

Graphing Single Inequalities

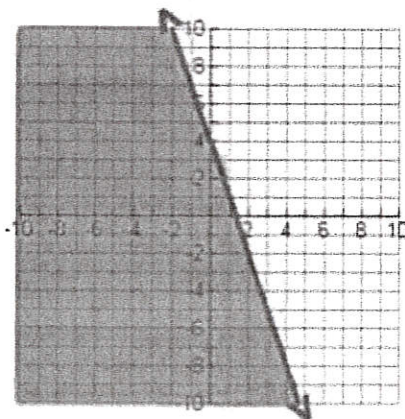
b 1. Which inequality represents the graph to the right:

a.  $y \geq 3x + 4$

b.  $y \leq -3x + 4$

c.  $y > -3x + 4$

d.  $y < 3x + 4$



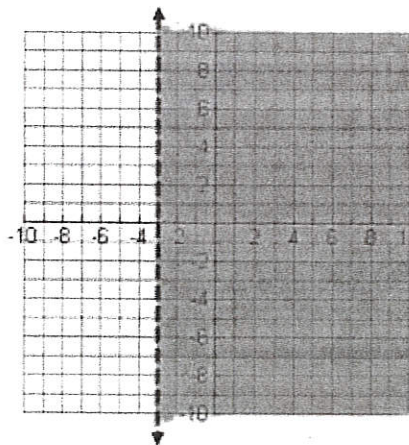
c 2. Which inequality represents the graph to the right:

a.  $y \leq -3$

b.  $y > -3$

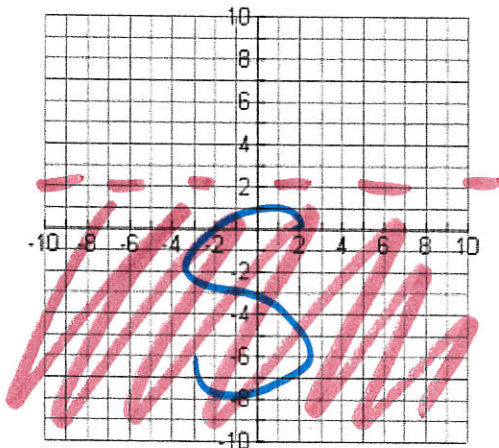
c.  $x > -3$

d.  $x \leq -3$



Graph each inequality below:

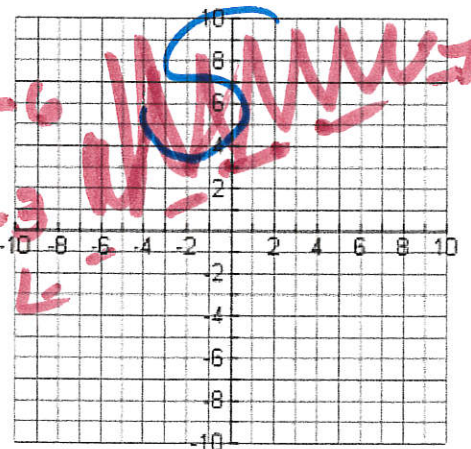
3.  $y < 2$



4.  $x - 2y < -6$

$-2y < -x - 6$

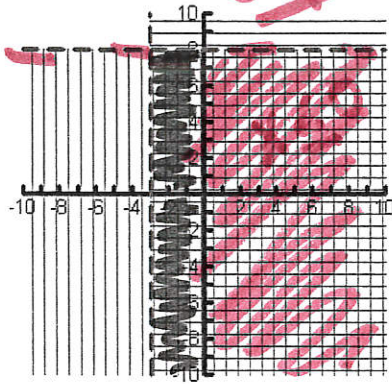
$y > \frac{1}{2}x + 3$



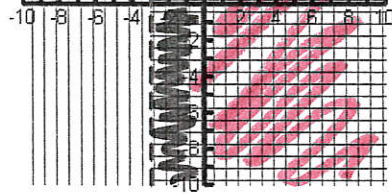
# Graphing Systems of Inequalities

Match each system of equations to its graph below.

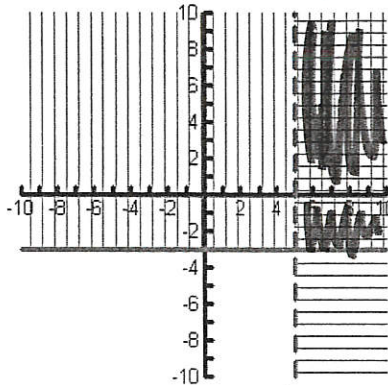
**a** 5.  $y < 8$   
 $x > -3$  ✓



**C** 6.  $y < 5$   
 $y \geq -7$

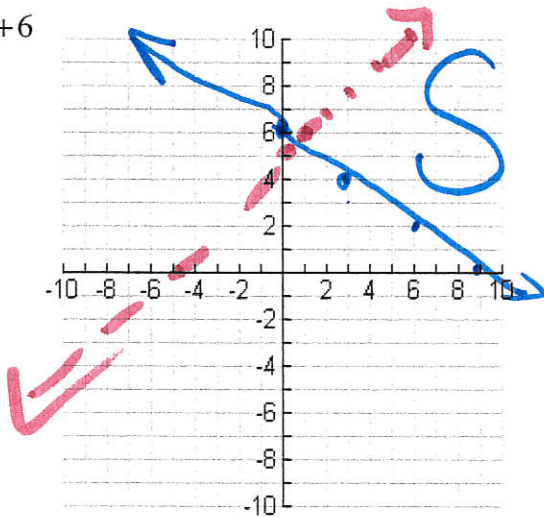


**B** 7.  $y \geq -3$   
 $x > 5$



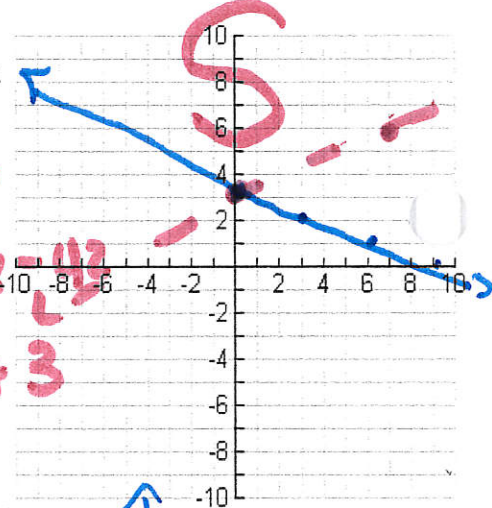
Graph each system of linear inequalities below and shade the appropriate region.

8.  $y \geq \frac{-2}{3}x + 6$   
 $y < x + 5$



9.  $3x + 9y \geq 27$   
 $-6x - 14y < -42$

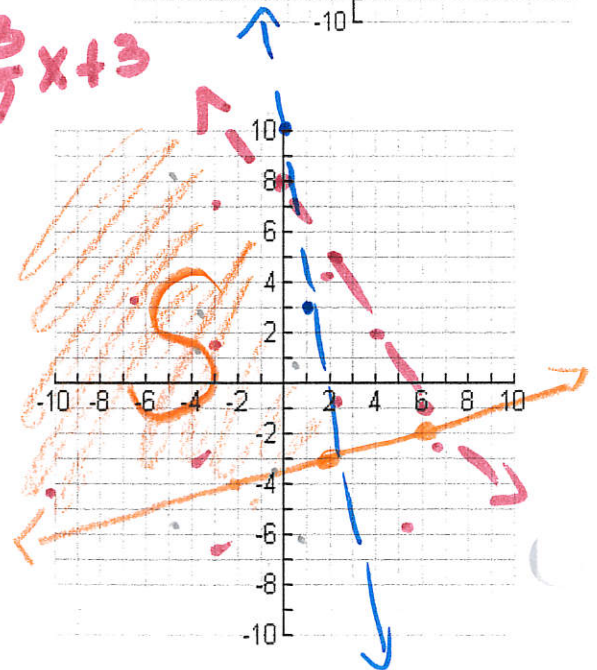
$y \geq -\frac{1}{3}x + 3$   
 $-14y < -6x - 42$   
 $y > \frac{6}{14}x + 3$   
 $y \geq \frac{3}{7}x + 3$



Graph each system of linear inequalities below and shade the appropriate region.

10.  $-6x + 4y < 32$   
 $y \geq \frac{1}{4}(x - 2) - 3$   
 $y < -7x + 10$

$4y < 6x + 32$   
 $y < \frac{3}{2}x + 8$



## Identify Solutions to Linear Systems

11. Without graphing, determine if  $(1, -4)$  is a solution to the following system.

Answer yes

$$\begin{aligned} -4 &\geq \left(\frac{1}{2} - 6\right) \\ -4 &\geq -5.5 \quad \checkmark \end{aligned}$$

$$\begin{aligned} -4 &\leq 3(1) \\ -4 &\leq 3 \quad \checkmark \end{aligned}$$

$$y \geq \frac{1}{2}x - 6 \quad \checkmark$$

$$y \leq 3x \quad \checkmark$$

$$2x + y < 5$$

$$\begin{aligned} 2(1) + (-4) &< 5 \\ 2 + (-4) &< 5 \\ -2 &< 5 \quad \checkmark \end{aligned}$$

12. Which point is a solution to the system graphed to the right?

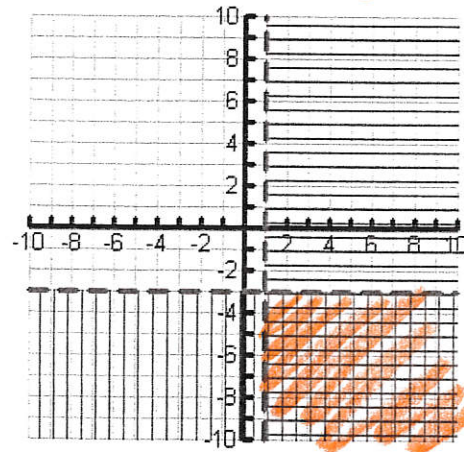
a.  $(4, 4)$

b.  $(4, -4)$

c.  $(-4, -4)$

d.  $(-4, 4)$

Answer: b



13. Which point(s) are solutions to the system graphed to the right?

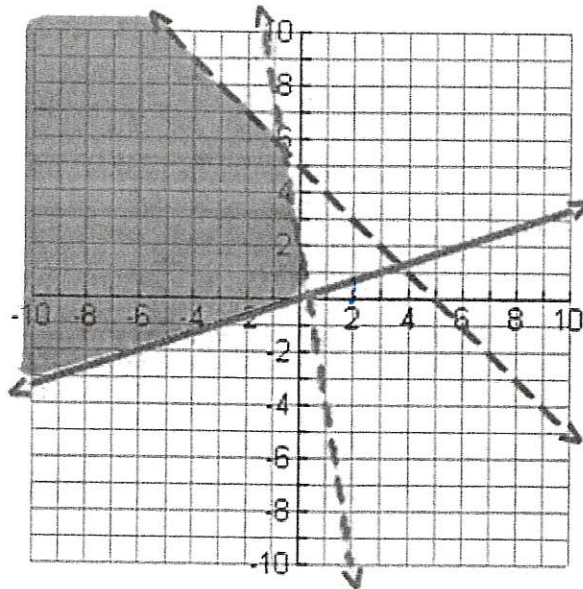
A.  $(-2, -3)$

B.  $(-1, 1)$  ✓

C.  $(2, 1)$

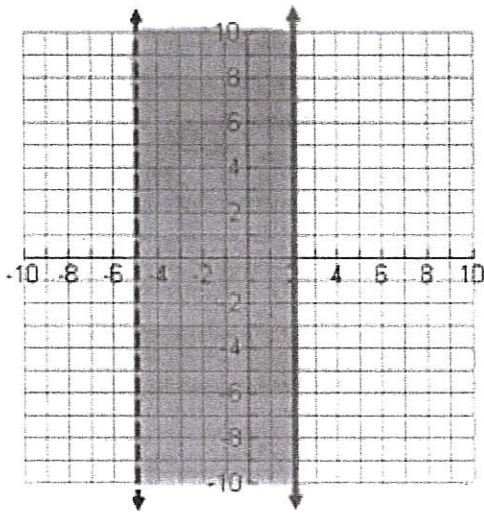
D.  $(-4, 0)$  ✓

Answer(s): B ; D



## Writing Systems of Linear Inequalities

14. Write the system of 2 linear inequalities graphed below:



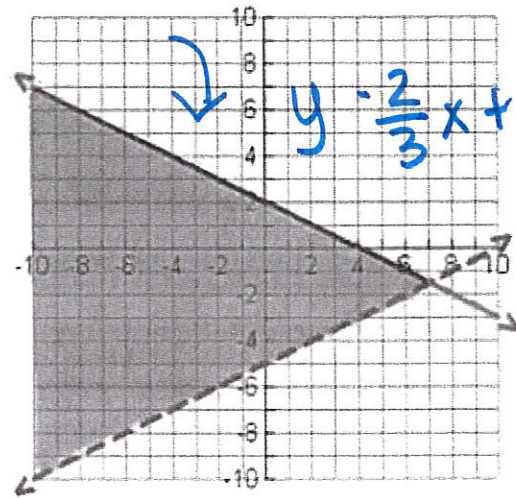
VUX

Answer  $x > -5$

Answer  $x \leq 2$

y

15. Write the system of 2 linear inequalities graphed below:



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

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

Answer  $y > \frac{1}{2}x - 5$

16. Write the system of 4 linear inequalities graphed below.

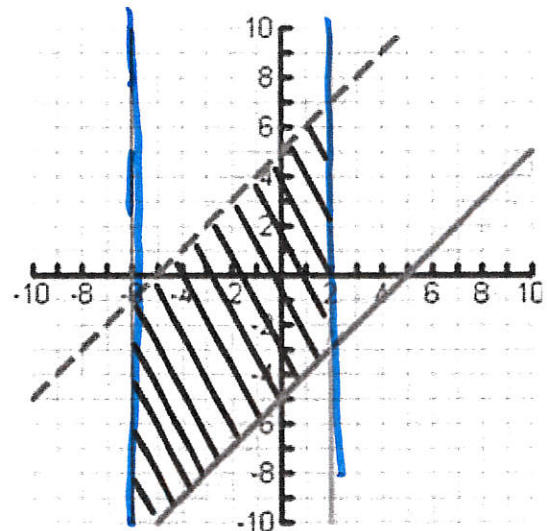
VUX

Answer  $x \geq -6$

Answer  $x \leq 2$

Answer  $y > 1x - 5$

Answer  $y < 1x + 5$



## SYSTEM of INEQUALITIES WORD PROBLEMS

1. You can work at most 20 hours next week. You need to earn at least \$92 to cover your weekly expenses. Your dog-walking job pays \$7.50 per hour and your job as a car wash attendant pays \$6 per hour. Write a system of linear inequalities to model the situation.

$d = \text{hrs dog walking}$      $c = \text{hours car wash}$

$$d + c \leq 20$$

$$7.50d + 6c \geq 92$$

2. Marsha is buying plants and soil for her garden. The soil cost \$4 per bag, and the plants cost \$10 each. She wants to buy at least 5 plants and can spend no more than \$100. Write a system of linear inequalities to model the situation.

$x = \# \text{ plants}$   
 $y = \text{bags soil}$

$$x \geq 5$$

$$10x + 4y \leq 100$$

3. Jonah is going to the store to buy candles. Small candles cost \$3.50 and large candles cost \$5.00. He needs to buy at least 20 candles, and he cannot spend more than \$80. Write a system of linear inequalities that represent the situation.

$$x + y \geq 20$$

$$3.50x + 5y \leq 80$$

4. John is packing books into boxes. Each box can hold either 15 small books or 8 large books. He needs to pack at least 35 boxes and at least 350 books. Write a system of linear inequalities to represent the situation.

$$S + L \geq 35$$

$$15S + 8L \geq 350$$

5. During a family trip, you share the driving with your dad. At most, you are allowed to drive for three hours. While driving, your maximum speed is 55 miles per hour.

a) Write a system of inequalities describing the possible numbers of hours  $t$  and distance  $d$  you may have to drive.

b) Is it possible for you to have driven 160 miles?

## Linear Programming Review

1. The Bakery sells bagels and cupcakes, earning a profit of \$6 for each dozen of bagels and \$8 for each dozen of cupcakes.

Let  $x = \# \text{ doz bagels}$  Let  $y = \# \text{ doz cupcakes}$

Profit =  $6x + 8y$

We are given the following information.

	1 dz <sup>x</sup> Bagels	1 dz <sup>y</sup> Cupcakes	Amount available
Eggs	3	6	50
Flour	7	5	100
Butter	3	4	75

Additionally, CTB must produce at least 3 dozens bagels everyday for its regulars.

Write the constraints:

1.  $3x + 6y \leq 50$
2.  $7x + 5y \leq 100$
3.  $3x + 4y \leq 75$
4.  $x \geq 3$
5.  $y \geq 0$

2. Lisa has an online jewelry shop where she sells earrings and necklaces.

She sells earrings for \$30 and necklaces for \$40.

$= \frac{1}{2} \text{ hr}$

It takes 30 minutes to make a pair of earrings and 1 hour to make a necklace, and, since Lisa is a math tutor, she only has 10 hours a week to make jewelry.

In addition, she only has enough materials to make 15 total jewelry items per week.

She makes a profit of \$15 on each pair of earrings and \$20 on each necklace.

How many pairs of earrings and necklaces should Lisa make each week in order to maximize her profit, assuming she sells all her jewelry?

Let  $x = \# \text{ necklaces}$

Let  $y = \# \text{ pairs earrings}$

	$x$	$y$	TOT
hrs	$1x$	$+\frac{1}{2}y$	$\leq 10$
mat.	$x$	$+y$	$\leq 15$

Constraints:

1.  $x + \frac{1}{2}y \leq 10 \Rightarrow y \leq -2x + 20$

2.  $x + y \leq 15 \Rightarrow y \leq -x + 15$

3.  $x \geq 0$

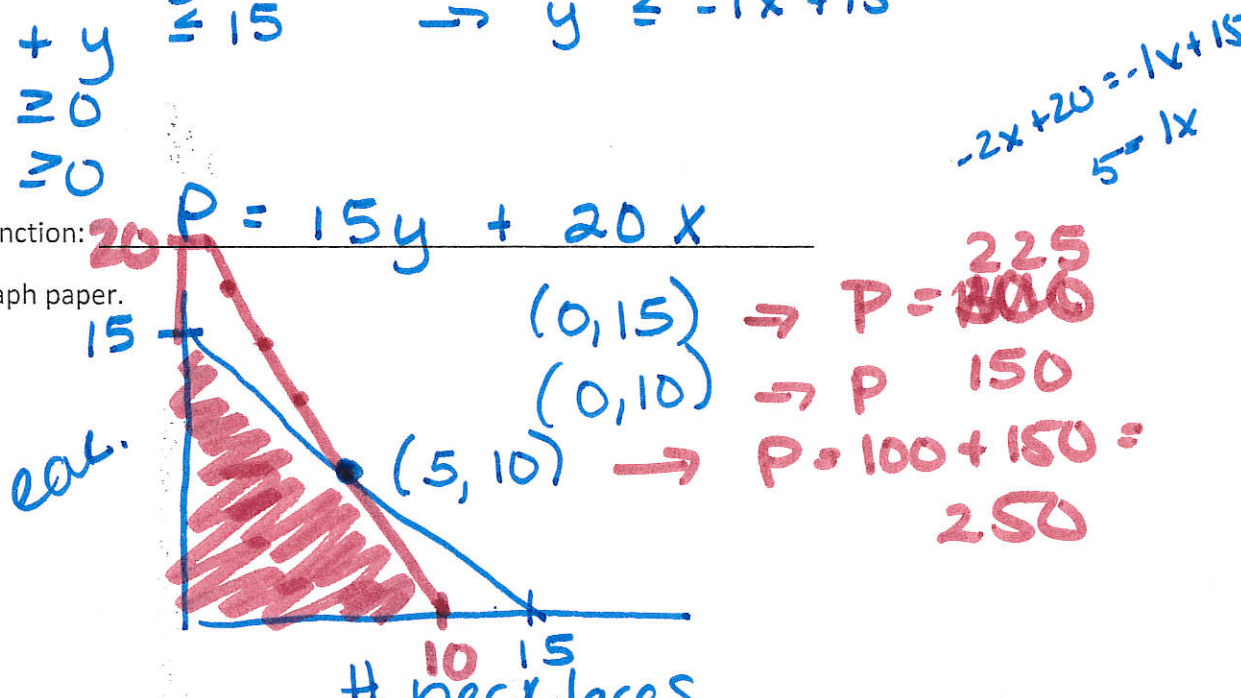
4.  $y \geq 0$

Objective Function:  $P = 15y + 20x$

Graph on graph paper.

Vertices:

Solution:



Max profit of \$250 when makes 5 necklaces and 10 pairs earrings.

