

$$9x - 7i > 3(3x - 7u)$$

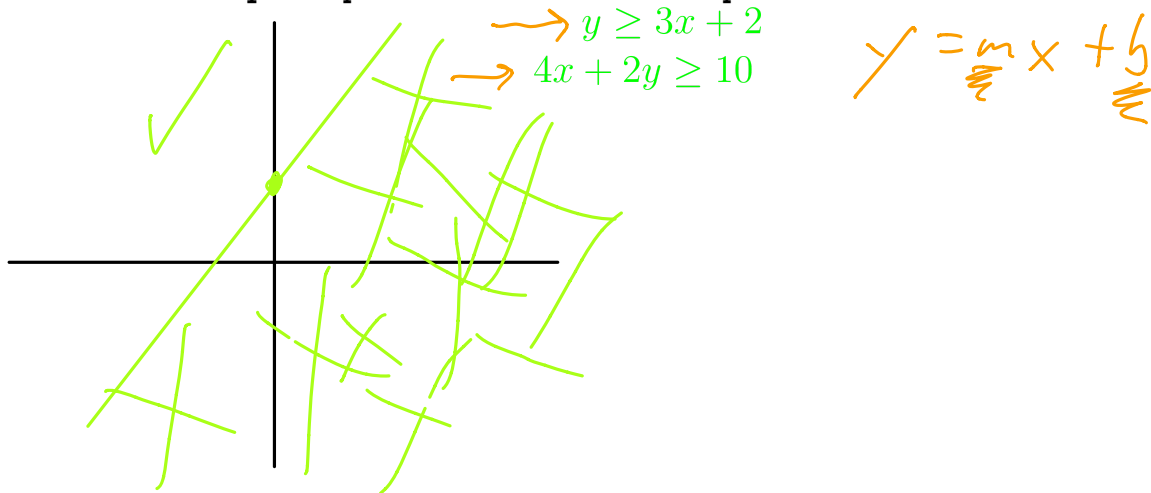
$$9x - 7i > 9x - 21u$$

$$-7i > 9x - 9x - 21u$$

$$-7i > -21u$$

$$i < 3u$$

A linear inequality in two variables may come in two forms:



An inequality in 2 variables defines an infinite area in the cartesian plane.

Any point  $(x, y)$  that satisfies the inequality is a solution.

Eg: Which points are solutions?

$$3x - 2y \geq -16$$

$$[(-3, 4), (0, 2), (-5, 3)]$$

$$3(-3) - 2(4) \geq -16$$

$$-9 - 8 \geq -16$$

$$-17 \geq -16$$

X

$$3(0) - 2(2) \geq -16$$

$$-4 \geq -16$$

✓

$$3(-5) - 2(3) \geq -16$$

$$-15 - 6 \geq -16$$

$$-21 \geq -16$$

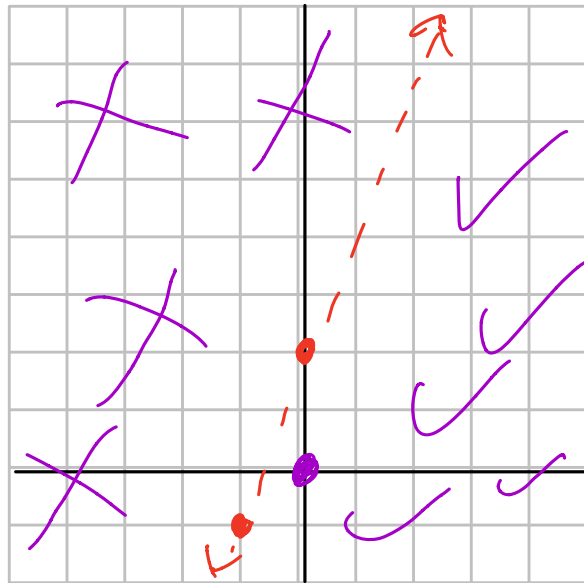
X

$$y < 3x + 2$$

(0, 0)

$$0 < 3(0) + 2$$

$$0 < 2$$

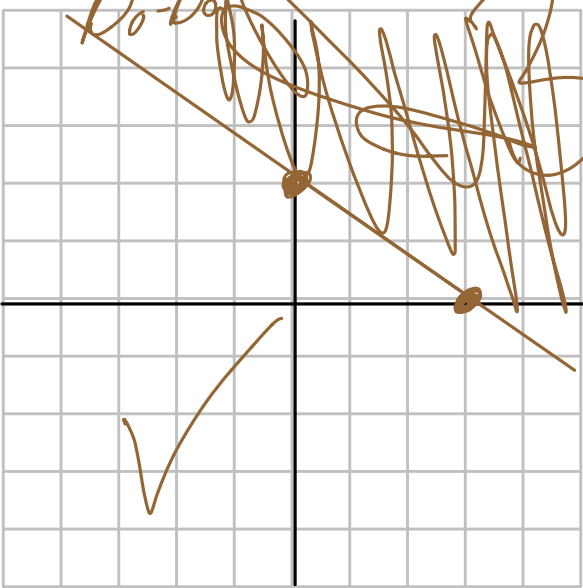


The line that separates valid solution points from invalid points is called the **boundary line**.

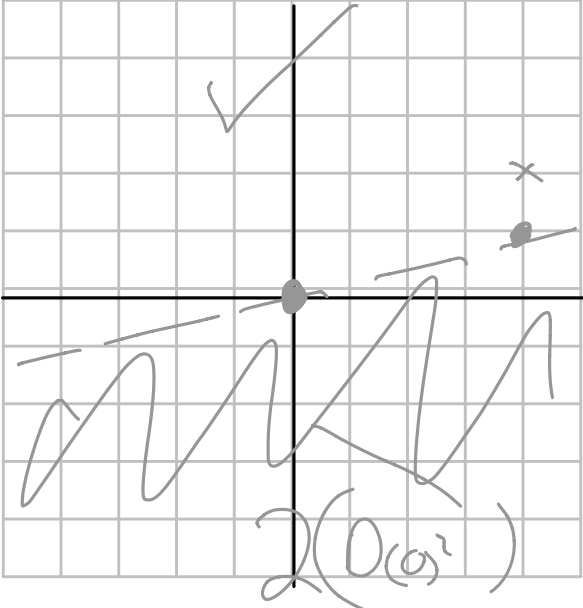
If the line itself is a solution, ( **$\geq, \leq$** ) then the boundary line should be solid.

If the line itself is not a solution, ( **$>, <$** ) then the boundary line should be dashed.

The algorithm:

|                                                         |                                                                                     |
|---------------------------------------------------------|-------------------------------------------------------------------------------------|
| EG:                                                     | $2x + 3y \leq 6$                                                                    |
| Solve for y                                             | $3y \leq 6 - 2x$ $y \leq \frac{6}{3} - \frac{2x}{3}$ $y \leq -\frac{2x}{3} + 2$     |
| Decide if you need a solid or dotted line               | SOLID                                                                               |
| Draw your line                                          |  |
| Decide which part of the graph contains valid solutions |                                                                                     |
| Scratch out the 'garbage'.                              |                                                                                     |

$$5(4) - 20(2) < 0$$

|                                                         |                                                                                         |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------|
| EG:                                                     | $5x - 20y < 0$                                                                          |
| Solve for y                                             | $\begin{aligned} -20y &< -5x \\ y &> \frac{-5x}{-20} \\ y &> \frac{x}{4} \end{aligned}$ |
| Decide if you need a solid or dotted line               | Dashed $2 > 1$ $(4, 2)$                                                                 |
| Draw your line                                          |      |
| Decide which part of the graph contains valid solutions |                                                                                         |
| Scratch out the 'garbage'.                              |                                                                                         |

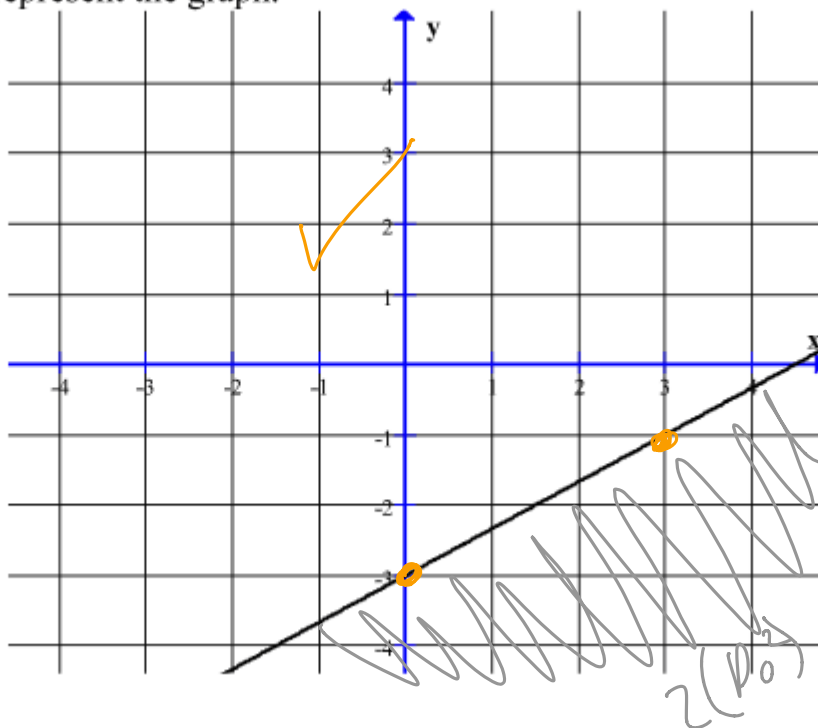
Write an inequality to represent the graph.

① eq<sup>n</sup> line

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

②  $> <$  ③  $<$

③  $y \geq \frac{2}{3}x - 3$



Write an inequality to represent the graph.

$$y \leq -2x + 1$$

