2.6 LINEAR INEQUALITIES IN TWO VARIABLES

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

Inequality	Type of Line	Where to Shade
$<$	dotted	below
$\leq$	solid	below
$>$	dotted	above
$\geq$	solid	above

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 $2x + 3y \geq 5$.

a) (0, 1)

$2(0)+3(1) \geq 5$

$0+3 \geq 5$

$3 \not\geq 5$

NOT A SOLUTION

b) (4, -1)

$2(4)+3(-1) \geq 5$

$8+-3 \geq 5$

$5 \geq 5$ ✓

SOLUTION

c) (2, 1)

$2(2)+3(1) \geq 5$

$4+3 \geq 5$

$7 \geq 5$ ✓

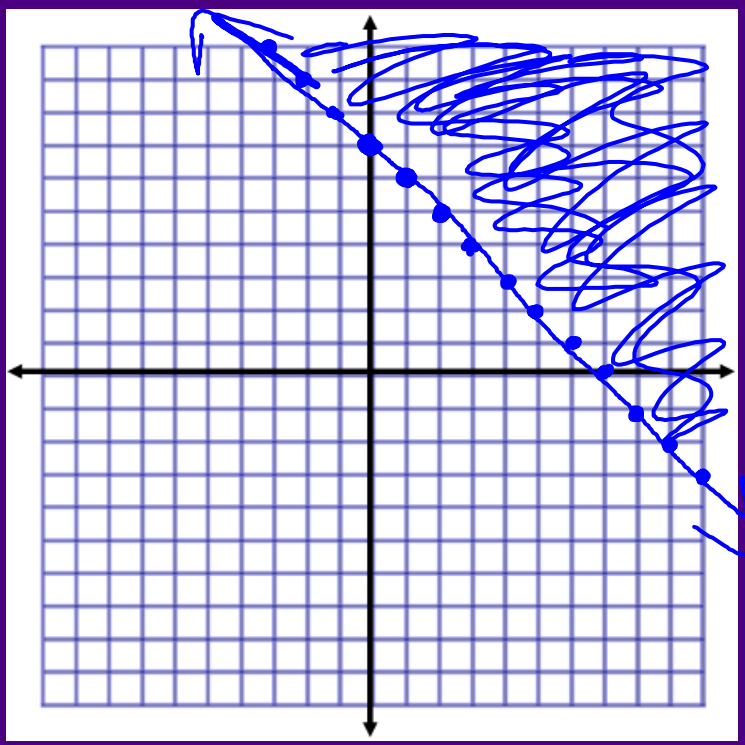
SOLUTION

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

solid above

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

$b = 7$

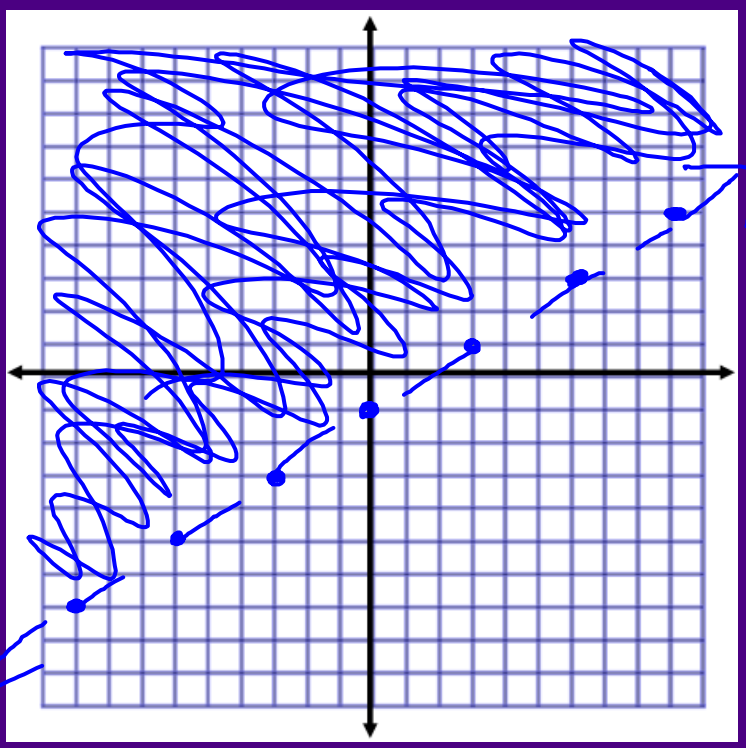


3. Graph $y > \frac{2}{3}x - 1$.

dotted above

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

$b = -1$



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

$-2x \qquad -2x$

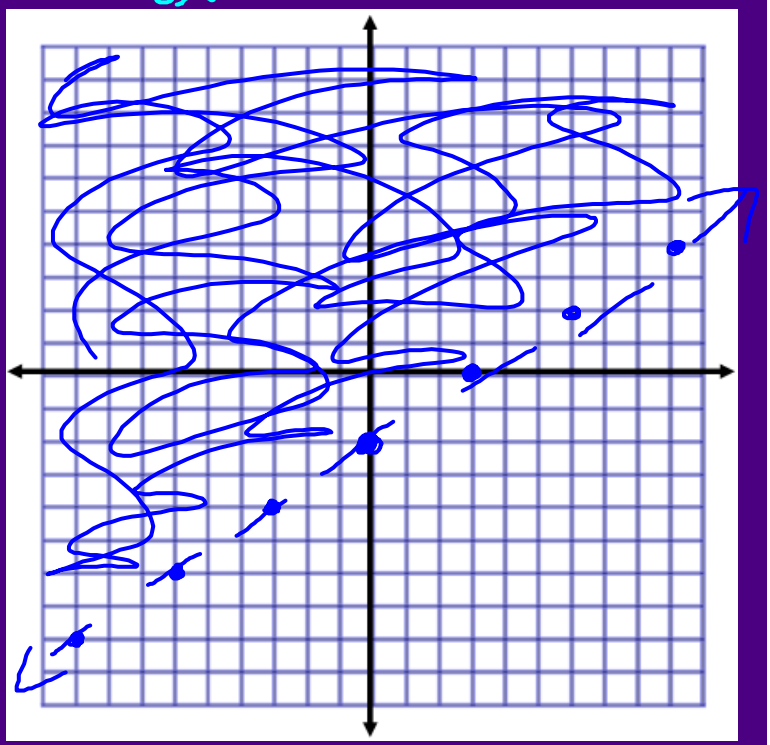
$\frac{-3y}{-3} < \frac{6}{-3} - \frac{2x}{-3}$

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

dotted above

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

$b = -2$



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

$-x \qquad -x$

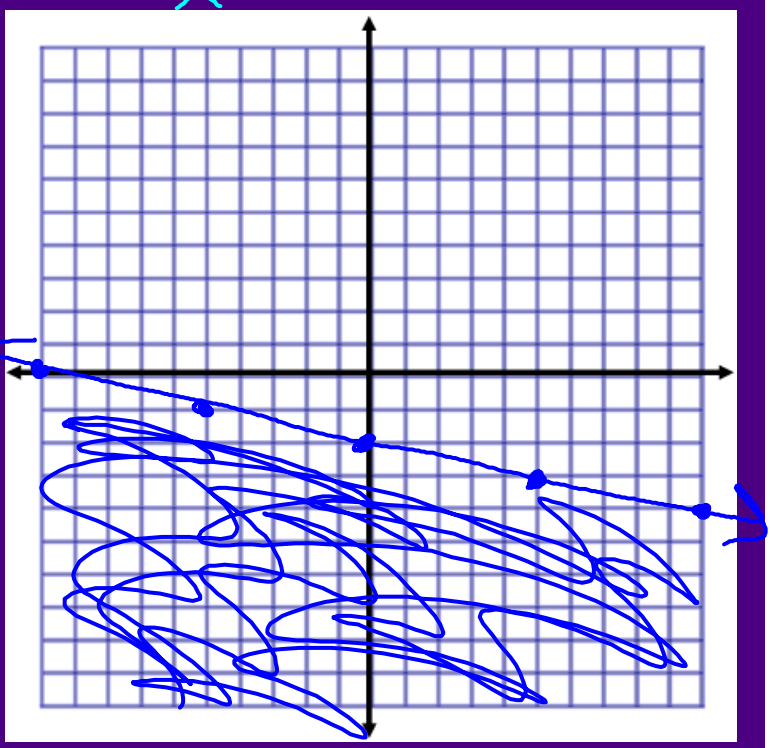
$\frac{5y}{5} \leq \frac{-10}{5} - \frac{x}{5}$

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

solid below

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

$b = -2$

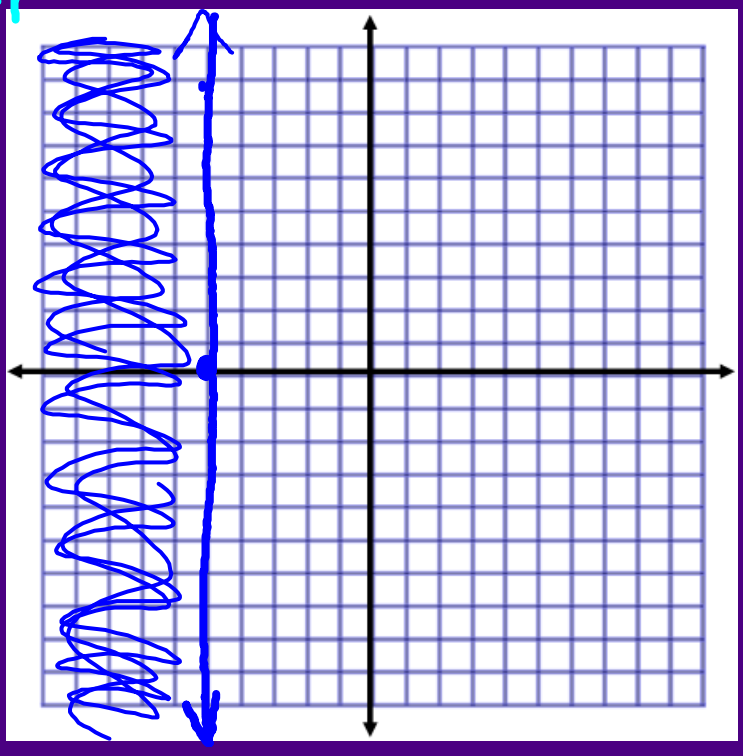


6. Graph $-x \geq 5$.

$-1 \quad -1$

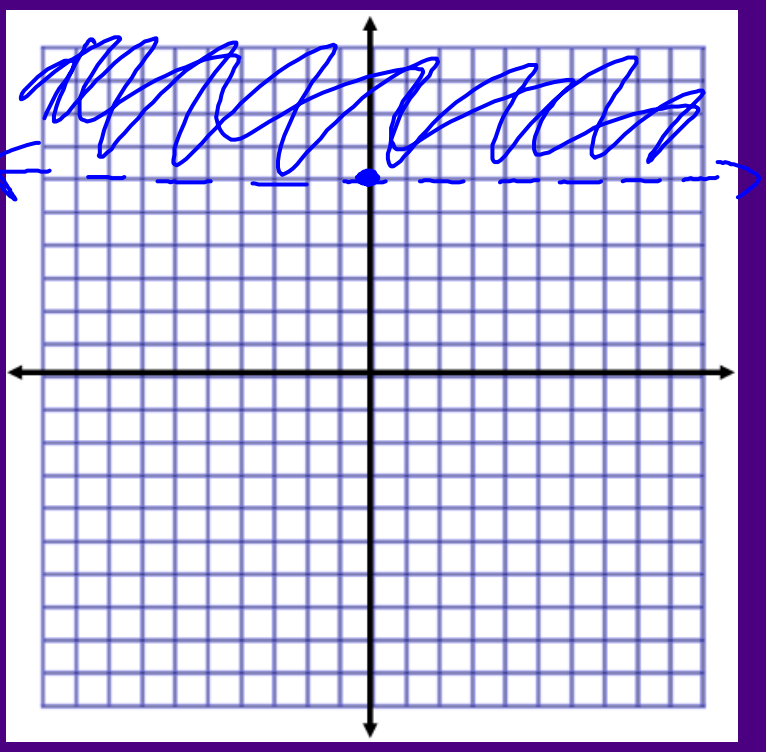
$x \leq -5$

solid below



7. Graph $y > 6$.

dotted above

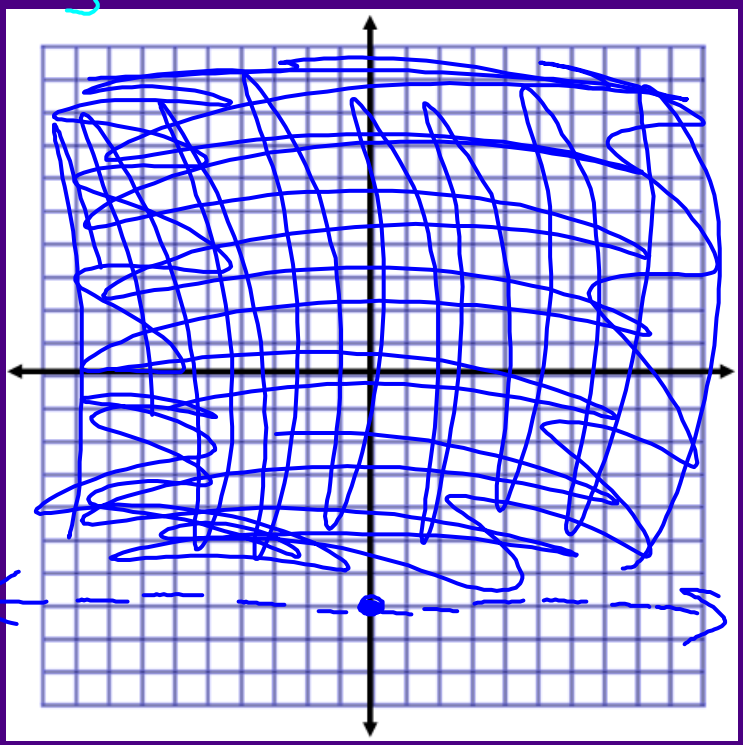


8. Graph $-3y < 21$.

$\frac{-3y}{-3} < \frac{21}{-3}$

$y > -7$

dotted above



9. Graph $x \leq \frac{1}{2}$.

solid below