Warm Up October 9, 2018

1.) ~~Shelley is on a nature hike. She starts out in a valley and~~ climbs ~~up a hill, stopping at regular intervals to take pictures.~~ ~~The elevation of the land in feet above or below sea level at each place Shelley stops follows the function~~ $a_n = a_{n-1} + 7$. The first place Shelley stops to take a picture is 18 feet below sea level, so $a_1 = -18$. What is the elevation of the tenth place Shelley stops?

+

$d = 7$

$a_1 = -18$ $a_4 = 3$ $a_7 = 24$

$a_2 = -11$ $a_5 = 10$ $a_8 = 31$ $a_{10} = 45$ ft.

$a_3 = -4$ $a_6 = 17$ $a_9 = 38$

$a_n = 7(n-1) - 18$ $7(9) - 18$

$a_{10} = 7(10-1) - 18$

2.) Vincent graphed a linear function. The function has a positive slope and a positive x-intercept. Which could be the function that Vincent graphed?

Value when $y = 0$

~~A.) 5x + 10y = 15~~

B.) 5x - 10y = 15

~~C.) 5x + 10y = -15~~

D.) 5x - 10y = -15

$5x + 10y = -15$
$-5x \qquad -5x$

$\frac{10y}{10} = \frac{-5x}{10} + \frac{15}{10}$

$5x - 10y = 15$
$-5x \qquad -5x$

$\frac{-10y}{-10} = \frac{-5x}{-10} + \frac{15}{-10}$

$y = \frac{1}{2}x - \frac{3}{2}$

$y = \frac{1}{2}x + \frac{3}{2}$

$5x - 10(0) = 15$

$5x = 15$

$x = 3$

What are linear inequalities?

LINEAR INEQUALITY	similar to linear equations but uses an inequality symbol
SOLUTION to a Linear Inequality	all of the ordered pairs that make the inequality true

Algebraically

EXAMPLE	Determine which ordered pairs are solutions to the linear inequality below: $2x - 3y < 15$			
	(X, Y)			
	(2, 5)	(-1,- 7)	(3, -4)	(0, 0)
	$2(2)-3(5)<15$ $4-15<15$ $-11<15$	$2(-1)-3(-7)<15$ $-2+21<15$ $19<15$	$18<15$	$0<15$
	YES!	NO!	NO!	YES!

Graphically

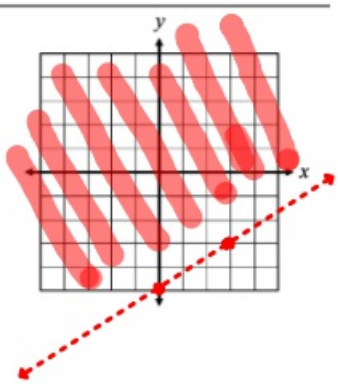
GRAPHING Linear Inequalities	Graphing linear inequalities is a way to show ALL the ordered pairs that are solutions! Steps to graph:
Step 1	Put the inequality in Slope-intercept form. Be sure to flip the inequality symbol if you multiply or divide by a negative number!
Step 2	Graph the line! • Use a ←——→ line for ≤ or ≥ symbols. • Use a ←- - - -→ line for < or > symbols.
Step 3	Shade! • Shade above the line for > or ≥ symbols. • Shade below the line for < or ≤ symbols.

Example: $2x - 3y < 15$

$$\frac{-2x \quad -2x}{}$$

$$\frac{-3y}{-3} < \frac{-2x}{-3} + \frac{15}{-3}$$

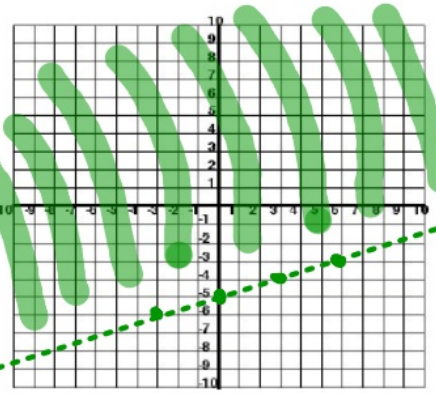
$$y > \frac{2}{3}x - 5$$



Graph the inequalities. Write three possible solutions.

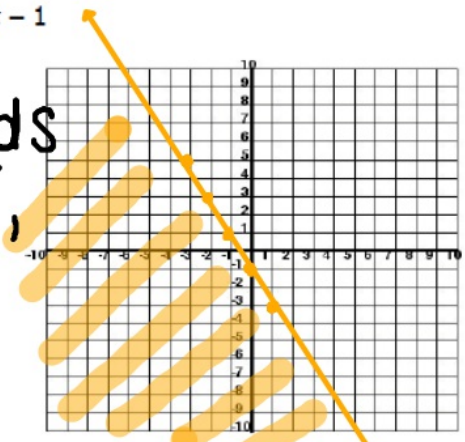
1. $y > \frac{1}{3}x - 5$

(0,0)
(1,2)
(0,1)

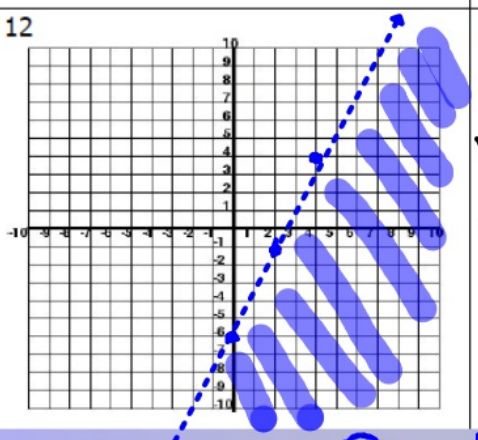


2. $y \le -2x - 1$

Quads
II, III,
IV



3. $5x - 2y > 12$

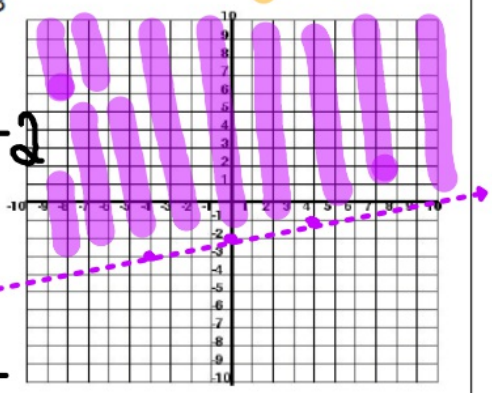


$$5x - 2y > 12$$
$$-5x \qquad -5x$$
$$\frac{-2y}{-2} > \frac{-5x}{-2} + \frac{12}{-2}$$
$$y < \frac{5}{2}x - 6$$

Quads
I, III
IV

4. $x - 4y < 8$

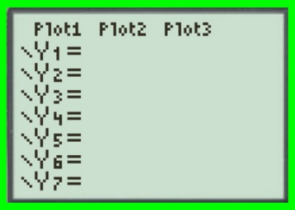
$y > \frac{1}{4}x - 2$



all 4

Calculator Steps!

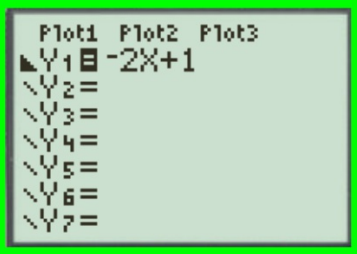
Y=



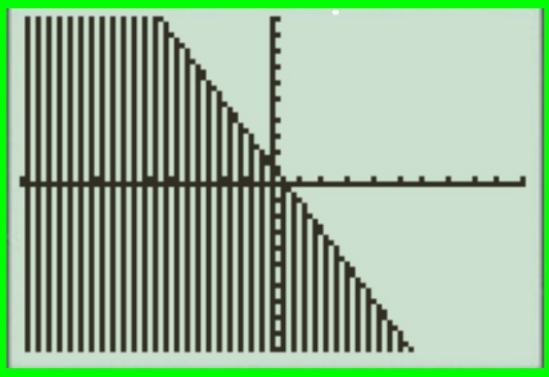
Enter the inequality:

$y \leq -2x+1$

We need to tell the calculator where to shade! Use the left arrow to highlight the diagonal line on the left.



Press enter until the correct triangle is created.
Hint: Shade up or down?



Graphing Linear Inequalities

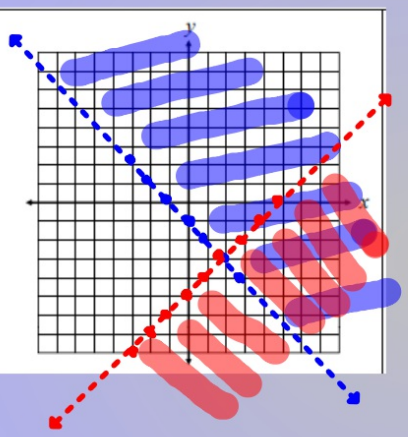
student.desmos.com

Class Code: 6WM4W5

Main Ideas/Questions	Notes/Examples
Systems of Linear Inequalities	two or more linear inequalities
SOLUTION to a System of Linear Inequalities	all coordiante points in the
	"overlapping" shaded region

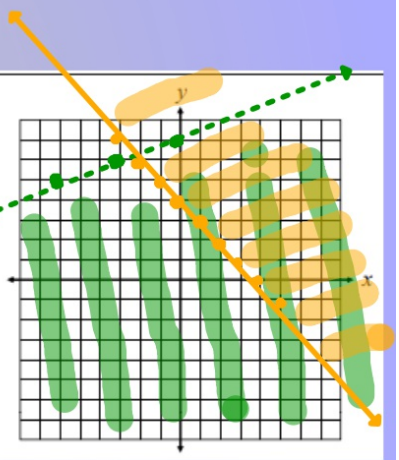
1. $\begin{cases} y > -x - 1 \\ y < x - 5 \end{cases}$

Quads I, IV

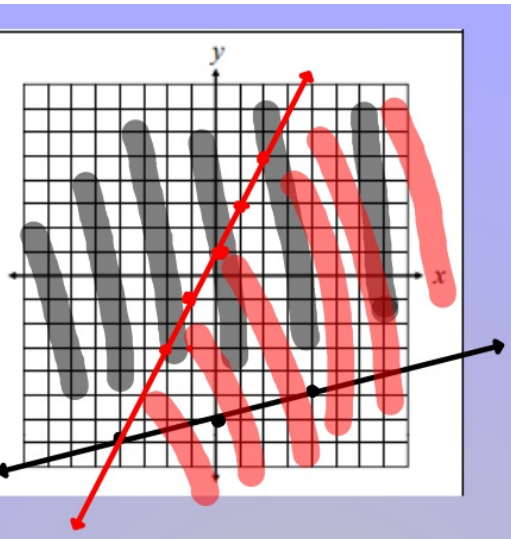


2. $\begin{cases} y < \frac{1}{3}x + 7 \\ y \geq -x + 4 \end{cases}$

Quads I, II, IV

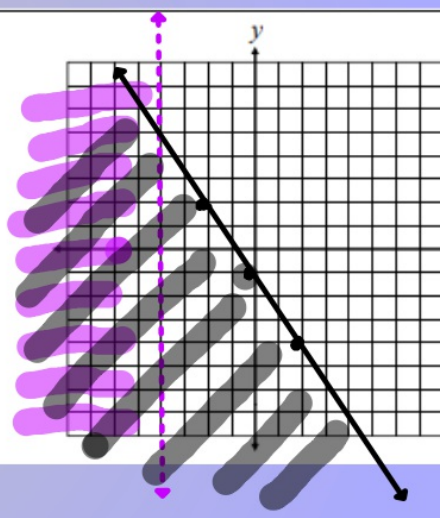


3. $\begin{cases} x - 4y \le 24 \\ y \le 2x + 1 \end{cases}$



$$x - 4y \le 24$$
$$-x \qquad -x$$
$$\frac{-4y}{-4} \le \frac{-x}{-4} + \frac{24}{-4}$$
$$y \ge \frac{1}{4}x - 6$$

4. $\begin{cases} x < -4 \\ 3x + 2y \le -2 \end{cases}$



$$3x + 2y \le -2$$
$$-3x \qquad -3x$$
$$\frac{2y}{2} \le \frac{-3x}{2} - \frac{2}{2}$$
$$y \le -\frac{3}{2}x - 1$$