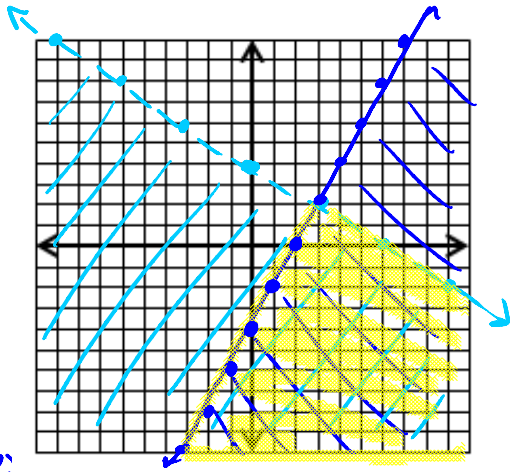
8.6 HW Pg. 291-293 #1-6, 8

1 **a.** Graph the following system of inequalities:

$$y \le 2x - 4$$
$$2x + 3y < 12$$

$3y < -2x + 12$
$y < -\frac{2}{3}x + 4$



b. Is (4, –3) a part of the solution to the system of inequalities? Use your graph to justify your answer.

c. Is (7, 5) a part of the solution to the system of inequalities? Use your graph to justify your answer.

d. Is (3, 2) a part of the solution to the system of inequalities? Use your graph to justify your answer.

e. Is the origin a part of the solution to the system of inequalities? Use your graph to justify your answer.

b) Yes - it lies in the shaded region of both inequalities

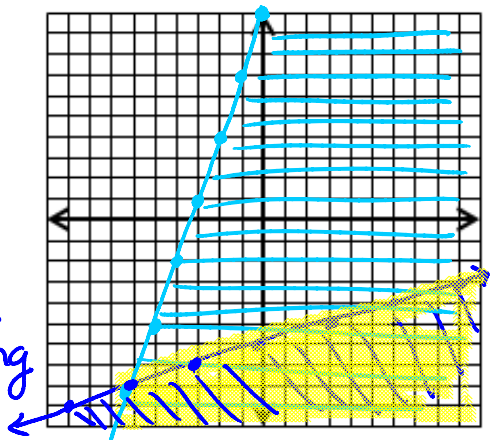
c) No - it only lies in the shaded region of $y \le 2x$.

d) No - it lies on the intersection of the 2 lines; however $2x + 3y < 12$ is a less than relationship, so the point is not included in the solution

e) No - it only lies in the shaded region of $2x + 3y < 12$.

2 **a.** Graph the following system of inequalities:

$$x - 3y \ge 18$$
$$y \le 3x + 10$$



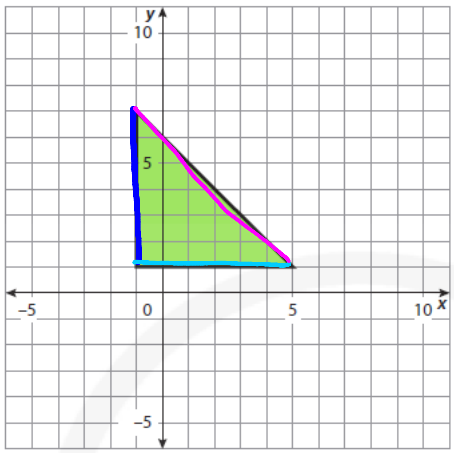
b. At what point do the boundary lines intersect? Is this point a part of the solution to the system of inequalities? Explain.

c. Describe the region of the graph that is the solution set for the system of inequalities.

b) The boundary lines intersect at $(-6, -8)$. This point is a part of the solution since both equations are " or = to " - meaning the coordinates on the boundary lines are included in the solution.

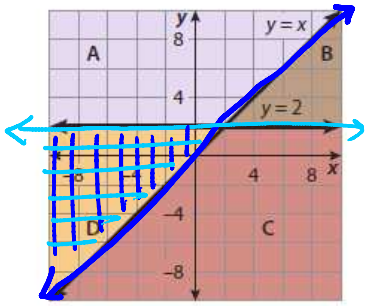
c) The solution set is the region found below both lines and the section of each line that borders the region.

3. Write a system of inequalities that describes the graph below.



$\begin{cases} x \ge 1 \\ y \ge 1 \\ y \le -x + 6 \text{ or } x + y \le 6 \end{cases}$

4. Which region of the graph represents the solution set for the system of inequalities $y \geq x$ and $y \leq 2$? D



5. A small company makes unfinished tables and chairs. Each table uses 40 board feet of wood, and each chair uses 20 board feet. It takes 6 hours of labor to make a table and 8 hours of labor to make a chair. There are 2,000 board feet of wood and 600 labor-hours available for the next week.

a. Let T represent the number of tables made in the next week and C the number of chairs. Write inequalities that relate T and C to the total available amount of wood and to the total available labor.

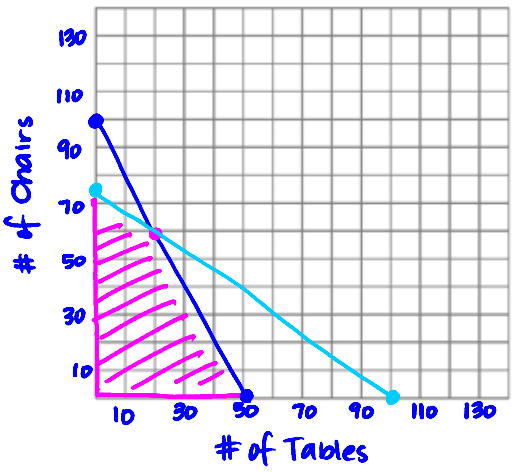
$40T + 20C \leq 2{,}000$

$6T + 8C \leq 600$

b. This situation can be further described by the inequalities $T \geq 0$ and $C \geq 0$. Why?

You cannot have a negative # of tables and chairs.

c. Draw a graph of the solution set for this situation.



$40T + 20C = 2000$

T	C	
0	100	→ (0, 100)
50	0	→ (50, 0)

$6T + 8C = 600$

T	C	
0	75	→ (0, 75)
100	0	→ (100, 0)

d. Yes, the point (30, 35) lies in the shaded region of both inequalities.

e. No, the point (50, 10) lies in the shaded region of only one inequality.

6. A principal has received a $1,200 grant to buy new printers for his school. He has a choice between buying black-and-white printers for $45 each and color printers for $120 each. He wants at least 20 new printers.

a. Let B represent the number of black-and-white printers and C the number of color printers. Write a system of inequalities that models the situation.

b. Draw a graph of the solution set.

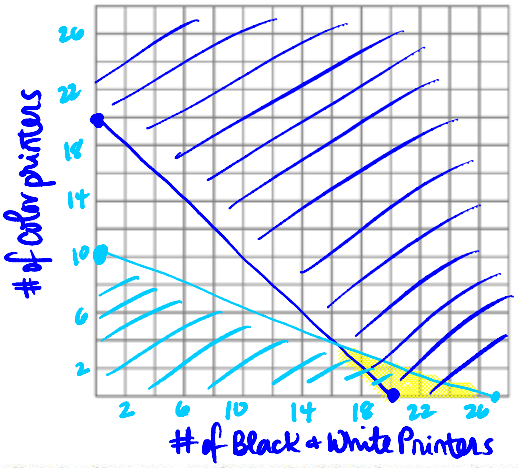
c. What is the largest number of color printers that will satisfy both requirements? Explain.

$B+C \geq 20$

$45B + 120C \leq 1200$

$B \geq 0$

$C \geq 0$



$B+C=20$

B	C
0	20
20	0

$45B+120C=1200$

B	C
0	10
$26\frac{2}{3}$	0

$-45(B+C)=(20)-45 \rightarrow -45B-45C=-900$

$45B+120C=1200$ + $45B+120C=1200$

$75C=300$

$C=4$

$B=16$

The largest # of color printers that will satisfy both equations is 4.

8. A ballpark offers two packages for birthday party favors. Package A includes 5 tickets for a ball-toss game and 6 pennants for the home team. Package B includes 15 tickets for a ball-toss game and 3 pennants for the home team. The ballpark management wants to have at least 30 packages available. They also want to include at least 300 tickets but no more than 180 pennants.

a. Write a system of inequalities that models this situation. Let a represent the number of A packages and b the number of B packages.

b. Graph the system of inequalities to determine how many of each package can be assembled.

c. Is it possible to assemble 10 of Package A and 40 of Package B? Explain.

d. Is it possible to assemble 20 of Package A and 30 of Package B? Explain.

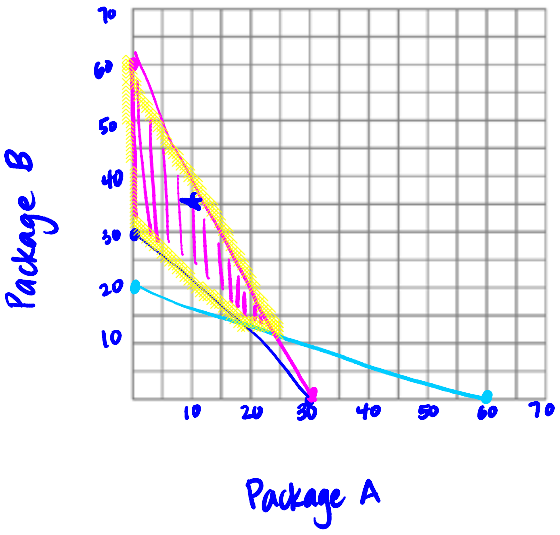
$A+B \geq 30$

$5A+15B \geq 300$

$6A+3B \leq 180$

$A \geq 0$

$B \geq 0$



$A+B=30$

A	B
0	30
30	0

$5A+15B=300$

A	B
0	20
60	0

$6A+3B=180$

A	B
0	60
30	0

c) YES! The point (10,40) is in the shaded region

d) NO ∴ The point (20,30) is not in the shaded region