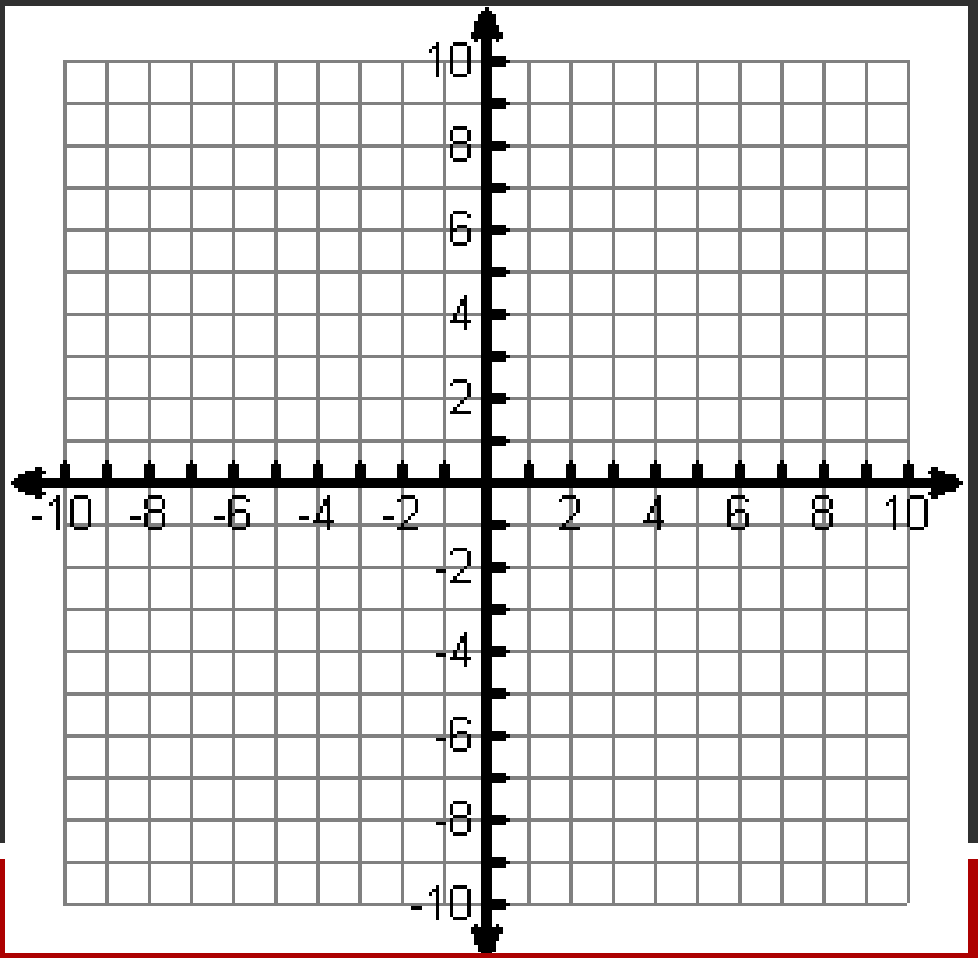
WARM – UP

Solve each equation for y then graph.

1. $2x + y = 5$
2. $2y - x = 6$
3. $2x + 3y = 15$



GSE Algebra I – 2.6

UNIT QUESTION: How do I justify and solve the solution to a system of equations or inequalities?

Standard: MCC9-12.A.REI.1, 3, 5, 6, and 12

Today's Question:
How do I know where to shade when graphing linear inequalities?

Standard: MCC9-12.A.REI.12

SOLVING LINEAR INEQUALITIES IN TWO VARIABLES

Coordinate Plane

Half plane

A region containing all points that has one boundary, which is a straight line that continues in both directions infinitely.

Steps for Graphing Inequalities

1. Get in slope-intercept form
2. Determine solid ($\leq$ $\geq$)or dashed line (< >)
3. Determine whether to shade above or shade below the line (Test Points)
4. If the test point is true, shade the half plane containing it.
5. If the test point is false, shade the half plane that does NOT contain the point.

Symbols

Dashed Line

Shade right or Above

$<$ $>$

Shade Left or Below

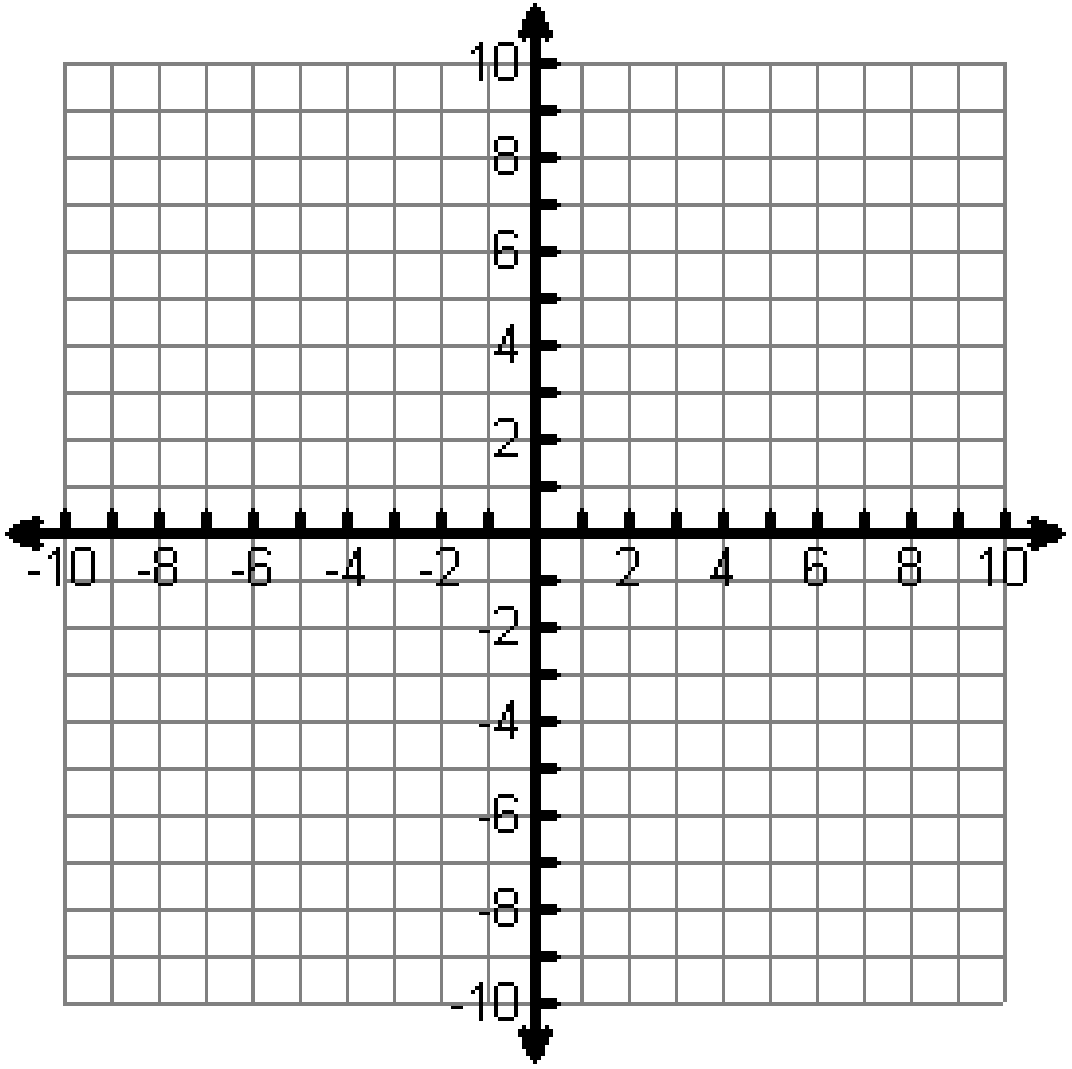
Symbols

Solid Line

$\leq$ $\geq$

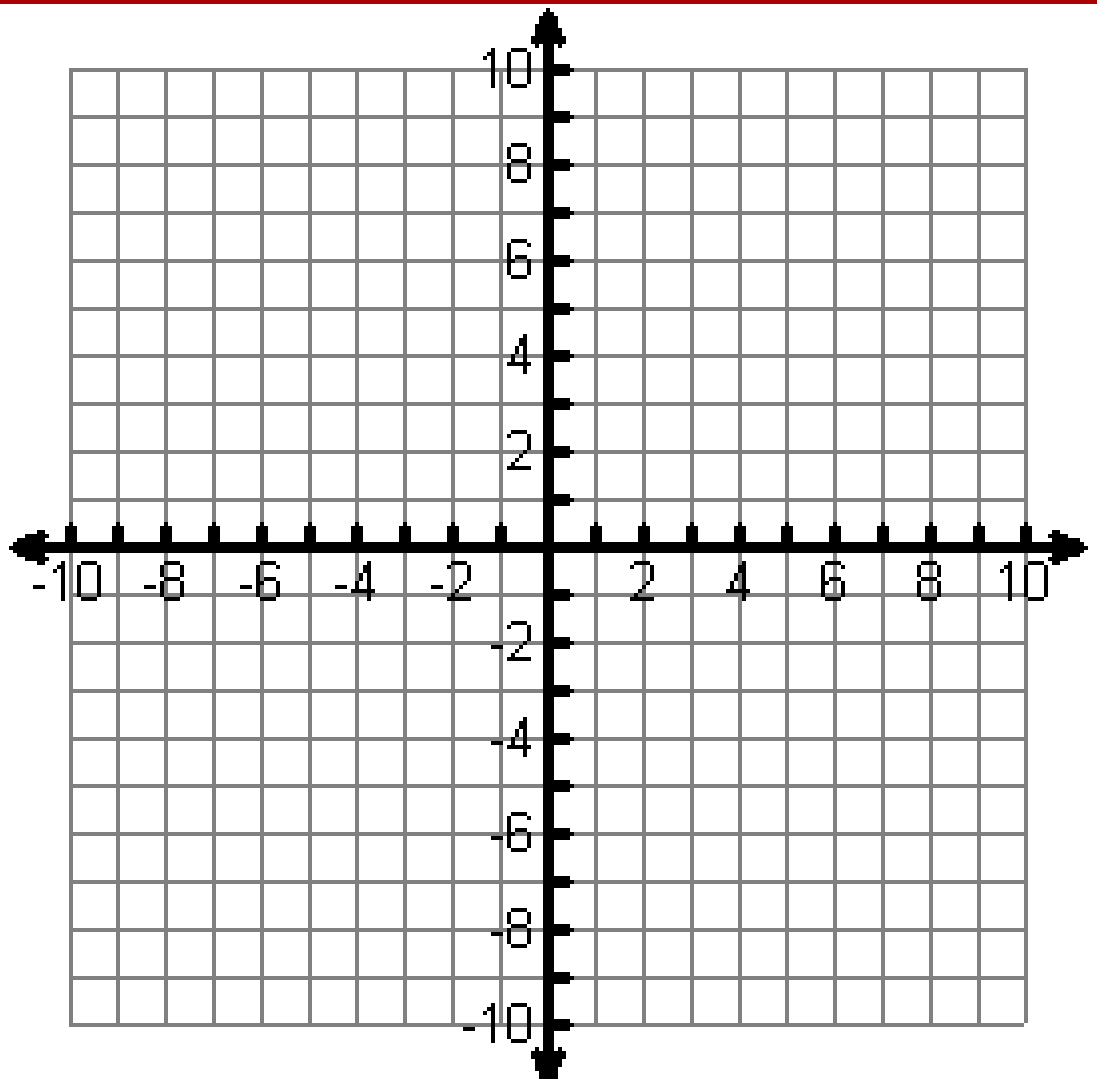
Ex. 1

$$y \leq -3x + 7$$



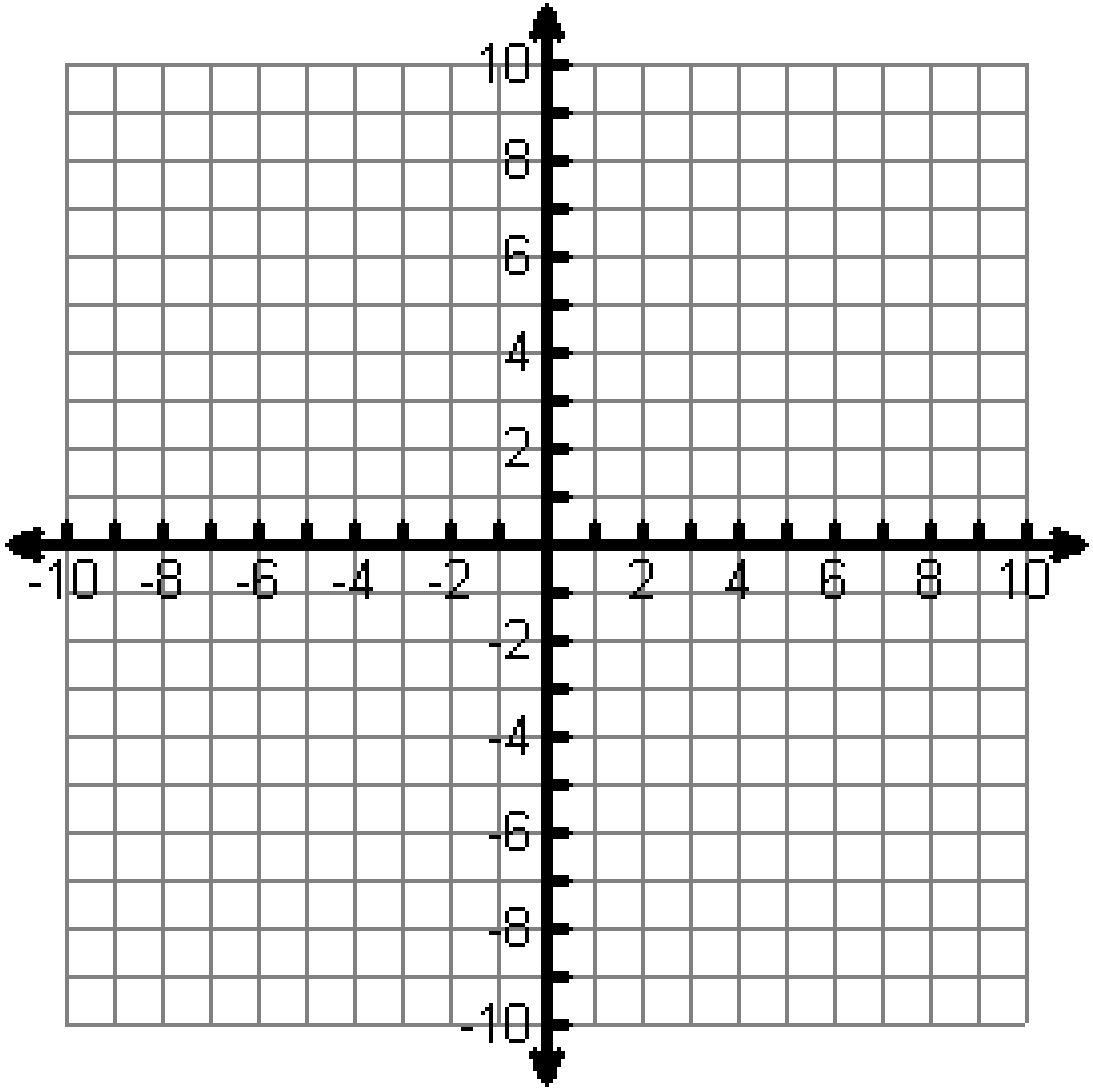
Ex. 2

$$y > \frac{1}{3}x - 4$$



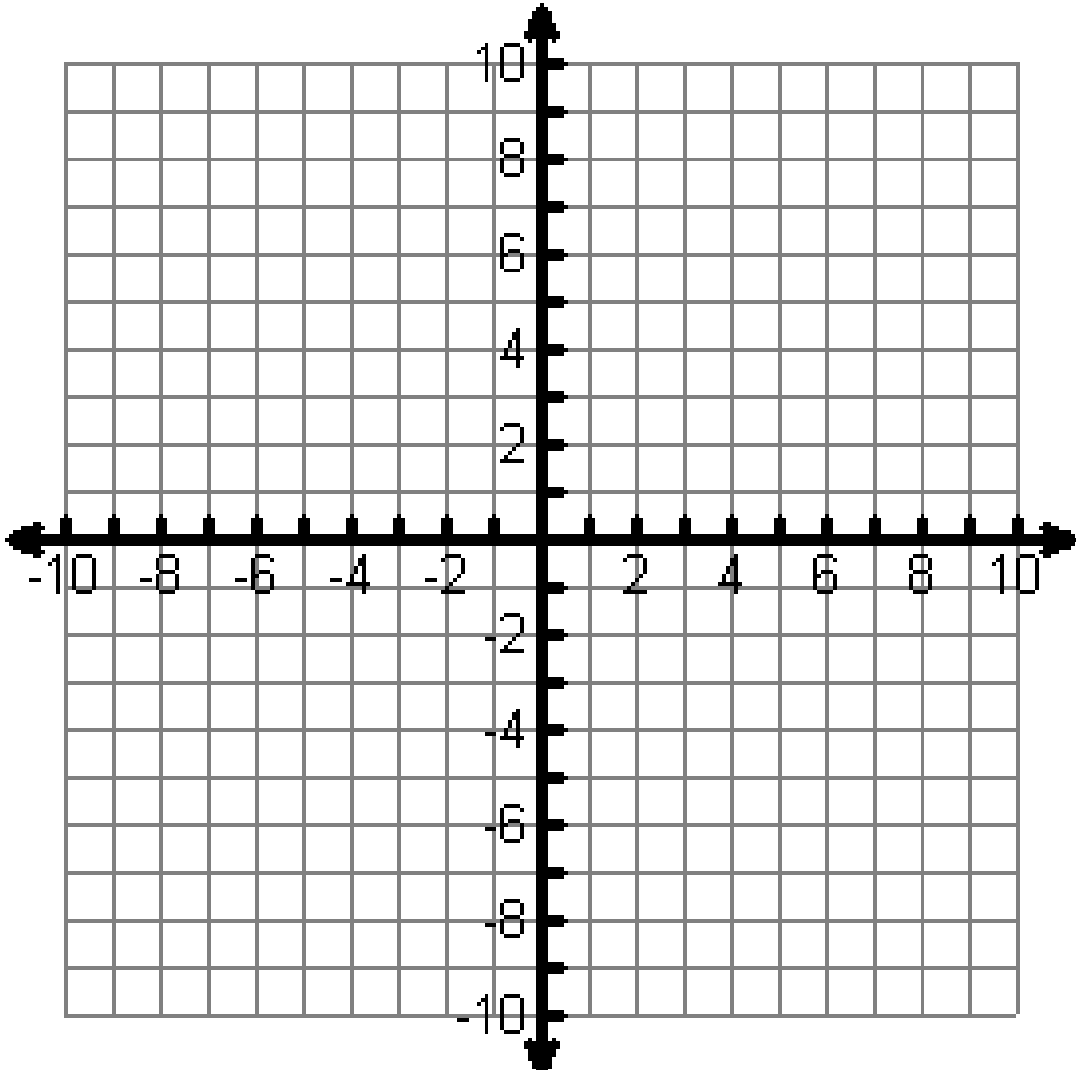
Ex.3

$x - 2y \leq 6$



Ex. 4

$2x - y < 4$



SOLVING SYSTEMS OF LINEAR INEQUALITIES IN TWO VARIABLES

Coordinate Plane

System of Inequalities

- Graph the **line** and appropriate **shading** for each inequality on the same coordinate plane.

System of Inequalities

- Remember:
  - DASHED for $<$ and $>$, and
  - SOLID for $\leq$ and $\geq$.

Solution to a System of Linear Inequalities

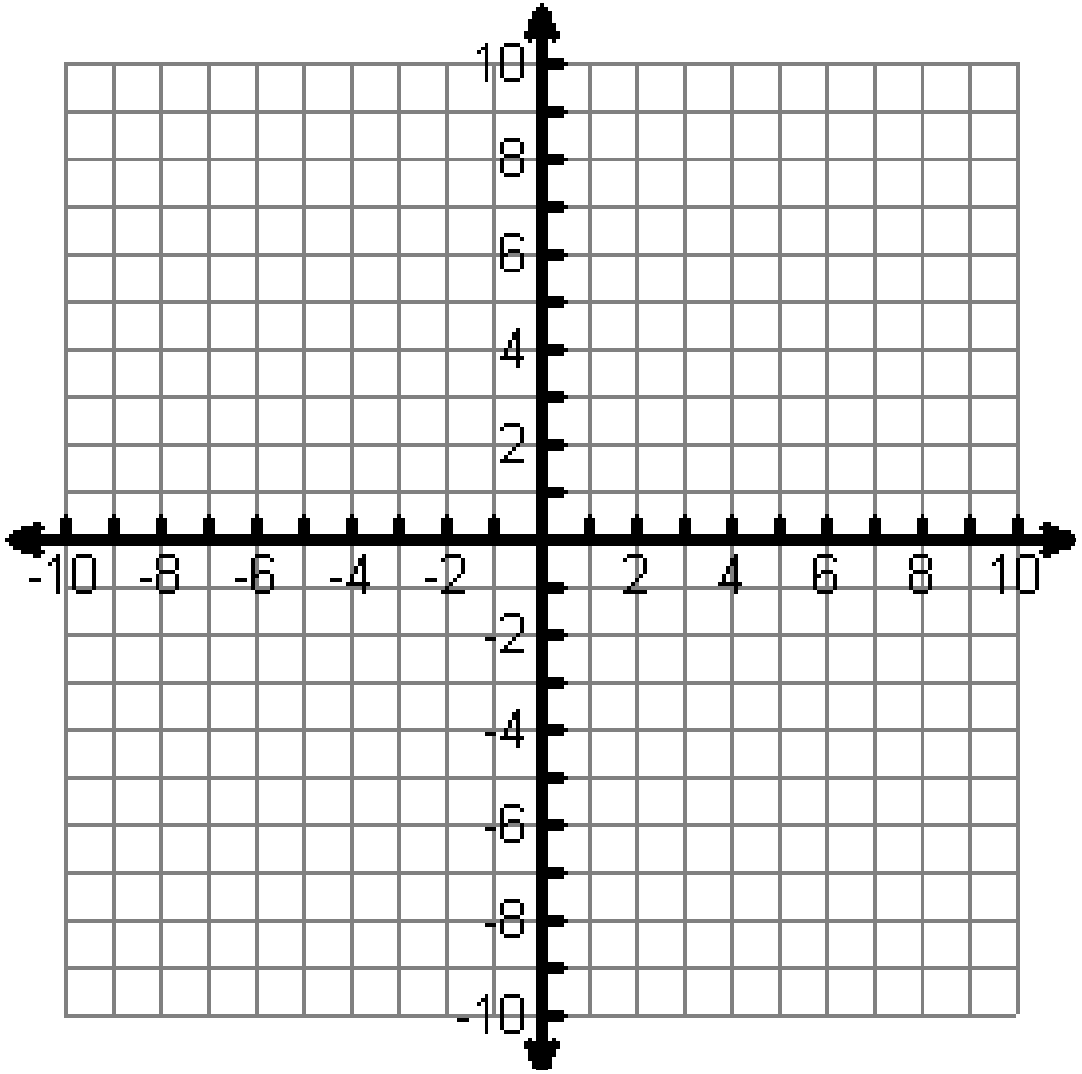
- The solution is the section where all of the shadings **overlap**.

★ *Sometimes it helps to use different color pencils for each line and shaded region. It makes it easier to determine the overlapped shaded regions.*

Ex. 5

$y \leq 2x + 1$

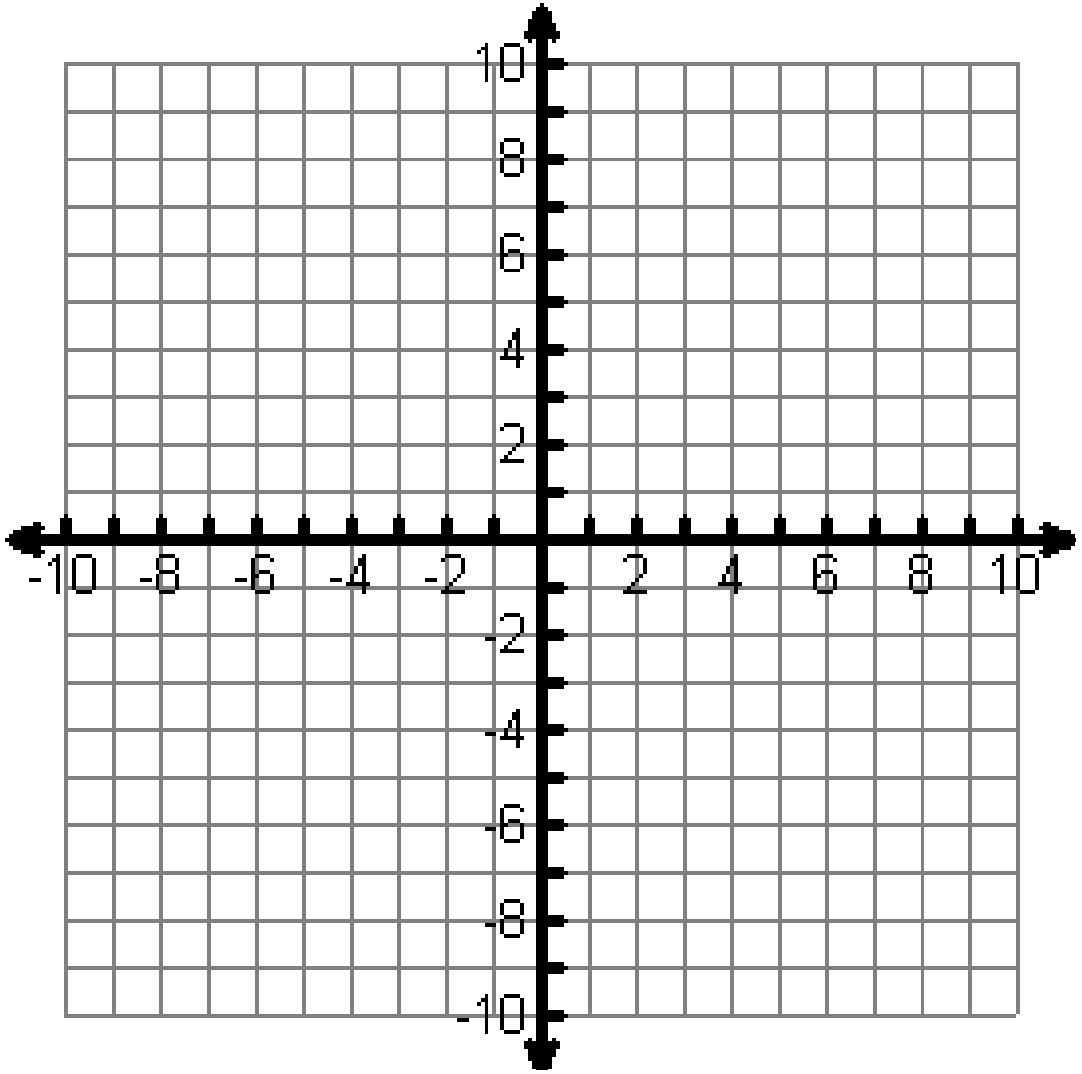
$y > -2x + 5$



Ex. 6

$y > 2x + 1$

$y \leq -2x + 5$



Ex. 7

- It takes 2 hours to make the blade of a figure skate. It takes 3 hours to make the blade of a hockey skate. There is a maximum of 40 hours per week in which the blades can be made for both types of skates.
- It takes 3 hours to make the boot of a figure skate. It takes 1 hour to make the boot for a hockey skate. There is a maximum of 20 hours per week in which boots can be made for both types of skates.

Ex. 7

1. **What is the inequality that represents the time it takes to make the blades of the two different types of skates?**

$$2x + 3y \leq 40$$

2. **What is the inequality that represents the amount of time it takes to make the boots of the two different skates?**

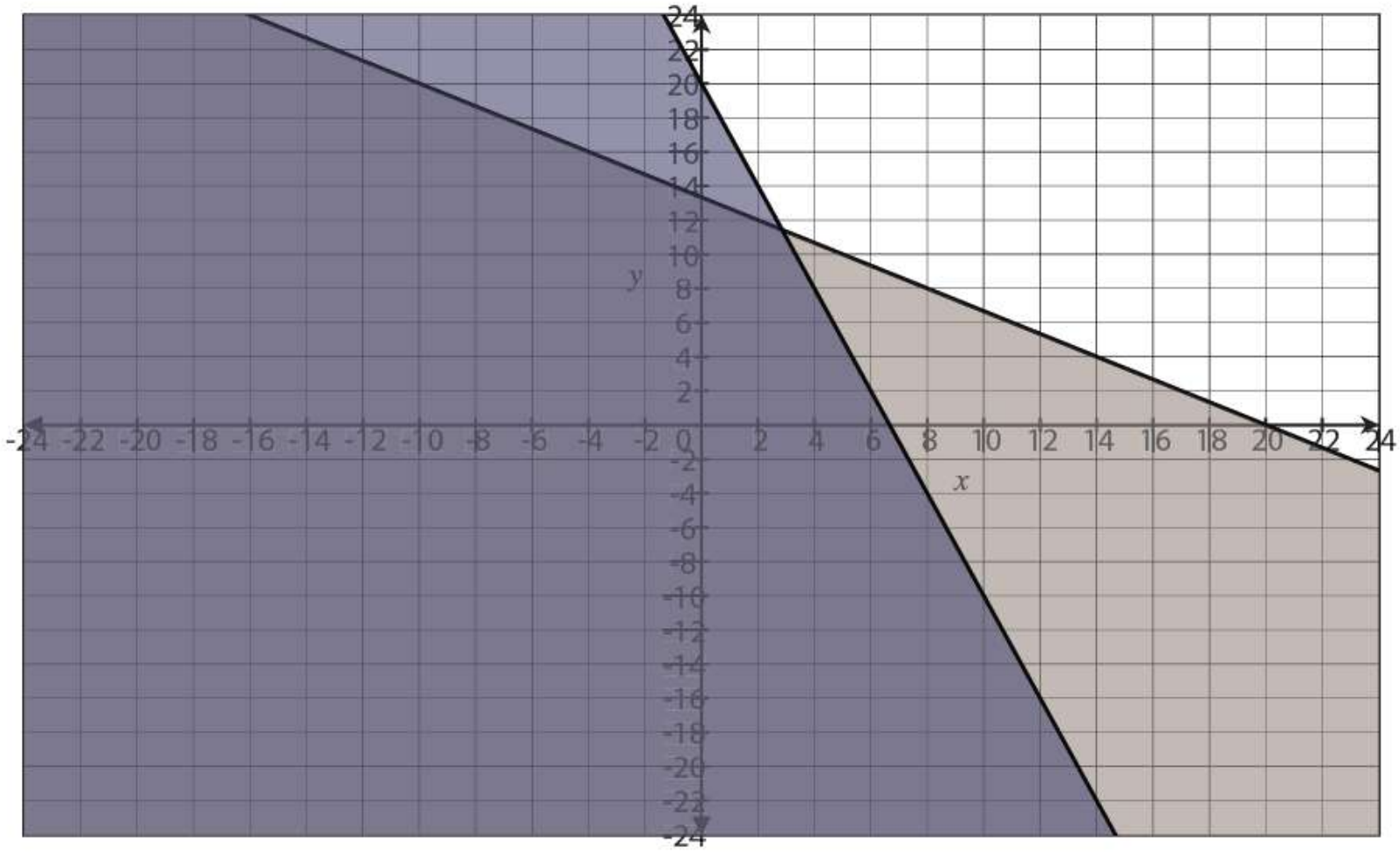
$$3x + y \leq 20$$

Ex. 7

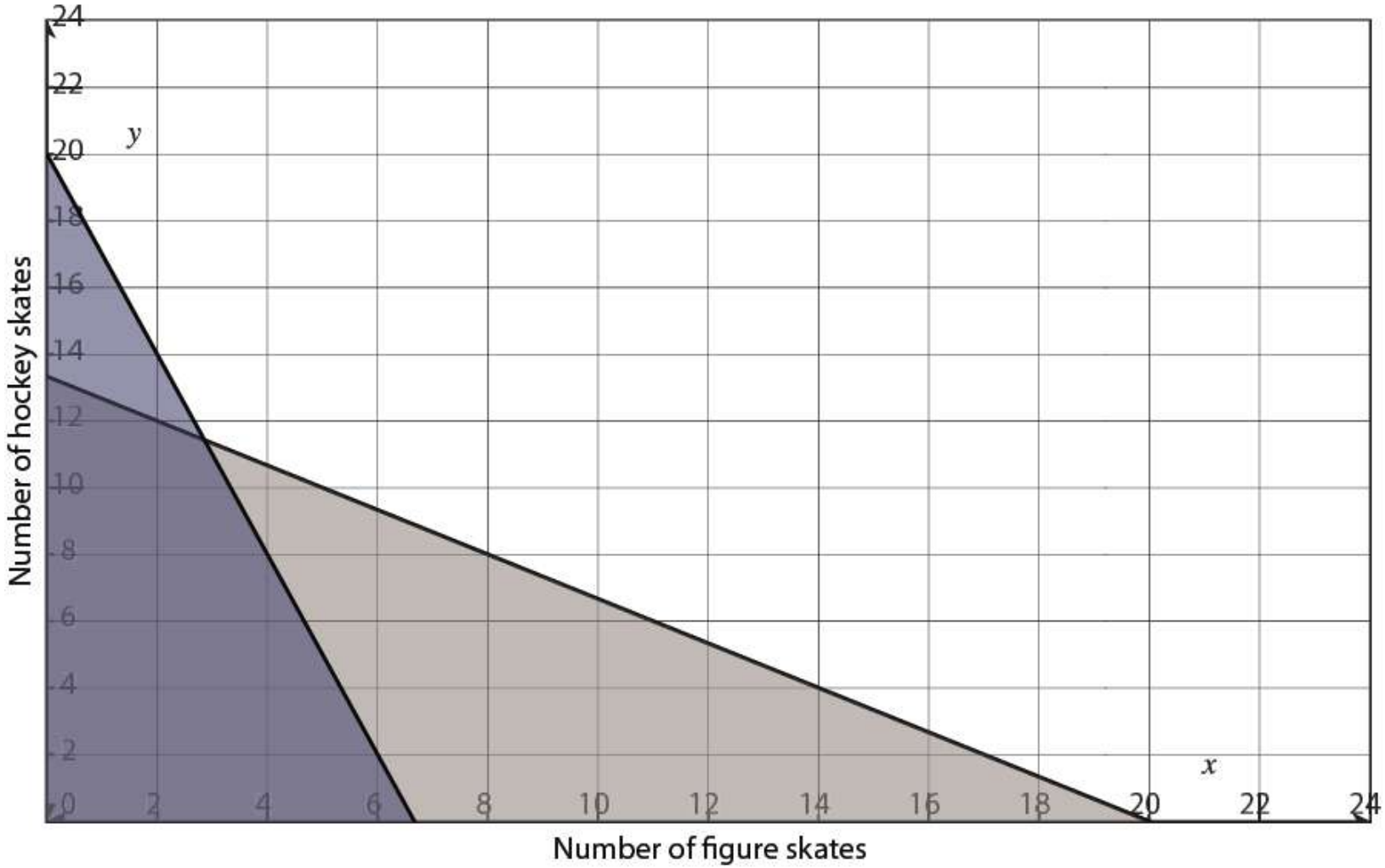
Graph and consider some constraints to the problem.

What is the solution of all possible combinations of figure skates and hockey skates that can be produced given the constraints of this situation?

#7's Graph



Ex. 7's Solution with Constraints



Ex. 8

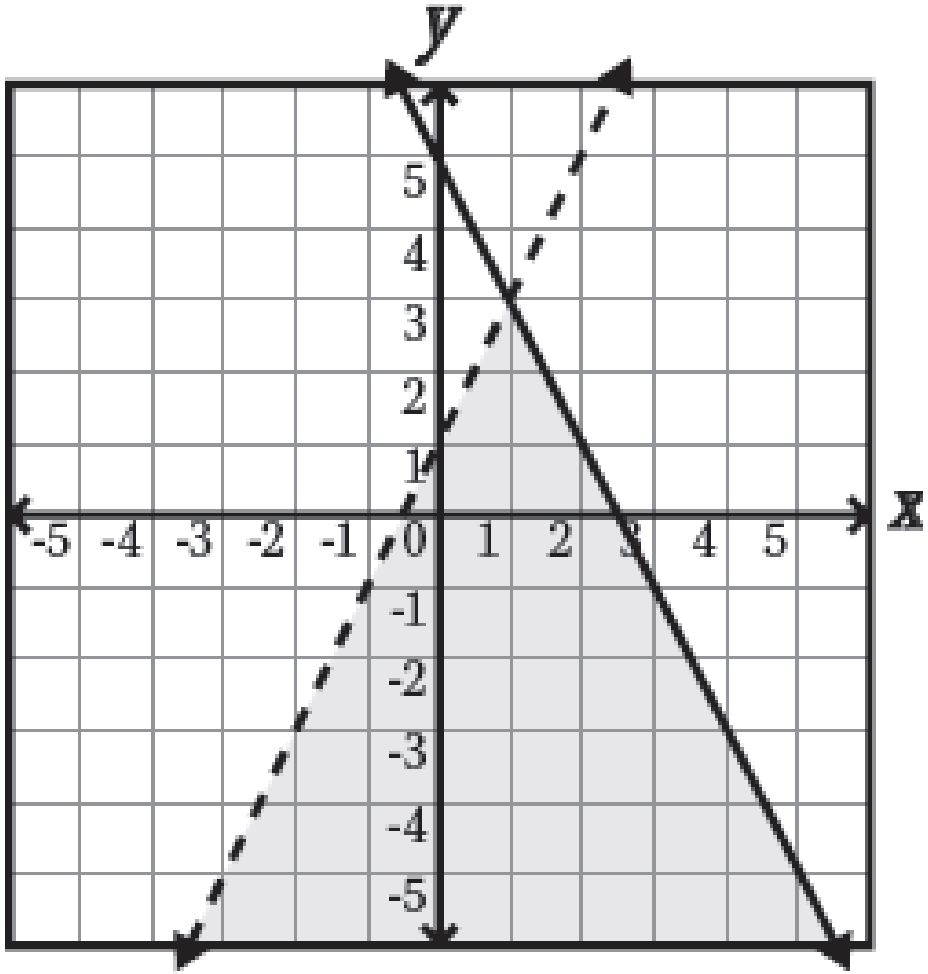
- Which system of inequalities represents the graph below?

a. $\begin{cases} y \leq 2x+1 \\ y > -2x+5 \end{cases}$

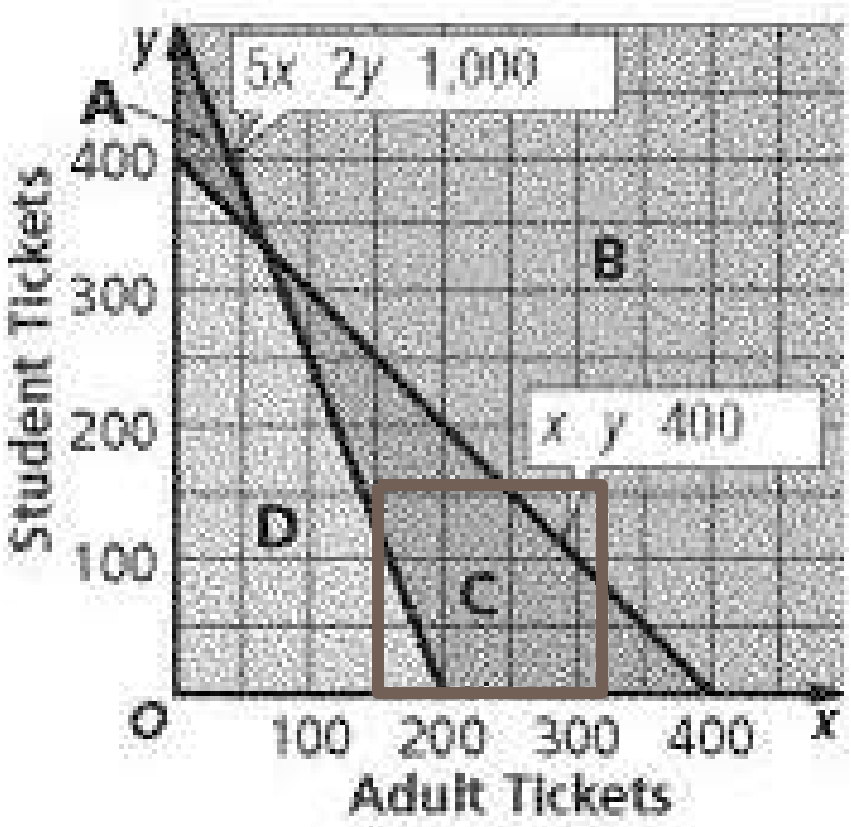
b. $\begin{cases} y > 2x+1 \\ y > -2x+5 \end{cases}$

c. $\begin{cases} y > 2x+1 \\ y \leq -2x+5 \end{cases}$

d. $\begin{cases} y < 2x+1 \\ y \leq -2x+5 \end{cases}$



Ex. 9



- Brenda's high school theater can seat at most 400 people. Adult tickets are $5 and student tickets are $2. The school must make at least $1000 for the show to go on. Which region represents the possible numbers of adult and student tickets sold that meet the given conditions?

Homework

Worksheet