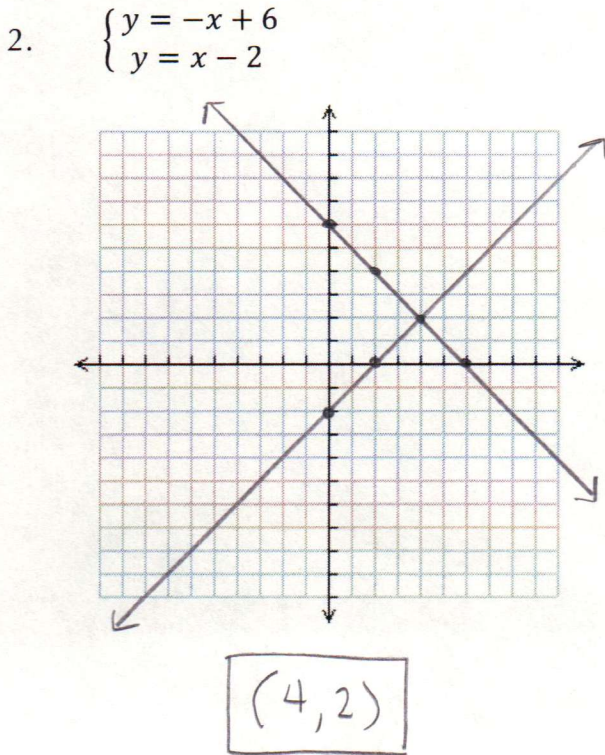
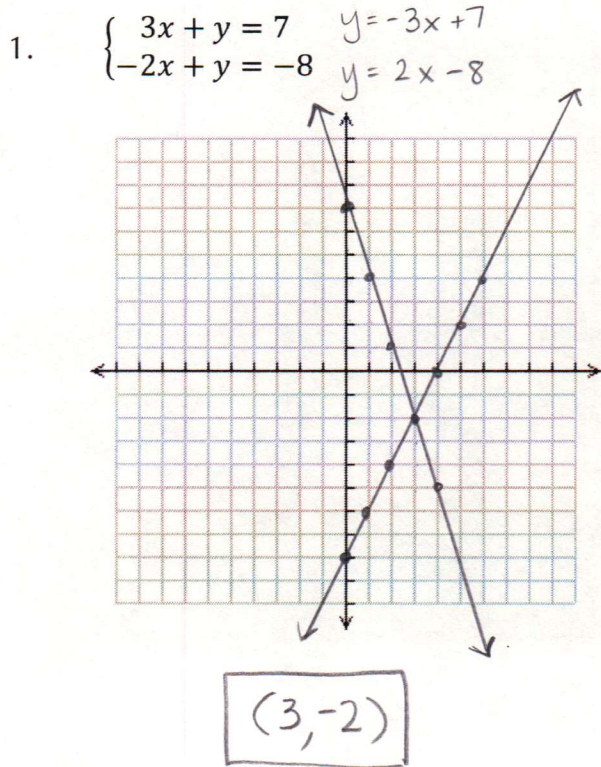


Systems of Linear Equations

Solve each system by graphing. Write your solution as an ordered pair (x, y).



Solve each system using substitution. Write your solution as an ordered pair (x, y).

6.
$$\begin{cases} -2x - y = -35 \\ y = -x + 15 \end{cases} \quad (20, -5)$$

$$-2x - (-x + 15) = -35$$

$$-2x + x - 15 = -35$$

$$-x - 15 = -35$$

$$\begin{array}{r} +15 \quad +15 \\ -x - 15 = -35 \\ \hline -x = -20 \\ \hline -1 \quad -1 \\ x = 20 \end{array}$$

$$y = -(20) + 15$$

$$y = -5$$

7.
$$\begin{cases} x + 2y = 20 \\ -4x - y = -73 \end{cases} \quad (18, 1)$$

$$x = 20 - 2y$$

$$-4(20 - 2y) - y = -73$$

$$-80 + 8y - y = -73$$

$$-80 + 7y = -73$$

$$\begin{array}{r} +80 \quad +80 \\ -80 + 7y = -73 \\ \hline 7y = 7 \\ \hline y = 1 \end{array}$$

$$x + 2(1) = 20$$

$$\begin{array}{r} x + 2 = 20 \\ -2 \quad -2 \\ \hline x = 18 \end{array}$$

Solve each system using elimination. Write your solution as an ordered pair (x, y).

8.
$$-\left[\begin{array}{r} 2x + y = 3 \\ 2x + 2y = 2 \end{array} \right] \quad \boxed{(2, -1)}$$

$$\begin{array}{r} -y = 1 \\ -1 \quad -1 \end{array}$$

$$y = -1$$

$$2x + (-1) = 3$$

$$\begin{array}{r} 2x - 1 = 3 \\ +1 \quad +1 \end{array}$$

$$\begin{array}{r} 2x = 4 \\ \frac{2x}{2} = \frac{4}{2} \end{array} \quad x = 2$$

10.
$$-\left[\begin{array}{r} -3x - y = -15 \\ 8x + 4y = 48 \end{array} \right] \quad \boxed{(3, 6)}$$

$$-\left[\begin{array}{r} 12x + 4y = 60 \\ 8x + 4y = 48 \end{array} \right]$$

$$\begin{array}{r} 4x = 12 \\ \frac{4x}{4} = \frac{12}{4} \end{array}$$

$$x = 3$$

$$-3(3) - y = -15$$

$$\begin{array}{r} -9 - y = -15 \\ +9 \quad +9 \end{array}$$

$$\begin{array}{r} -y = -6 \\ -1 \quad -1 \end{array} \quad y = 6$$

9.
$$3 \left(\begin{array}{r} 3x + 5y = -1 \\ x + 2y = -1 \end{array} \right) \quad \boxed{(3, -2)}$$

$$-\left[\begin{array}{r} 3x + 6y = -3 \\ 3x + 5y = -1 \end{array} \right]$$

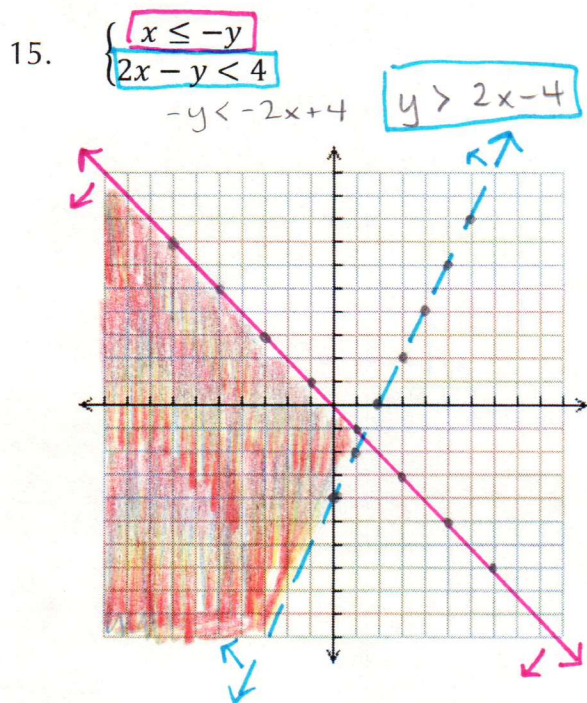
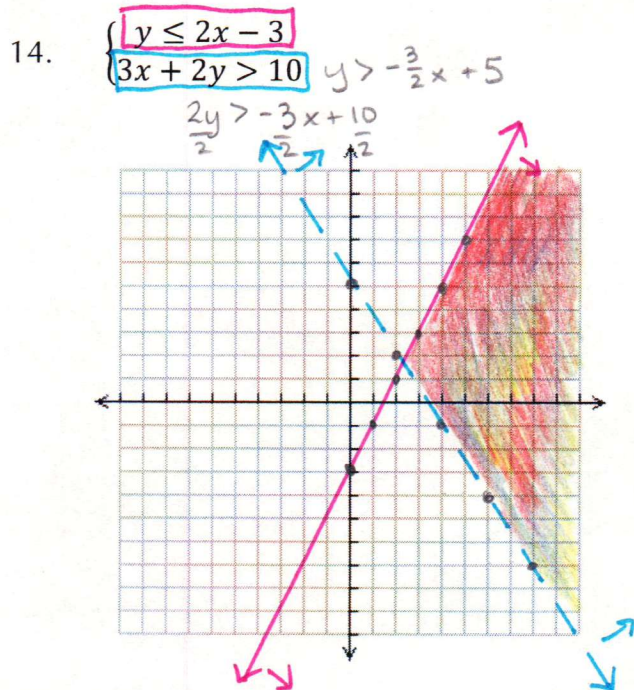
$$y = -2$$

$$x + 2(-2) = -1$$

$$\begin{array}{r} x - 4 = -1 \\ +4 \quad +4 \end{array} \quad x = 3$$

Solving Systems of Inequalities

Solve each system by graphing.



Context Problems

For each context problem:

- Write a system of **equations**
- Solve the system by graphing
- Verify your solution by solving algebraically (substitution or elimination)
- Interpret your solution

12. You and your brother are both saving money to be able to go on a trip. You already have \$400 in the bank and are planning to save another \$250 per month. Your brother has \$200 in the bank and plans to save \$300 per month. You think you will have more money in 6 months when the trip is scheduled to happen. Are you correct? How do you know?

$m = \text{months}$

$b = \text{bank balance}$

$$b = 250m + 400 \quad \leftarrow \text{you}$$

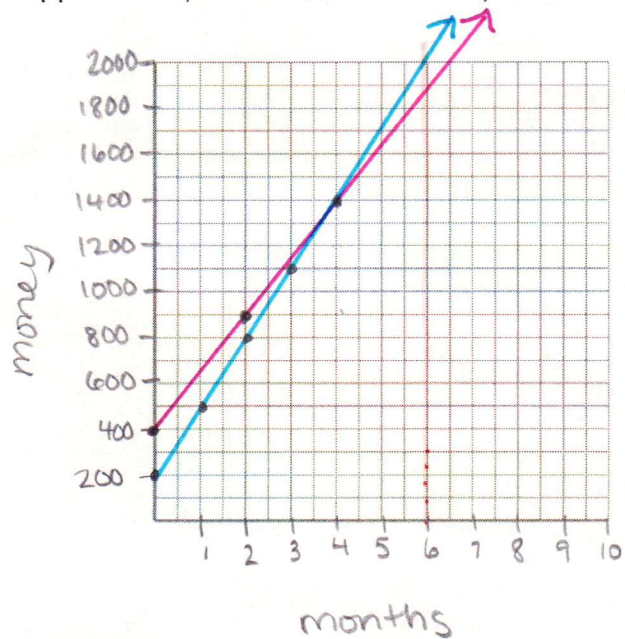
$$b = 300m + 200 \quad \leftarrow \text{brother}$$

$$\begin{array}{r} 300m + 200 = 250m + 400 \\ -250m \\ \hline 50m + 200 = 400 \end{array}$$

$$\begin{array}{r} 50m + 200 = 400 \\ -200 \\ \hline 50m = 200 \end{array}$$

$$\frac{50m}{50} = \frac{200}{50}$$

$$m = 4 \quad b = 300(4) + 200 = 1400$$



Your brother will end up with more money. You both have \$1400 at 4 months.

13. Tickets for school play cost \$4 for adults and \$2 for students. At the end of the play, the school sold a total of 105 tickets and collected \$360. Find the number of adult and students ticket sold.

$a = \text{adult tickets}$

$s = \text{student tickets}$

$$a + s = 105$$

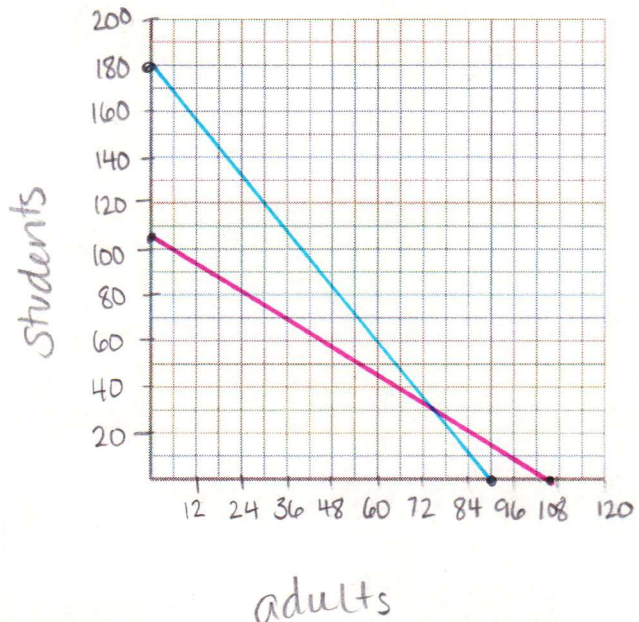
$$4a + 2s = 360$$

$$\begin{array}{r} 2a + 2s = 210 \\ - [4a + 2s = 360] \\ \hline -2a = -150 \end{array}$$

$$\frac{-2a}{-2} = \frac{-150}{-2}$$

$$a = 75$$

$$\begin{array}{r} 75 + s = 105 \\ -75 \\ \hline s = 30 \end{array}$$



There were 75 adult tickets and 30 student tickets sold.

For each context problem:

- Write a system of **inequalities**
- Find the limits for each inequality
- Graph the system.
- Give 3 realistic solutions to the system

18. You are planning a cookout. You think you will need at least 5 packages of hotdogs and hamburgers. A package of hotdogs costs \$1.90, and a package of hamburger costs \$5.20. You can spend a maximum of \$20 on hotdogs and hamburgers.

$d = \text{hotdogs}$
 $h = \text{hamburgers}$

$$d + h \geq 5$$

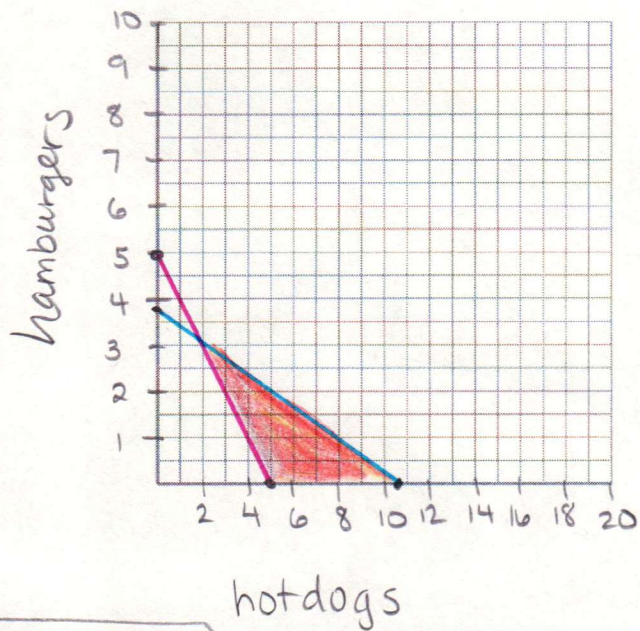
hotdogs: $[5, \infty)$

hamburgers: $[5, \infty)$

$$1.9d + 5.2h \leq 20$$

hotdogs: $[0, 10] \leftarrow 10.52$

hamburgers: $[0, 3] \leftarrow 3.85$



any 3 solutions in shaded region

19. You receive a \$75 gift card to the movie theater. A ticket on Tuesday costs \$5 and tickets are \$12 the rest of the week. You want to go see at least 6 movies.

$T = \text{Tuesday}$

$D = \text{Other days}$

$$T + D \geq 6$$

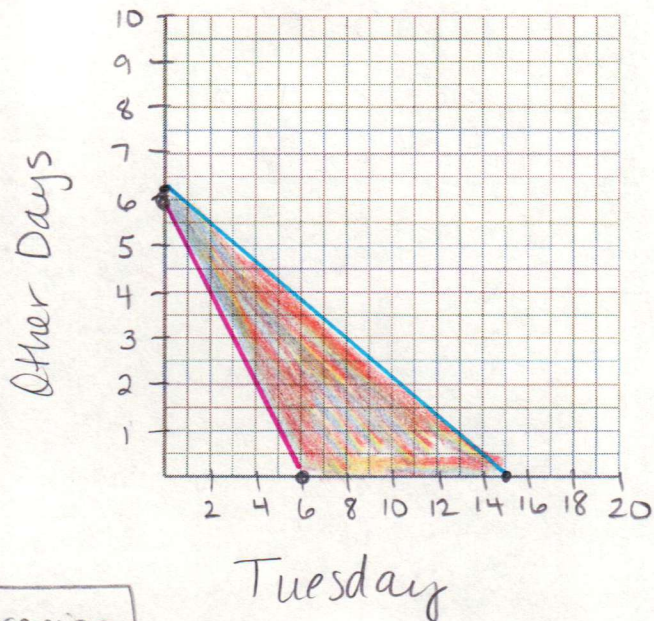
Tuesday: $[6, \infty)$

Other: $[6, \infty)$

$$5T + 12D \leq 75$$

Tuesday: $[0, 15]$

Other: $[0, 6] \leftarrow 6.25$



any 3 solutions in shaded region

For each context problem:

- Write a system of **inequalities**
- Find the limits for each inequality
- Graph the system.
- Give 3 realistic solutions to the system

20. Beaver Achievers has a weekly budget of \$75 for snacks. You have found that granola bars are \$0.50 each and bottles of water are \$0.75 each. You need to make sure you have at least 50 bottles of water.

g = granola bars

w = water

$$w \geq 50$$

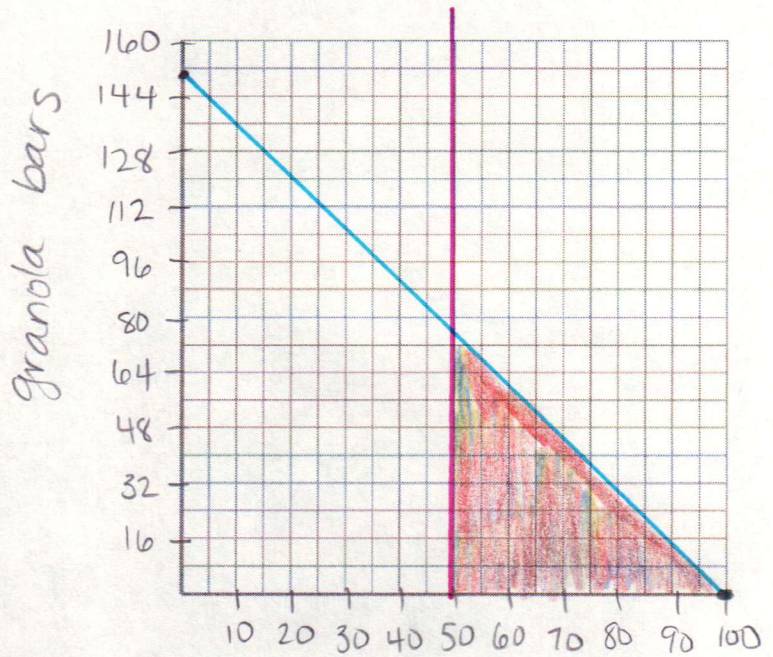
water: $[50, \infty)$

granola: $[0, \infty)$

$$.5g + .75w \leq 75$$

water $[0, 100]$

granola $[0, 150]$



Water

any 3 solutions in the shaded region, remember to include context. ex: 60 water
48 granola bars