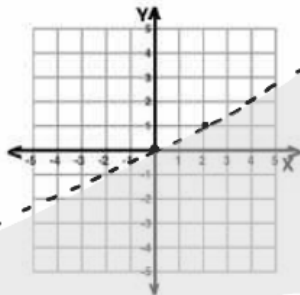
$b = 0$

$m = \frac{-4}{1}$

$(1,0)$

$0 \leq -4(1)$

$0 \leq -4$ ✗

$(1,0)$

$2(1) - 4(0) > 0$

$2 > 0$

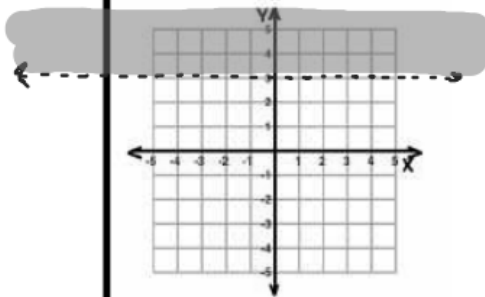Graph the linear inequality $2x - 4y > 0$

$$x = \frac{0}{2} = (0,0)$$

$$y = \frac{0}{4} = (0,0)$$

$$m = -\frac{A}{B}$$
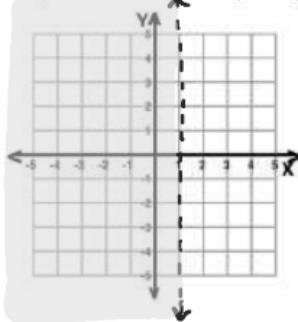
$$= \frac{-2}{-4} = \frac{1}{2}$$
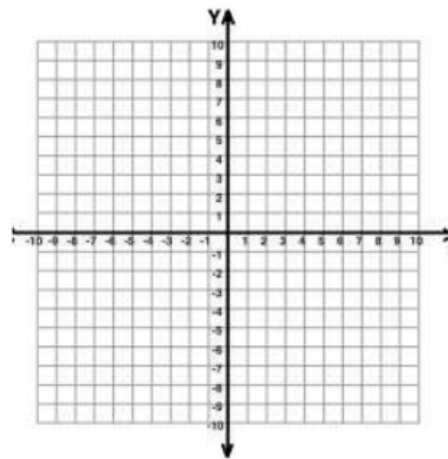
Graph the linear inequality $y > 3$. $y = 3$

Graph the linear inequality $x < 1$.

Find the feasible region.

$x \geq 1$
$y \leq 6$
$y \geq x - 2$

Find the feasible region.
$2x + y \geq 4$
$x - y < -1$