

5.7 LINEAR INEQUALITIES IN TWO VARIABLES

The differences between graphing linear equations and linear inequalities are the type of line used and the shading.

<u>Inequality</u>	<u>Type of Line</u>	<u>Where to Shade</u>
$<$	dotted	below y-int.
\leq	solid	below y-int.
\geq	solid	above y-int.
$>$	dotted	above y-int.

An ordered pair is a **solution** of a linear inequality if the inequality is true when the values for x and y are plugged in.

Example 1

Check whether the given ordered pairs are solutions of $2x + 3y \leq 5$.

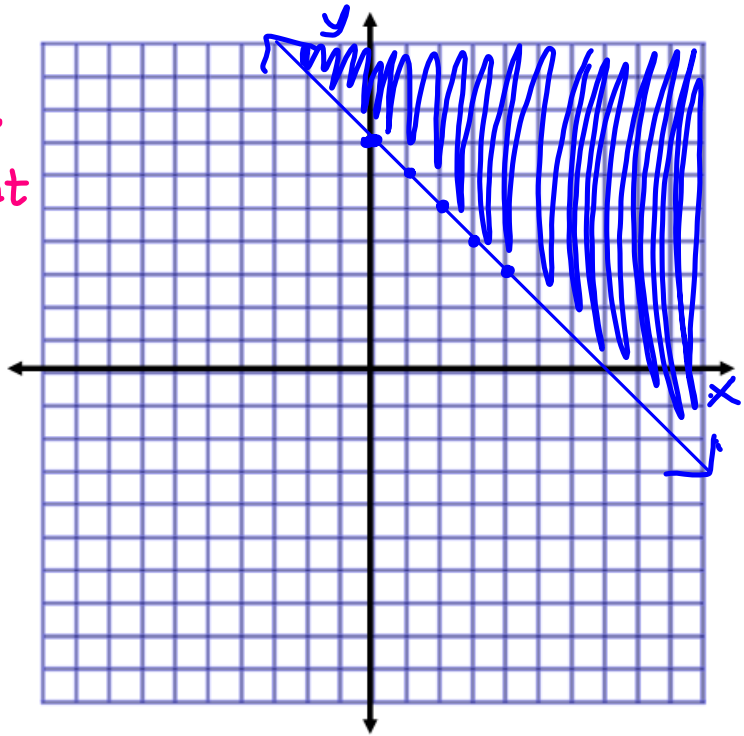
a) $(0, 1)$ **solution** b) $(4, -1)$ **solution** c) $(2, 1)$ **not a solution**

$$\begin{array}{l} 2(0) + 3(1) \stackrel{?}{\leq} 5 \\ 0 + 3 \leq 5 \\ 3 \leq 5 \checkmark \\ \text{true} \end{array} \quad \begin{array}{l} 2(4) + 3(-1) \stackrel{?}{\leq} 5 \\ 8 + -3 \leq 5 \\ 5 \leq 5 \\ \text{true} \end{array} \quad \begin{array}{l} 2(2) + 3(1) \stackrel{?}{\leq} 5 \\ 4 + 3 \leq 5 \\ 7 \leq 5 \\ \text{false} \end{array}$$

2. Graph $y \geq -x + 7$.

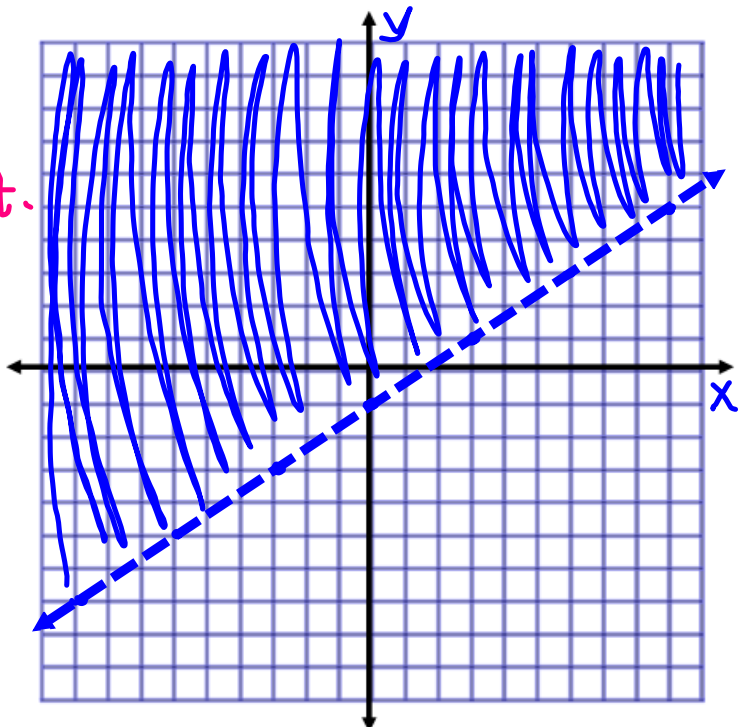
$m = -1$
 $y\text{-int} = 7$
solid line

shade above $y\text{-int}$



3. Graph $y > \frac{2}{3}x - 1$.

$m = \frac{2}{3}$
 $y\text{-int} = -1$
dotted line
shade above $y\text{-int}$.



4. Graph $2x - 3y > 6$.

$$\frac{-2x}{-3} > \frac{-2x+6}{-3}$$

$$\frac{-3y}{-3} > \frac{-2x+6}{-3}$$

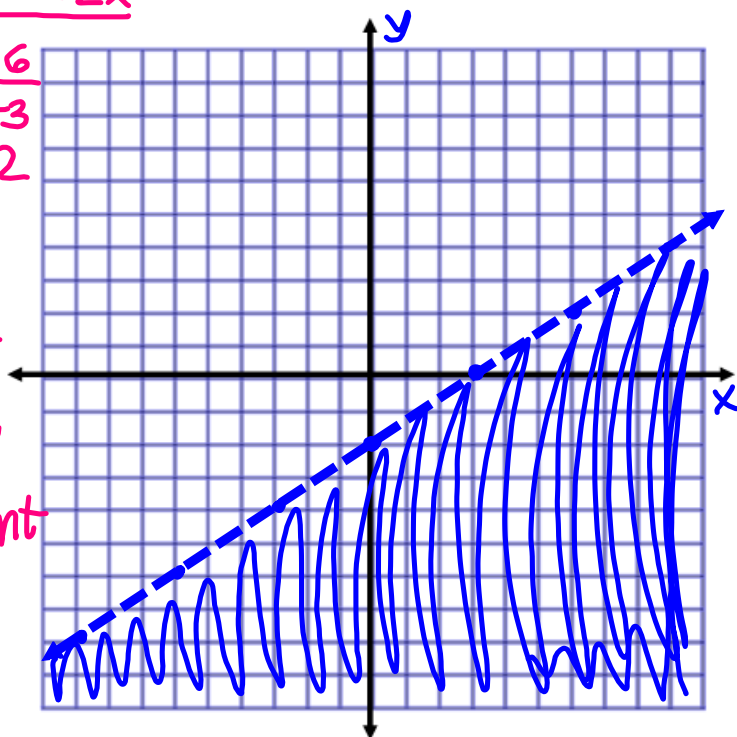
$$y < \frac{2}{3}x - 2$$

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

$$y\text{-int} = -2$$

dotted line

shade below y-int

5. Graph $x + 5y \leq -10$.

$$\frac{x}{5} + \frac{5y}{5} \leq \frac{-10}{5}$$

$$\frac{5y}{5} \leq \frac{-x-10}{5}$$

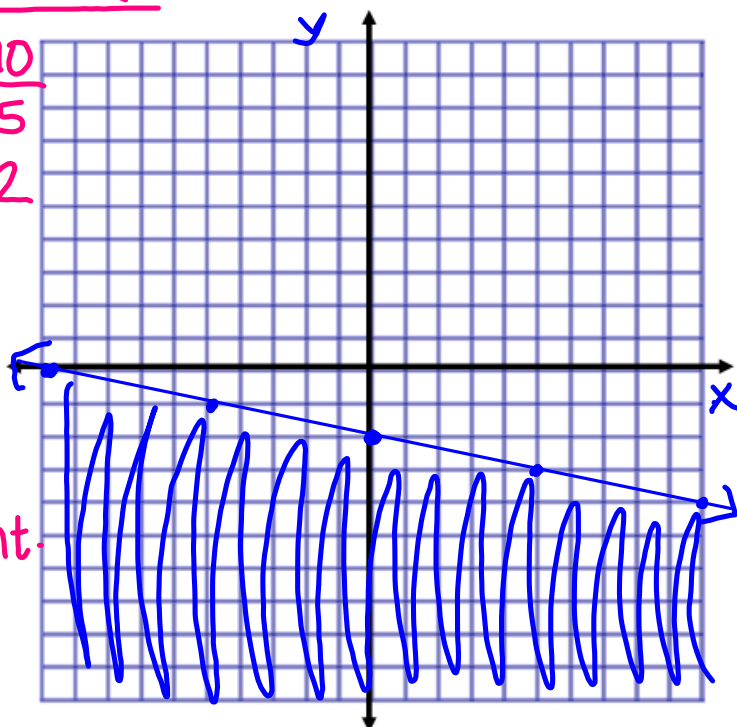
$$y \leq -\frac{1}{5}x - 2$$

$$m = -\frac{1}{5}$$

$$y\text{-int} = -2$$

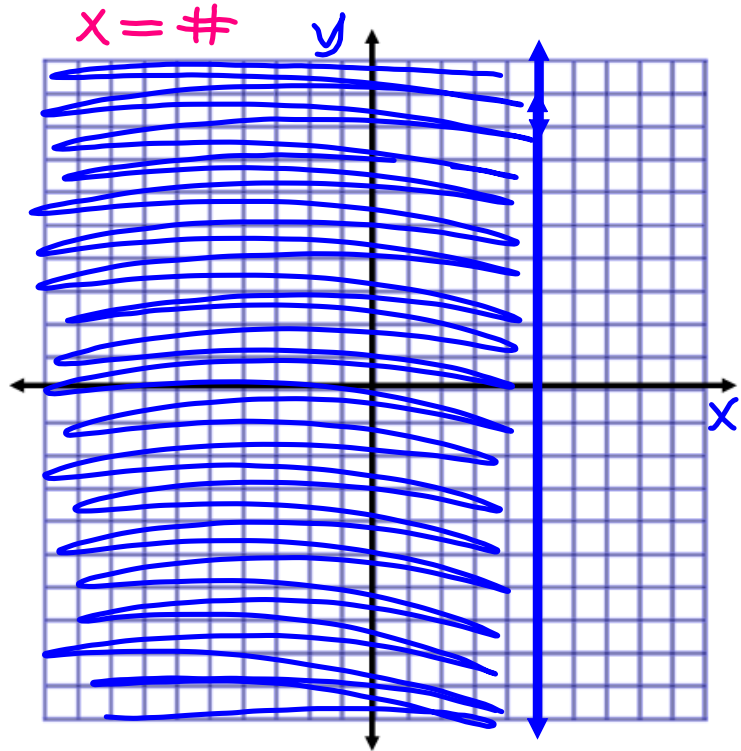
solid line

shade below y-int.



6. Graph $x \leq 5$.

vert. line
solid line
shade left



7. Graph $y > 6$.

hor. line $y = \#$
dotted line
shade above

