

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## SYSTEMS OF INEQUALITIES COMMON CORE ALGEBRA I



We can have **systems of inequalities** as well as **systems of equations (equalities)**. The definition of solving a system still holds: we have to find all points that make all inequalities true.

**Exercise #1:** Consider the system of inequalities shown below. Determine if each of the following points is a solution or not to the system. Show work that justifies your answers.

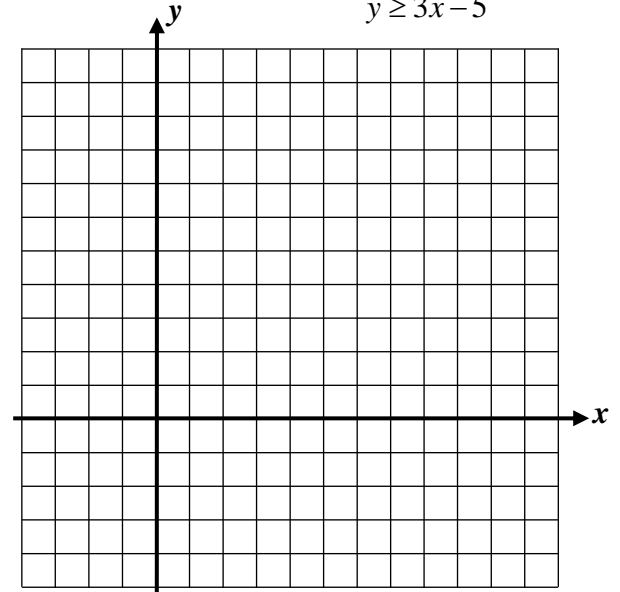
(a)  $(3, 8)$

(b)  $(5, 9)$

$$x + y > 10$$

$$y \geq 3x - 5$$

(c) Graph the solution set to this system of inequalities.



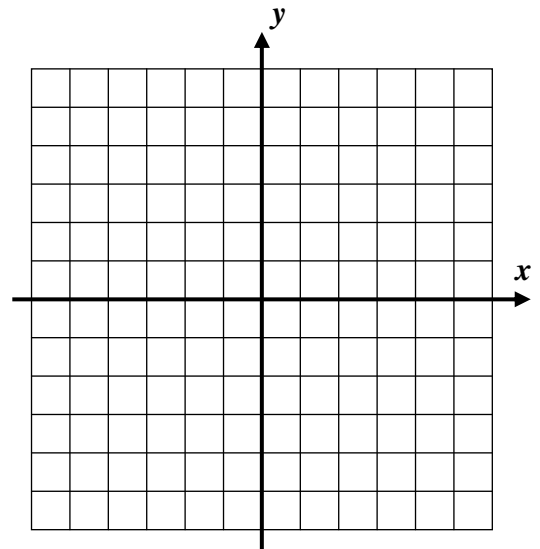
**Exercise #2:** On the grid shown below, graph the solution to the system of inequalities shown below. State a point that lies in the solution set and one that doesn't.

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

$$x \geq -2$$

Point in Solution Set:

Point Not in Solution Set:



**Exercise #3:** Which of the following points is a solution to the system of inequalities shown below? Show the work that leads to your answer.

(1)  $(3, -6)$

(3)  $(-2, 10)$

$$y \leq -4x + 2$$

$$y > \frac{x}{2} + 7$$

(2)  $(0, 2)$

(4)  $(4, 10)$

Very often, systems of inequalities will define portions of the  $xy$ -plane that can be visualized and manipulated.

**Exercise #4:** Consider the system of inequalities given below.

(a) Determine which, if any, of these points is a solution to the system.

$$y \geq -2$$

$$x < 4$$

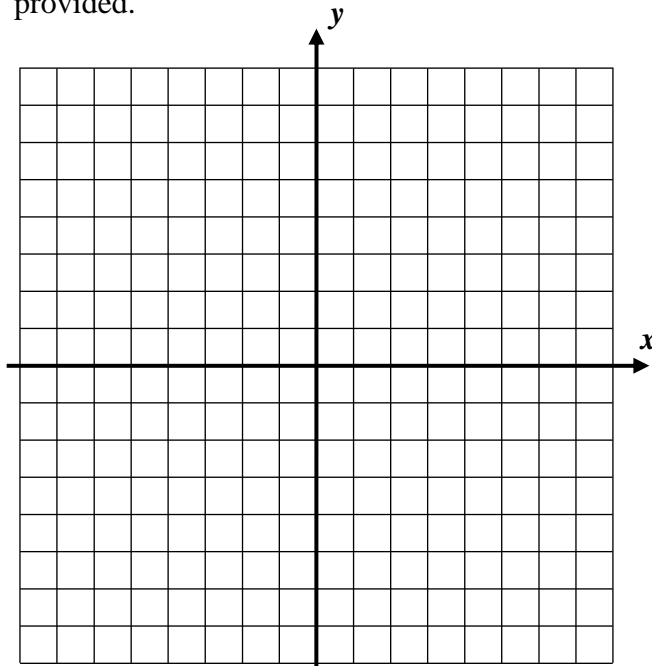
$$y \leq 2x$$

$(-1, 4)$

$(3, 1)$

(c) Find the area of the portion of the  $xy$ -plane that represents the solution.

(b) Sketch the solution to the system on the grid provided.



(d) Why does the dashed line of one of the borders **not** make a difference in terms of the area you found in part (c)?



## SOLVING SYSTEMS OF INEQUALITIES COMMON CORE ALGEBRA I HOMEWORK

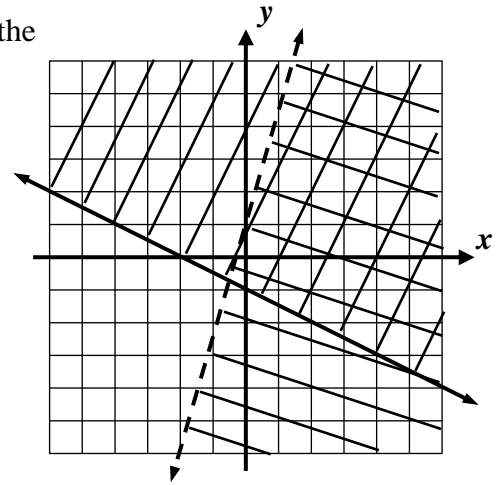
### FLUENCY

1. Which of the following points is a solution to the system of inequalities shown below?

- |            |             |                  |
|------------|-------------|------------------|
| (1) (3, 5) | (3) (1, -2) | $y > x + 1$      |
| (2) (1, 3) | (4) (2, 3)  | $y \leq -2x + 7$ |

2. A system of inequalities is shown graphed below. Which of the following points lies in the solution set of this system?

- |             |             |
|-------------|-------------|
| (1) (-1, 2) | (3) (2, -4) |
| (2) (1, 5)  | (4) (4, 2)  |



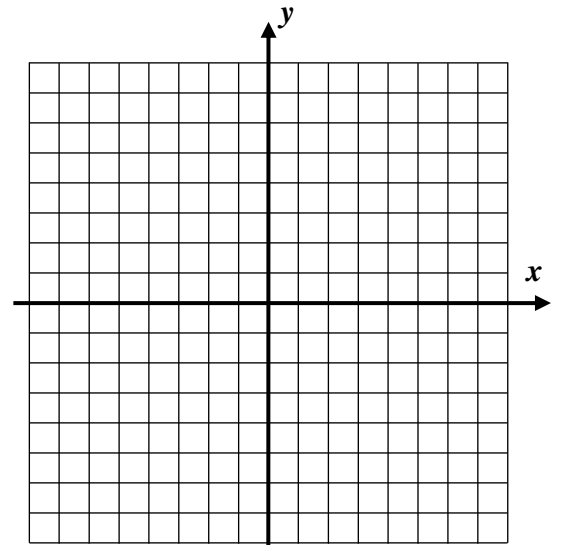
3. Consider the system of inequalities shown below.

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

$$y \leq -x + 6$$

(a) Is the origin, (0, 0), part of the solution set of the system?  
Determine without first graphing.

(b) Graph the solution to the system of inequalities. Then, state one point that lies in the set and one that doesn't.



One Point That Lies in the Solution:

One Point that Does Not Lie in the Solution

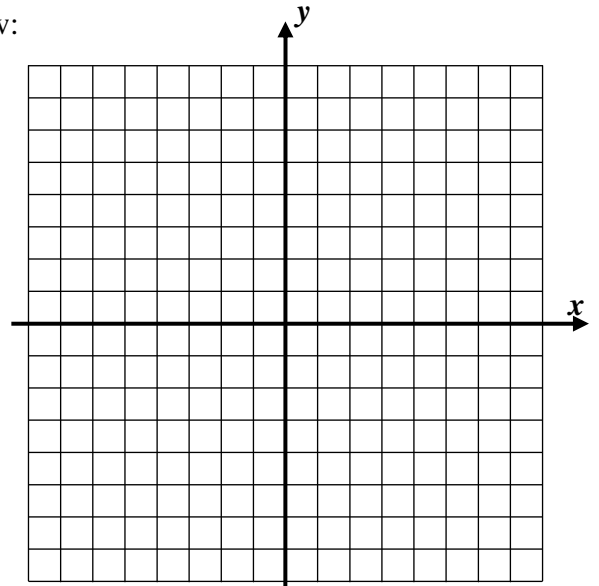


4. Sketch the solution to the system of inequalities shown below:

$$y + 2x < 6$$

$$x \leq 2$$

State a point that lies in the solution set:

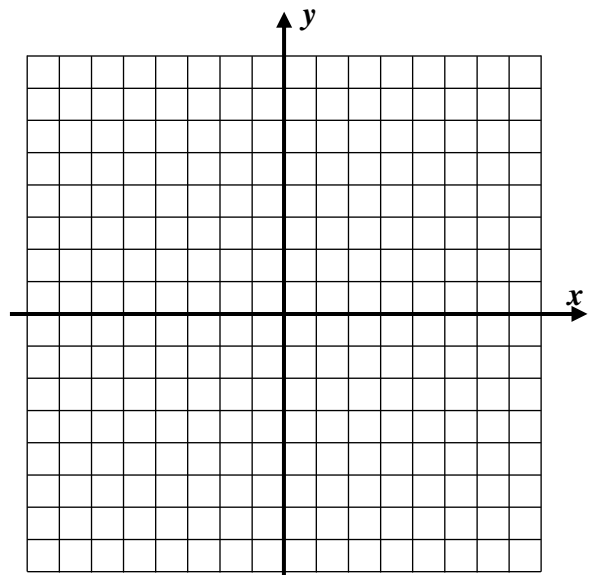


5. Find the area of the triangular region defined by the system of inequalities shown below.

$$y \geq x$$

$$x \geq -3$$

$$y \leq 6$$



### REASONING

6. Consider the system of inequalities shown below:

$$y \geq x + 2$$

$$y \leq x - 3$$

(a) Graph the system solution to the system on the grid.

(b) Why can you **not** state a point in the solution set?

