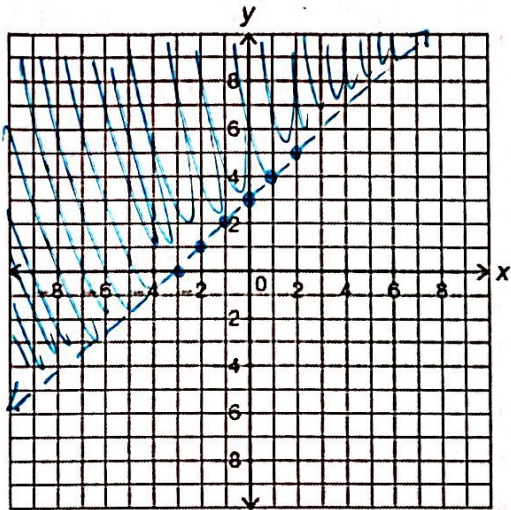


# Day 3 - Graphing Systems of Inequalities - Notes

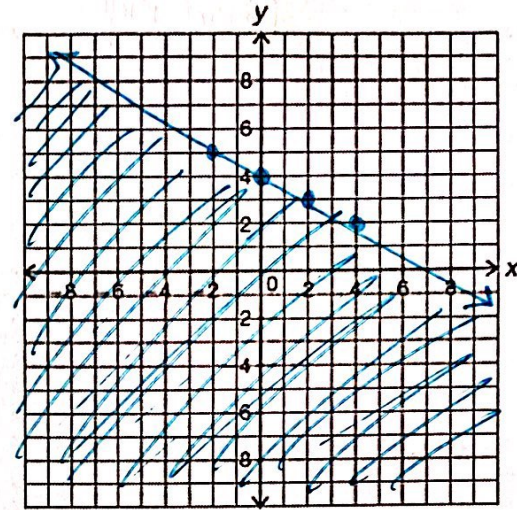
**Learning Target:** I can graph a system of inequalities and determine if a point is a solution.

**Review:** Graph each inequality. Name a solution that would satisfy the inequality.

a.  $y > x + 3$



b.  $y \leq -\frac{1}{2}x + 4$



The **solution of a system of linear inequalities** is the intersection of the solution to each inequality. Every point in the intersection regions satisfies the solution. Determine if the following points are a solution to the inequality:

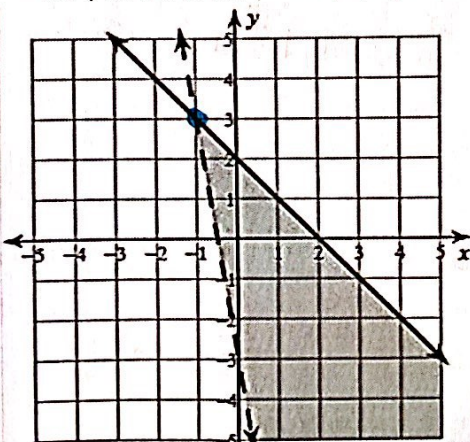
$x + 5y < -1$   
 $2y \geq -3x - 2$

$(0, -1)$  **Solution**  
 $0 + 5(-1) < -1$   
 $-5 < -1$  True  
 $2(-1) \geq -3(0) - 2$   
 $-2 \geq -2$  True

$(2, 3)$  **Not a Solution**  
 $2 + 5(3) < -1$   
 $17 < -1$  False

**Warning...Potential Misconception!!!**

Do you think the point  $(-1, 3)$  is a solution to the inequality?



Not a Solution

**Determining Solutions Located on a Boundary Line**  
 If a point lies on a **solid** line, it is a solution.  
 If a point lies on a **dashed** line, it is not a solution.  
 It must be true or a solution for both inequalities/boundary lines to be a solution!

# Graphing Systems of Inequalities in Slope Intercept Form

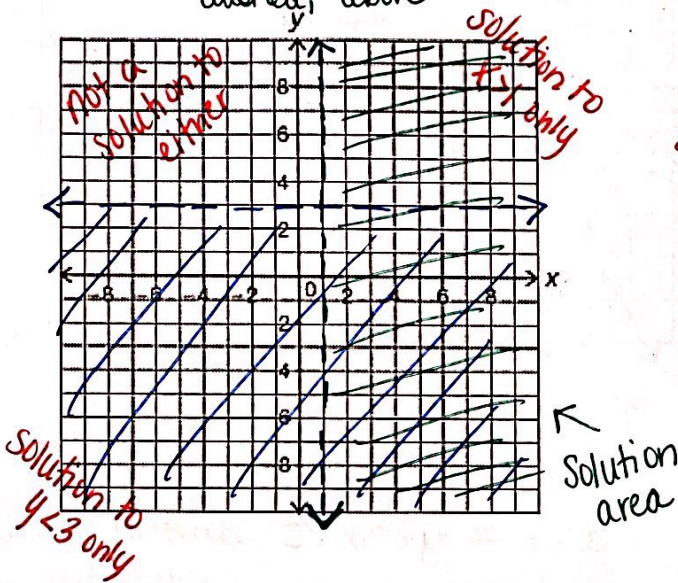
## Steps for Graphing Systems of Inequalities

**Step 1:** Graph the boundary lines of each inequality. Use dashed lines if the inequality is  $<$  or  $>$ . Use a solid line if the inequality is  $\leq$  or  $\geq$ .

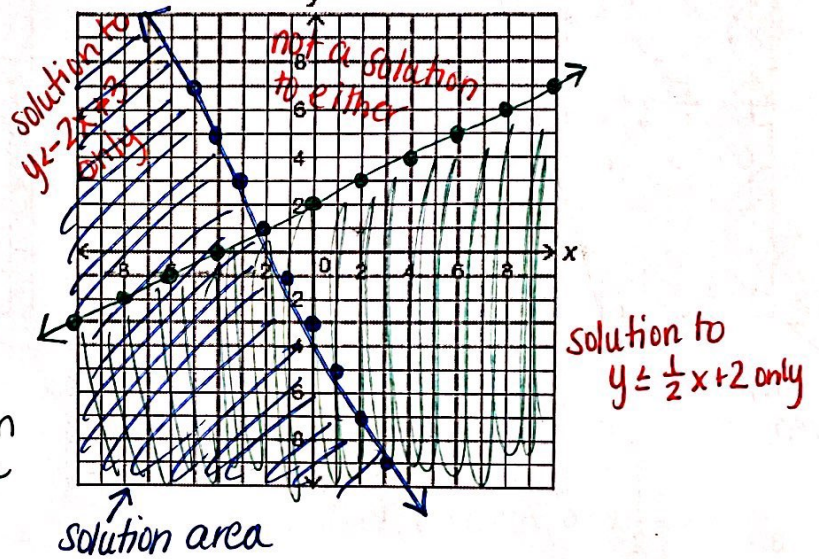
**Step 2:** Shade the appropriate half plane for each inequality.

**Step 3:** Identify the solution of the system of inequalities as the intersection of the half planes from Step 2.

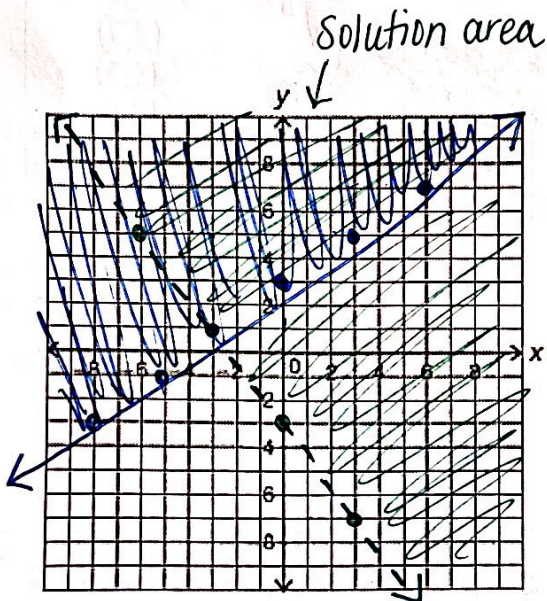
A.  $y < 3$  dashed, below  
 $x > 1$  dashed, above



B.  $y < -2x - 3$  dashed, below  
 $y \leq \frac{1}{2}x + 2$  solid, below



C.  $y \geq \frac{2}{3}x + 3$  solid, above  
 $y > -\frac{4}{3}x - 3$  dashed, above



D.  $\frac{2y > -8x + 16}{2} \quad \frac{4x + y < -2}{-4x} \quad -4x$   
 $y > -4x + 8$  dashed above  
 $y < -4x - 2$  dashed, below

