

1) Graph line

$> <$  Use dashed line

$\geq \leq$  Use solid line

2) Pick a point not on line and see if TRUE or FALSE

$(0, 0)$  is good if not on line

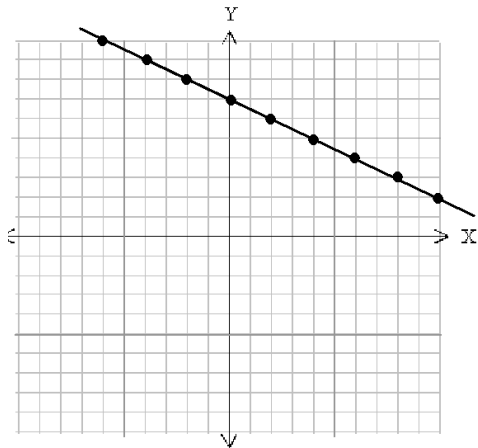
3) Shade the graph

### Example 1

Graph the inequality  $y \geq -\frac{1}{2}x + 7$ .

**Step 1** – Graph the line.

Pretend the inequality is the equation  $y = -\frac{1}{2}x + 7$  and graph it. Since the inequality symbol is  $\geq$ , we will use a solid line.



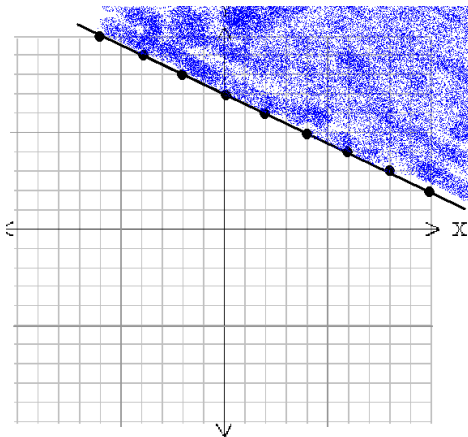
**Step 2** – Pick a point not on the line and see if it is TRUE or FALSE.

If  $(0, 0)$  isn't on the line, it's the easiest point to pick. It isn't on our line, so let's use it!

$$\begin{aligned} (0) &\geq -\frac{1}{2}(0) + 7 \\ 0 &\geq 0 + 7 \\ 0 &\geq 7 \\ \text{This is } &\mathbf{FALSE!} \end{aligned}$$

**Step 3** – Shade the graph

Since  $(0, 0)$  was **FALSE**, we will not shade the side of the line that has  $(0, 0)$ . Instead, we will shade the *other* side.



Coloring is lots of fun... but what does this actually mean???

- Pick any point from the parts that ARE colored in (including the line if it is solid). Take the coordinates of that point and plug them into the inequality  $y \geq -\frac{1}{2}x + 7$  and you will get a TRUE statement.
- Pick any point from the parts that ARE NOT colored in (including the line if it is dashed). Take the coordinates of that point and plug them into the inequality  $y \geq -\frac{1}{2}x + 7$  and you will get a FALSE statement.

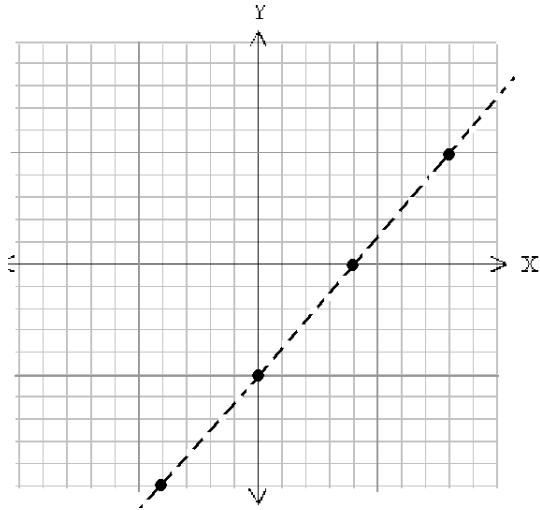
Just like inequalities on the number line, we always color/fill in what is TRUE!

**Example 2**

Graph the inequality  $5x - 4y < 20$ .

**Step 1** – Graph the line.

Pretend the inequality is the equation  $5x - 4y = 20$  and graph it. Since the inequality symbol is  $<$ , we will use a dashed line.



**Step 2** – Pick a point not on the line and see if it is TRUE or FALSE.

$(0, 0)$  isn't on the line, so let's use it again!

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

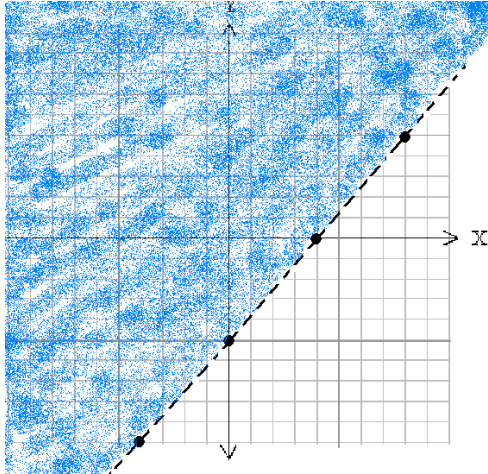
$$0 - 0 < 20$$

$$0 < 20$$

This is TRUE!

**Step 3 – Shade the graph**

Since  $(0, 0)$  was TRUE, we *will* shade the side of the line that has  $(0, 0)$ .



Every point in the shaded area will make the inequality  $5x - 4y < 20$  true.