FLUENCY

1. Which of the following points lies on the graph of $y = 3x - 5$?

(1) $(1, -5)$ (3) $(4, 7)$

(2) $(2, 0)$ (4) $(5, 5)$

$7 = 3(4) - 5$

$7 = 12 - 5$

$7 = 7$

2. Which of the following points does not lie on the graph of $y = \frac{1}{2}x + 3$?

(1) ~~$(10, 8)$~~ (3) ~~$(0, 3)$~~

(2) ~~$(-2, 2)$~~ (4) $(-6, -3)$

$3 = \frac{1}{2}(0) + 3$

$3 = 0 + 3$

$3 = 3$

$2 = \frac{1}{2}(-2) + 3$

$2 = -1 + 3$

$2 = 2$

$8 = \frac{1}{2}(10) + 3$

$8 = 5 + 3$

$8 = 8$

$-3 = \frac{1}{2}(-6) + 3$

$-3 = -3 + 3$

$-3 = 0$

3. Which of the following points would not lie on the line $y = 7$?

(1) $(-2, 7)$ (3) $(0, 7)$

(2) $(7, -1)$ (4) $(5, 7)$

(x, y)

4. For the inequality $y > 4x + 1$ determine if each of the following points does or doesn't lie in its solution. Show the work that leads to your answer.

(a) $(2, 15)$

$15 > 4(2) + 1$

$15 > 9$

Y

(b) $(4, 10)$

$10 > 4(4) + 1$

$10 > 17$

N

(c) $(0, 1)$

$1 > 4(0) + 1$

$1 > 0 + 1$

$1 > 1$

N

(d) $(-3, -8)$

$-8 > 4(-3) + 1$

$-8 > -11$

Y

5. Determine if the point $(4, 7)$ is a solution to the system of equations shown below. Justify your yes/no answer.

$y = 2x - 1$ $7 = 2(4) - 1$ ✓ Y

and

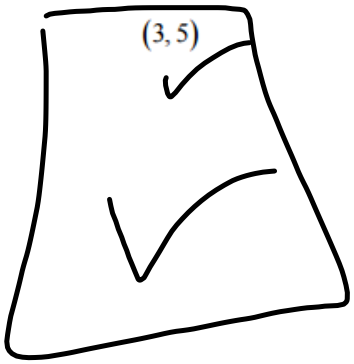
$y = \frac{1}{2}x + 5$ $7 = \frac{1}{2}(4) + 5$ ✓

6. One of the following two points lies in the solution set of the system of inequalities below. Determine which point it is and explain why your choice lies in the solution set and the other does not.

$x + y < 10$ $(6, 1)$

$y \geq \frac{2}{3}x - 2$ $x + y < 10$ ✓

$y \geq \frac{2}{3}x - 2$ X



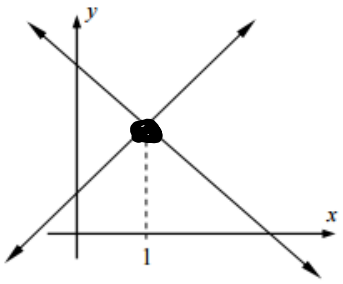
REASONING

7. James quickly sketched the graphs of $y=-4x+10$ and $y=2x+3$. His graph is shown below. Explain how you know that his graph is inaccurate.

$y=-4(1)+10$ $y=2(1)+3$

$y=-4+10$ $y=5$

$y=6 \neq$



8. The point $(4, 20)$ lies on the line $y=mx+8$, for some value of m.

(a) If $m=2$, will the point $(4, 20)$ lie on the line? How can you tell?

$y=2x+8$

$20=2(4)+8$

$20=16$

X

(b) Find the value of m for which the point $(4, 20)$ will lie on the line.

$20=4m+8$

-8

$\frac{12=4m}{4}$ $m=3$

Mindfulness:

Choose Your Breath:

- Initial (monitor/keep rhythm)
- Heart/Belly
- Calming (2 in, 4 out)
- Energizing (4 in, 2 out)

Bell Ringer:

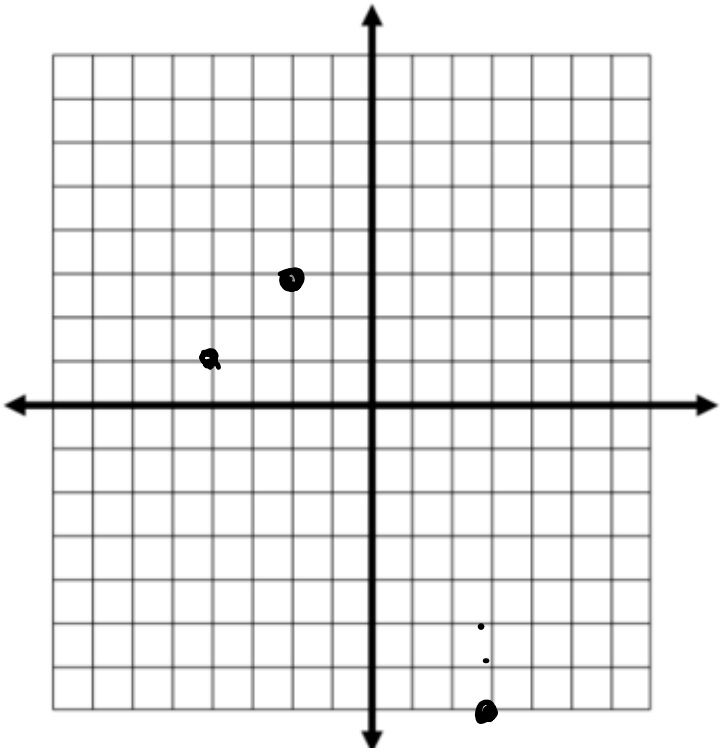
$$f(x)=\begin{cases} x+5 & x<-2 \\ -2x-1 & x\geq -2 \end{cases}$$

Function? Yes or No

f (3) =

f (−4) =

f (−2) =



GRAPHS OF LINEAR INEQUALITIES
COMMON CORE ALGEBRA I

So, we have graphed linear functions and in the last lesson learned that the points that lie on a graph are simply the (x, y) pairs that make the equation true. Graphing an inequality in the xy-plane is exactly the same

GRAPHING INEQUALITIES

To graph an inequality simply means to plot (or shade) **all** (x, y) pairs that make the inequality true

***Exercise* #1:** Consider the inequality $y > x + 3$.

(a) Determine whether each of the following points lies in the solution set (and thus on the graph of) the inequality given.

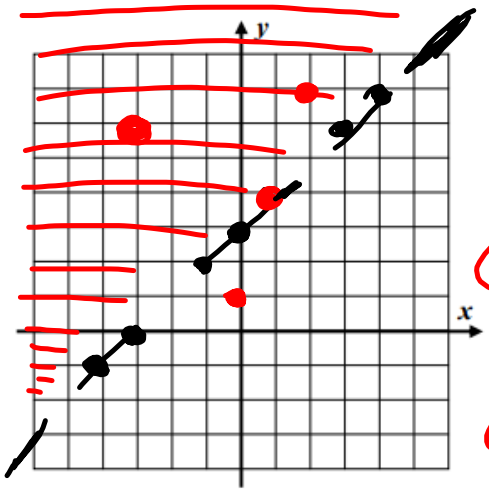
$(2, 7)$ $(0, 1)$ $(1, 4)$

$7 > 2+3$ $1 > 0+3$ $4 > 1+3$

$7 > 5$ ✓ $1 > 3$ ✗ $4 > 4$ ✗

(b) Graph the line ~~$y = x + 3$~~ on the grid below in **dashed form**. Why are points that lie on this line **not** part of the **solution set** of the inequality?

$y > x + 3$



(c) Plot the three points from part (a) and use them to help you shade the proper region of the **plane** that represents the solution set of the inequality.

$(-3, 6)$

(d) Choose a fourth point that lies in the region you shaded and show that it is in the solution set of the inequality.

$6 > -3 + 3$

$6 > 0$

(e) The point $(10, 12)$ cannot be drawn on the graph grid above, so it is difficult to tell if it falls in the shaded region. Is $(10, 12)$ part of the solution set of this inequality? Show how you arrive at your answer.

$y > x + 3$

$12 > 10 + 3$

$12 > 13$

There are some challenges to graphing linear inequalities, especially if the output, y, has not been solved for. Let's look at the **worst case scenario**.

***Exercise* #2:** Consider the inequality $3x - 2y \geq 2$

(a) Rearrange the left-hand side of this inequality using the commutative property of addition.

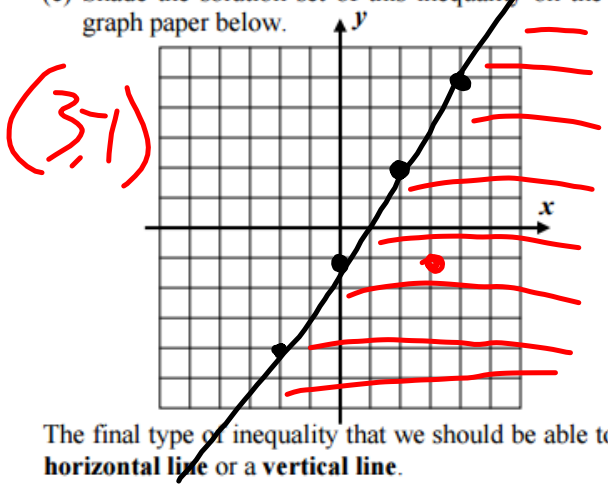
$-2y + 3x \geq 2 - 3y$

(b) Solve this inequality for y by applying the **properties of inequality** that we used in Unit #2.

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

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

(c) Shade the solution set of this inequality on the graph paper below.



(d) Pick a point in the shaded region and show that it is a solution to the **original** inequality.

$3(3) - 2(-1) \geq 2$

$9 + 2 \geq 2$

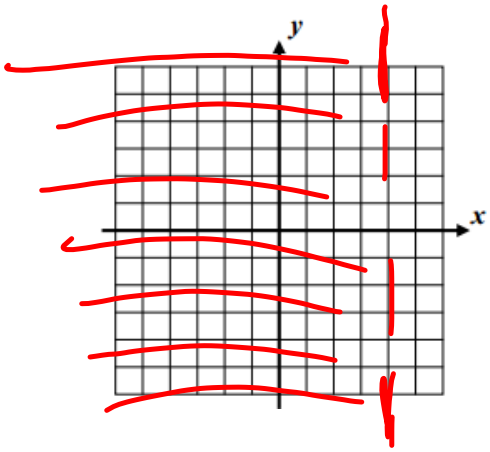
$11 \geq 2$ ✓

The final type of inequality that we should be able to graph quickly and effectively is one that involves either a **horizontal line** or a **vertical line**.

***Exercise* #3:** Shade the solution set for each of the following inequalities in the xy-planes provided. First, state in your own words the (x, y) pairs that the inequality is describing.

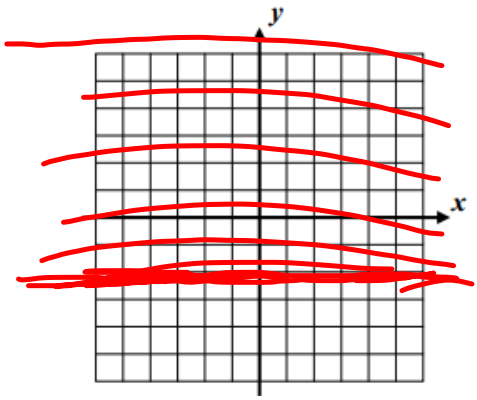
(a) $x < 4$

Your own words:



(b) $y \geq -2$

Your own words:



FLUENCY

1. Determine which of following points lie in the solution set of the inequality $y \geq 2x - 4$ and which do not. Justify each choice.

(a) $(5, 4)$

$4 \geq 2(5) - 4$ N

$4 \geq 6$

(b) $(0, -1)$

$-1 \geq 2(0) - 4$ Y

$-1 \geq -4$

(c) $(10, 16)$

$16 \geq 2(10) - 4$ Y

$16 \geq 20 - 4$

$16 \geq 16$

(d) $(2, -1)$

$-1 \geq 2(2) - 4$

$-1 \geq 4 - 4$

$-1 \geq 0$ N

2. Which of the following points lies in the solution set of the inequality $y \geq 3x + 10$?

(1) $(1, 10)$

(2) $(-1, 3)$

(3) $(4, 20)$

(4) $(2, 16)$