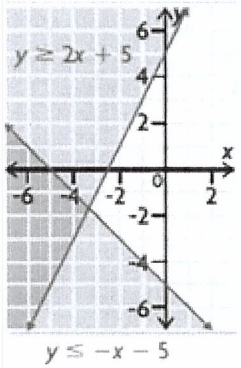
# 6.2/3 Solving Systems of Linear Inequalities- Day1 (Concept #2)

**System of Linear Inequalities**: A set of two or more linear inequalities that are graphed on the same coordinate plane; the intersection of their solution regions represents the solution set for the system. Example →




**EXAMPLE #1:**

Graph the system of linear inequalities. Choose two possible solutions from the set. Assume $x \in R$, $y \in R$.

$2x + 3y \leq 9$ and $y - 6x \geq 1$

$\frac{3y}{3} \leq \frac{-2x+9}{3}$

$y \leq -\frac{2}{3}x + 3$ (slope, y-int.)

→ boundary line is solid because ≤

→ Shade below the line

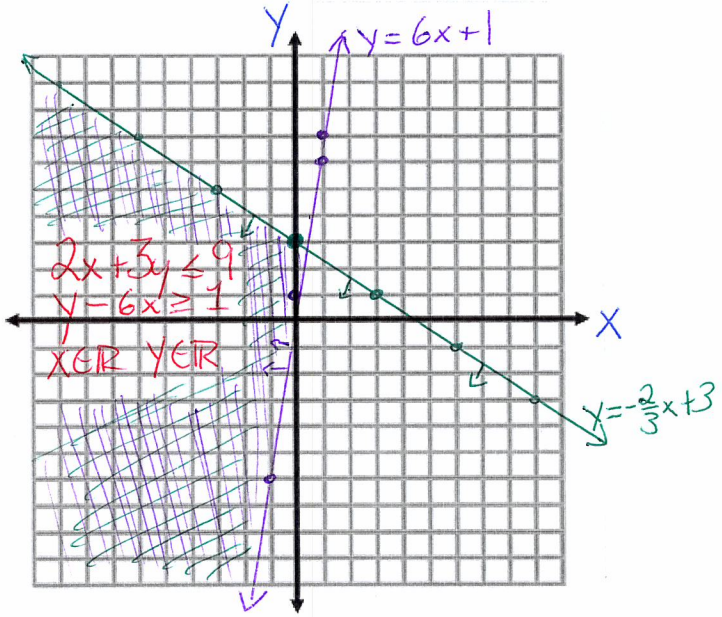
Boundary Line Equation ⇒ $y = -\frac{2}{3}x + 3$

$y \geq 6x + 1$ (slope, y-int.)

→ boundary line is solid

→ Shade above the line

Boundary Line Equation ⇒ $y = 6x + 1$




**EXAMPLE #2:**

Graph the system of linear inequalities. Choose two possible solutions from the set. Assume $x \in I$, $y \in I$.

$-3x - 2y < 6$ and $y \leq 3$

$\frac{-2y}{-2} < \frac{3x+6}{-2}$ ☆ Flip the inequality ☆

$y > -\frac{3}{2}x - 6$ (slope, y-int.)

→ Boundary line is dashed since >

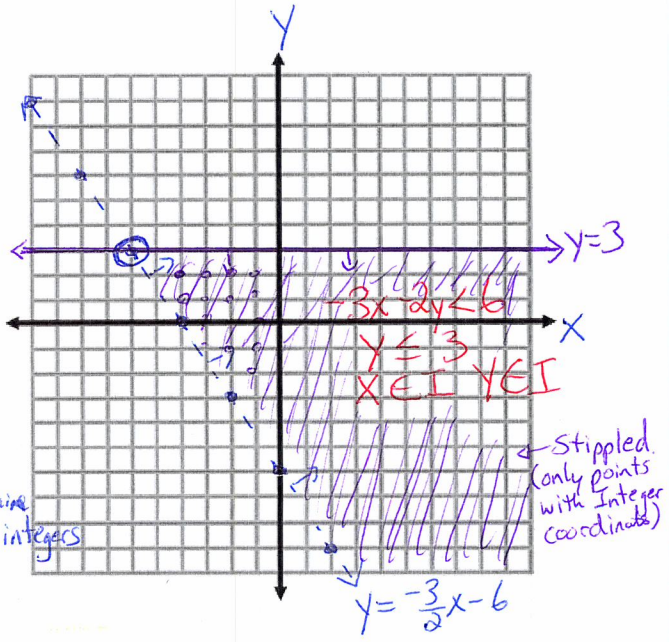
→ Shade above the line

Boundary Line Equation ⇒ $y = -\frac{3}{2}x - 6$

$y = 3$ Horizontal line

→ Boundary line is solid

→ Shade Below the line




Note: Since the domain and range only include integers

Does the intersection point of the system have an open dot or a closed dot? Explain

It will have an open dot because the solutions must satisfy both inequalities and $-3x - 2y < 6$ does not include the points on the line, therefore the intersection point is not included in the solution region.

**EXAMPLE #3:** The domain and range are within the set of whole numbers which can only be found in Quadrant I

Graph the system of linear inequalities. Choose two possible solutions from the set. Assume $x \in W$, $y \in W$.

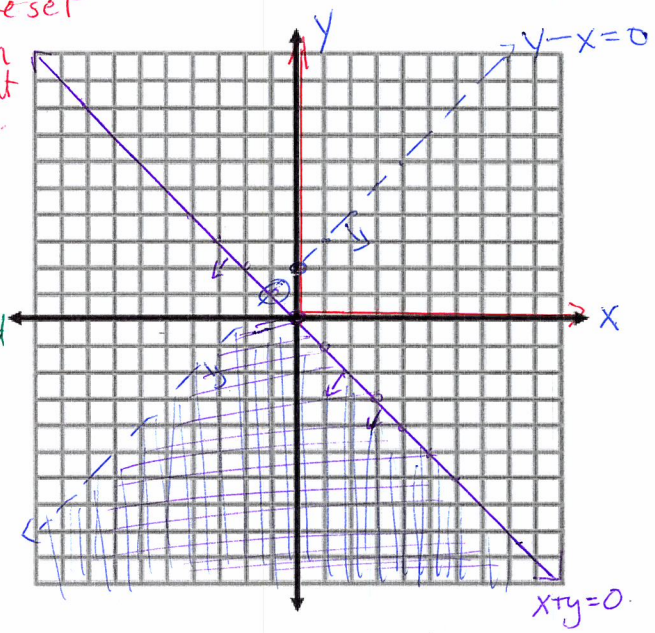
$y - x < 2$ (+x +x) and $x + y \leq 0$ (−x −x)

$y < x + 2$

- boundary line is dashed
- shade below the line

$y \leq -x$

- boundary line is solid
- shade below




There is only one solution (0,0)

**EXAMPLE #4:**

Graph the system of linear inequalities. Choose two possible solutions from the set. Assume $x \in R$, $y \in R$.

$2x + 10 > 3y$ (−2x −2x) and $3x - y - 4 \leq 0$ (−3x +4 +3x+4) and $x \geq 0$

$10 - 3y > 3y - 2x$ (−3y −3y)

$-3y + 10 > -2x$ (−10 −10)

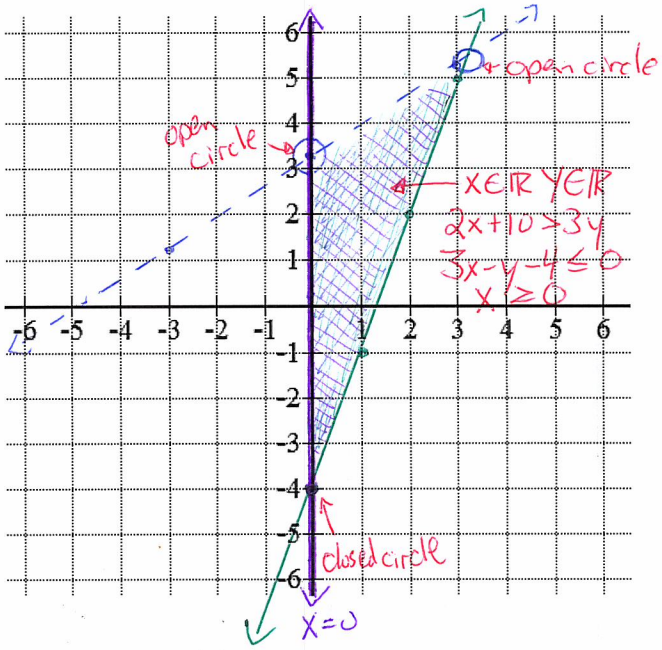
$\frac{-3y}{-3} > \frac{-2x}{-3} - \frac{10}{-3}$

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

$-y \leq -3x + 4$ (÷ −1 ÷ −1 ÷ −1)

$y \geq 3x - 4$

$x \geq 0$




Two possible solutions are (1,1), $(\frac{1}{2}, \frac{3}{2})$

**Assignment : pg 307 #1 Pg 317 #3(May not need to graph) ,4,5**