

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 $y > x + 3$.

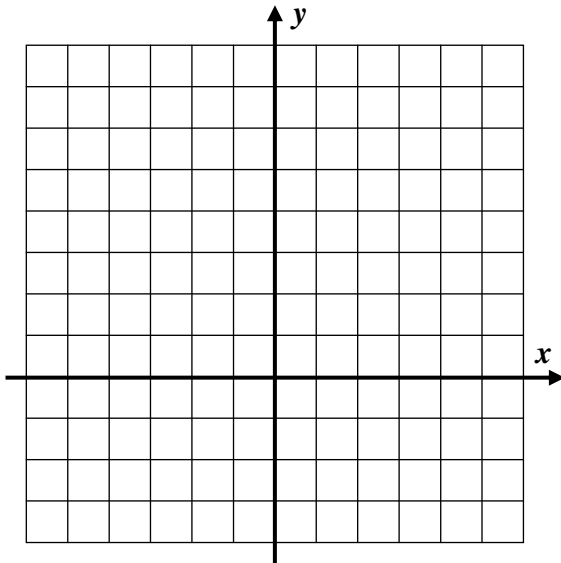
(a) Determine whether each of the following points lies in the solution set (and thus on the graph of) the inequality given.

$(2, 7)$

$(0, 1)$

$(1, 4)$

(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?



(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.

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

(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.



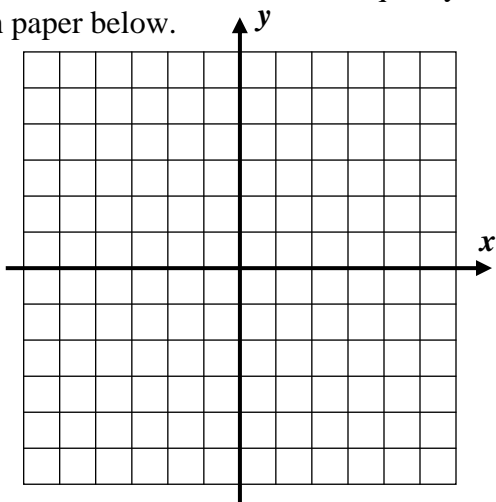
There are some challenges to graphing linear inequalities, especially if the output, y , has not been solved for. Let's look at the **worst case scenario**.

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

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

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

(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.

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**.

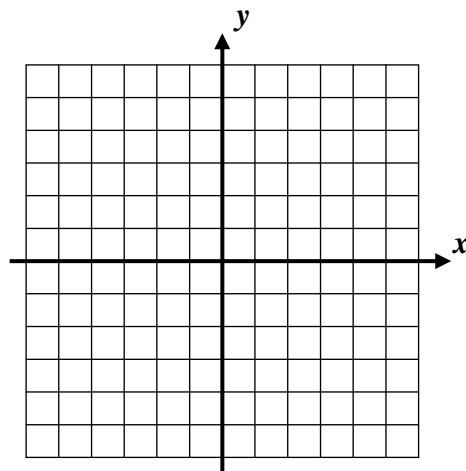
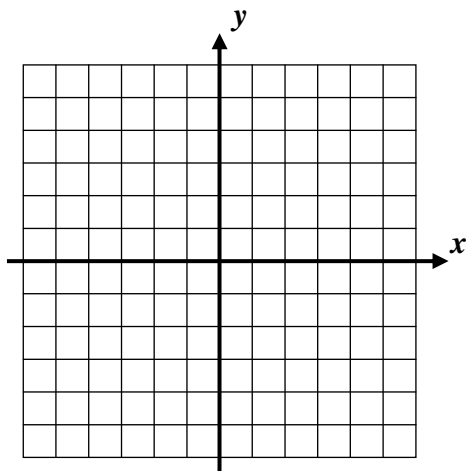
Exercise #3: Shade the solution set for each of the following inequalities in the xy -planes provided. First, state in your own words the (x, y) pairs that the inequality is describing.

(a) $x < 4$

(b) $y \geq -2$

Your own words:

Your own words:



Name: _____

Date: _____

GRAPHS OF LINEAR INEQUALITIES
COMMON CORE ALGEBRA I HOMEWORK

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) $(5, 4)$

(b) $(0, -1)$

(c) $(10, 16)$

(d) $(2, -1)$

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

(1) $(1, 10)$

(3) $(4, 20)$

(2) $(-1, 3)$

(4) $(2, 16)$

3. Which of the following points does *not* lie in the solution set to the inequality $y \geq -\frac{1}{3}x + 5$?

(1) $(6, 3)$

(3) $(-3, 8)$

(2) $(-6, 5)$

(4) $(12, 3)$

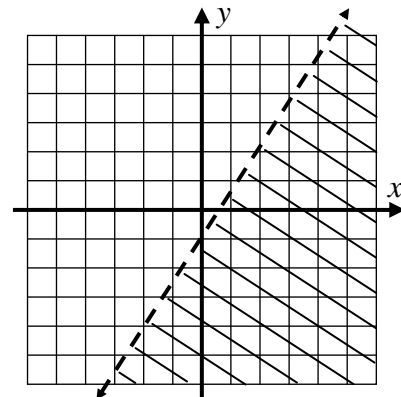
4. Which of the following linear inequalities is shown graphed below?

(1) $y < \frac{3}{2}x - 1$

(3) $y > \frac{2}{3}x - 1$

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

(4) $y \geq \frac{3}{2}x - 1$

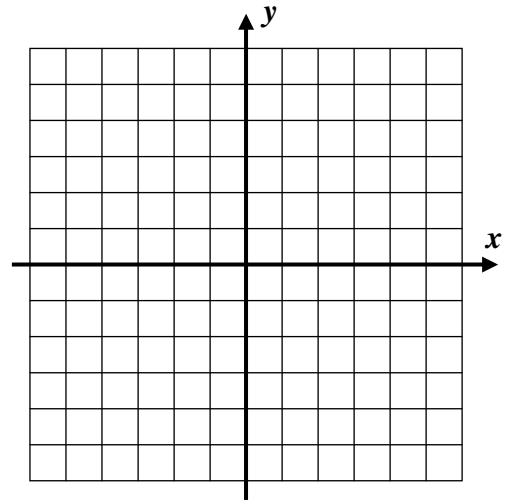


5. Graph the solution set to the inequality shown below. State one point that lies in the solution set and one point that does not.

$$y < -2x + 4$$

One Point In Solution:

One Point Not In Solution:

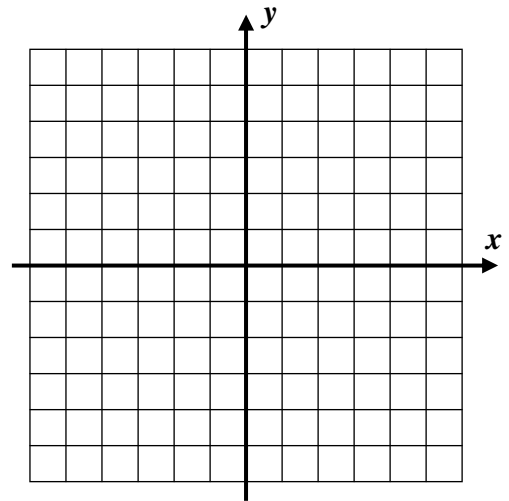


6. Rearrange the inequality below so that it is easier to graph and then sketch its solution set on the grid given. Be careful when dividing by a negative and remember to switch the inequality sign.

$$x - 2y \leq 6$$

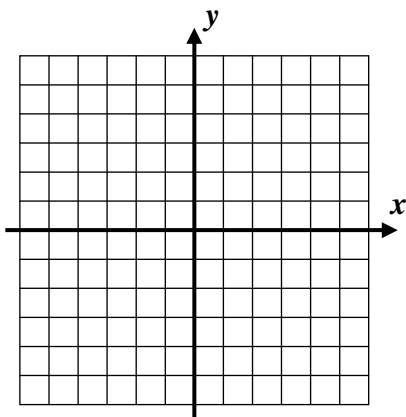
One Point In Solution:

One Point Not In Solution:



7. Graph the solution set to each of the following inequalities.

(a) $y \leq 4$



(b) $x > 1$

