

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

$$\begin{aligned} 2(0) + 3(1) &\stackrel{?}{\leq} 5 \\ 0 + 3 &\leq 5 \\ 3 &\leq 5 \checkmark \end{aligned}$$

b) $(4, -1)$ solution

$$\begin{aligned} 2(4) + 3(-1) &\stackrel{?}{\leq} 5 \\ 8 + -3 &\leq 5 \\ 5 &\leq 5 \checkmark \end{aligned}$$

c) $(2, 1)$ not a solution

$$\begin{aligned} 2(2) + 3(1) &\stackrel{?}{\leq} 5 \\ 4 + 3 &\leq 5 \\ 7 &\leq 5 \times \end{aligned}$$

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

$$m = \frac{-1 \text{ rise}}{1 \text{ run}}$$

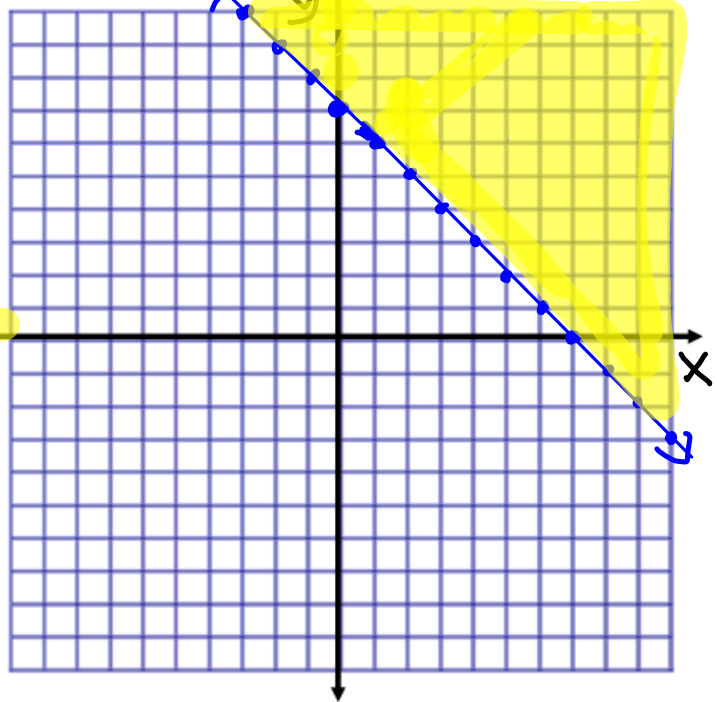
$$y\text{-int} = 7 \text{ *start}$$

solid line

shade above y-int

$$y = mx + b$$

slope y-int



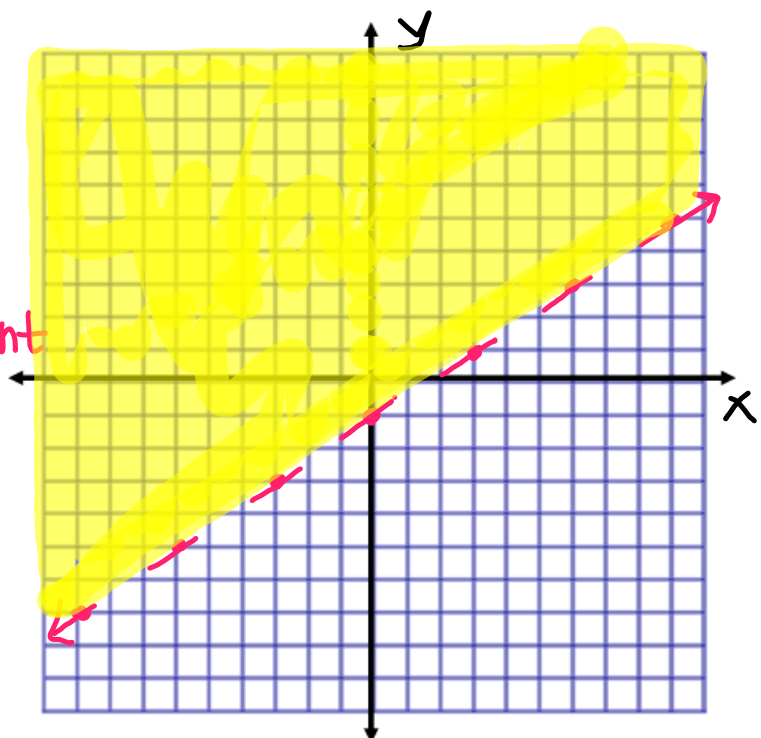
3. Graph $y > \frac{2}{3}x - 1$.

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

$$y\text{-int} = -1$$

dotted

shade above y-int



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

$$\begin{array}{r} 2x - 3y > 6 \\ -2x \quad -2x \\ \hline \end{array}$$

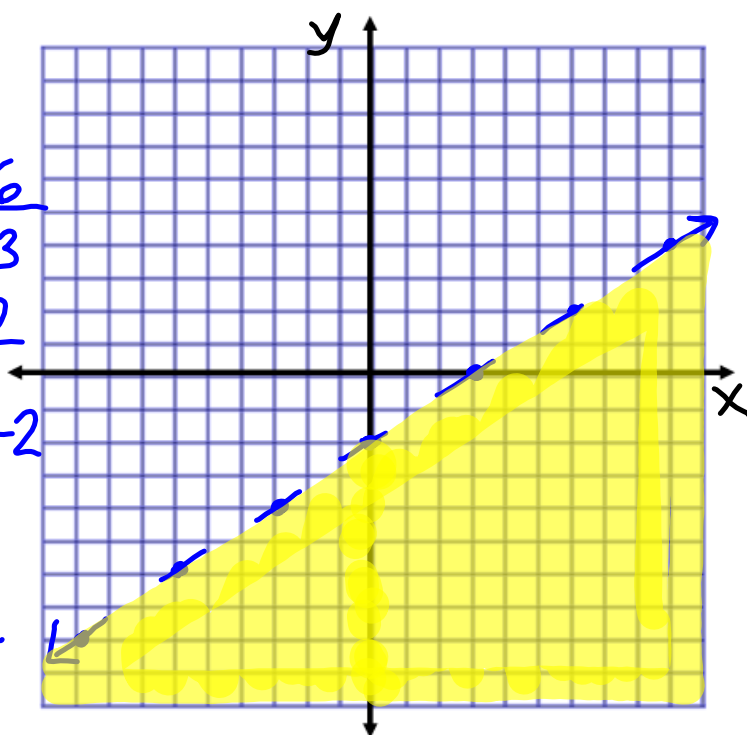
$$\begin{array}{r} -3y > -2x + 6 \\ -3 \quad -3 \quad -3 \\ \hline \end{array}$$

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

$$m = \frac{2}{3} \quad y\text{-int} = -2$$

dotted line

shade below y-int



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

$$\begin{array}{r} x + 5y \leq -10 \\ -x \quad -x \\ \hline \end{array}$$

$$\begin{array}{r} 5y \leq -x - 10 \\ 5 \quad 5 \quad 5 \\ \hline \end{array}$$

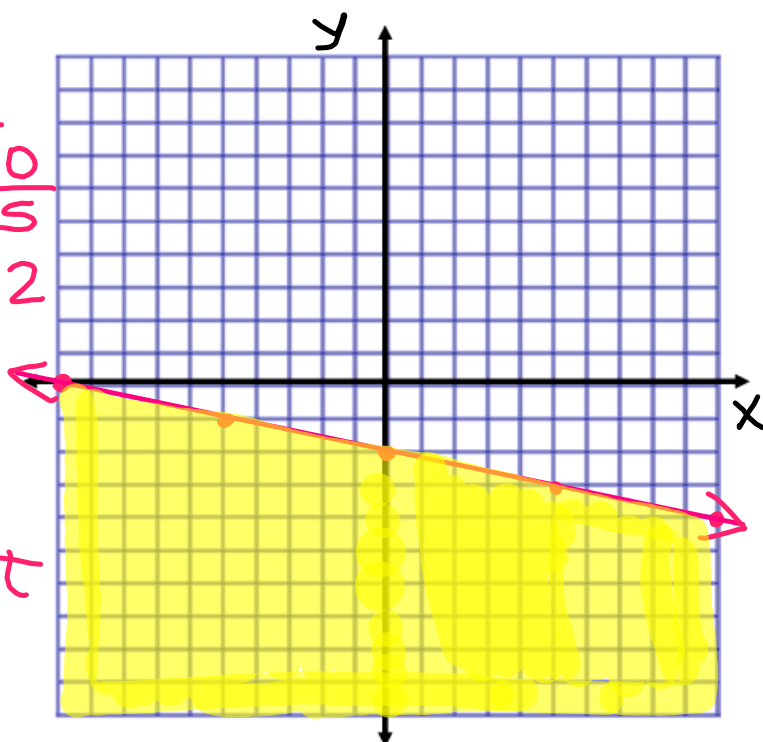
$$y \leq -\frac{1}{5}x - 2$$

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

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

solid line

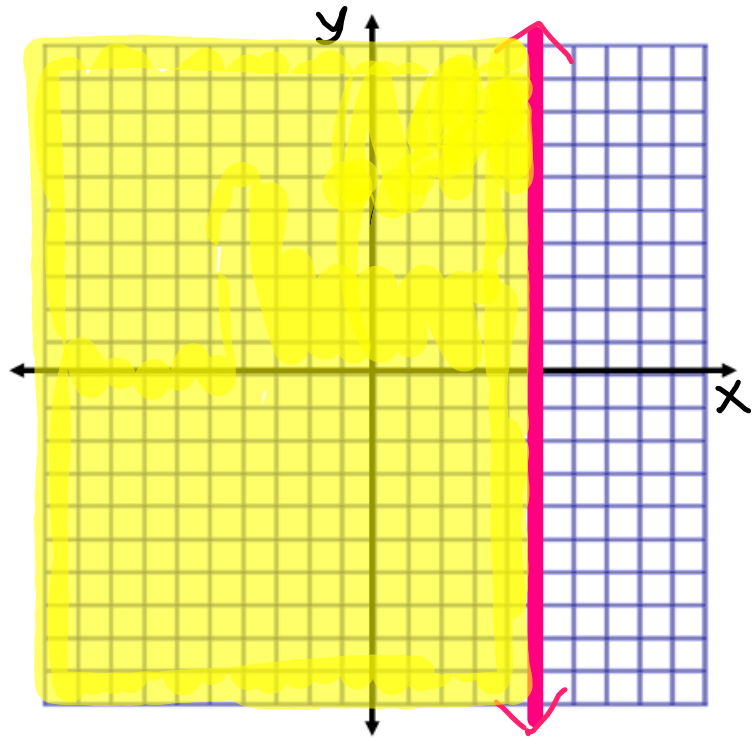
shade below y-int



6. Graph $x \leq 5$.

vert. line
solid
shade left
(#'s are
below 5)

$x = \#$ vertical



7. Graph $y > 6$.

hor. line
dotted
shade above

$y = \#$ horizontal

