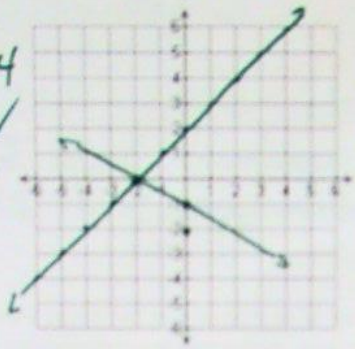
Review for Topic 4 Assessment
Solving Systems of Equations & Inequalities

Name: Key

1. Graph each system on the grid provided to find a solution. Check your solution algebraically.

a) $\begin{cases} 2x + 4y = -4 \\ y = x + 2 \end{cases}$ $4y = -2x - 4$, $y = -\frac{1}{2}x - 1$ Solution: $(-2, 0)$

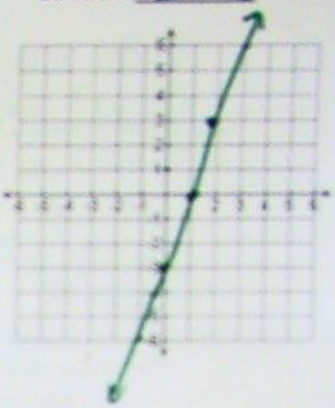
$2(-2) + 4(0) = -4$
$-4 + 0 = -4$ ✓
$0 = -2 + 2$ ✓



b) $\begin{cases} 3x - y = 3 \\ \frac{1}{3}y = x - 1 \end{cases}$

$-y = -3x + 3$
$y = 3x - 3$
$y = 3x - 3$

Solution: IMS



2. Does the system of equations have no solution or infinitely many solutions?

a) $\begin{cases} \frac{1}{2}(x + y) = (-4) \cdot 2 \\ 2x + 2y = 6 \end{cases}$

-2
$-2x + -2y = -8$
$0x - 2$

NS

b) $\begin{cases} x = -\frac{3}{2}y + 3 \\ 4x + 6y = 12 \end{cases}$

$4(-\frac{3}{2}y + 3) + 6y = 12$
$-6y + 12 + 6y = 12$
$12 = 12$

IMS

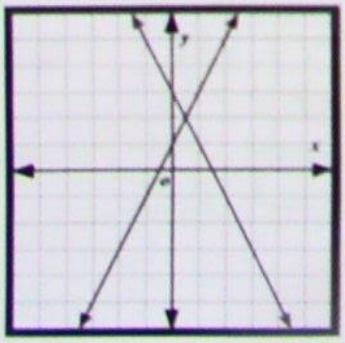
c) $\begin{cases} 6x + 3y = -6 \\ y = -2x - 2 \end{cases}$

$6x + 3(-2x - 2) = -6$
$6x + -6x - 6 = -6$
$-6 = -6$

IMS

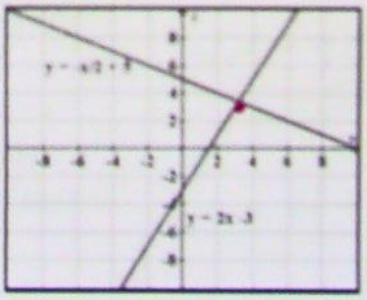
3. Estimate the solution of the system of equations.

a)



Solution: $(\frac{1}{2}, 2)$

b)



Solution: $(3, 3\frac{1}{2})$

$2(-\frac{x}{2} + 5) = (2x - 3) \cdot 2$
$-x + 10 = 4x - 6$
$16 = 5x$
$x = \frac{16}{5} = 3\frac{1}{5}$

Close enough for estimate.

4. For each word problem, define your variables, write a system of equations, and solve.

a) Sue plans to mix peppermints worth $1.20 per lb. with chocolates worth $2.40 per lb. to get a 40 lb.mix that is worth $1.65 per lb. How much of each should she use?

$40 \cdot 1.65 = 66$

Variables : P = peppermints
C = Chocolates

Equations: $P + C = 40$
$1.20P + 2.40C = 66$

Solution: 15 lb. of chocolates
25 lb of peppermints

Show work here

$\cdot -12 \rightarrow -12P + -12C = -480$
$\cdot 10 \rightarrow 12P + 24C = 660$

$12C = 180$
$C = 15$
$P + 15 = 40$
$P = 25$

b) Mrs. Johnson's exam is worth 145 points contains 50 questions. Multiple choice questions are worth two points and extended response questions are worth five points. How many of each type of question is on the test?

Variables : M: Multiple choice
E: Extended response

Equations: $M + E = 50$
$2M + 5E = 145$

Solution: 15 extended response?
35 multiple choice

Show work here

$\cdot -2 \rightarrow -2M + -2E = -100$
$2M + 5E = 145$

$3E = 45$
$E = 15$
$M + 15 = 50$
$M = 35$

c) 75 people attended a baseball game. Everyone there was a fan of either the home team or the away team. The number of home team fans was 90 less than 4 times the number of away team fans. How many home team and away team fans attended the game?

Variables : H: # home team fans
A: # away team fans

Equations: $H + A = 75$
$H = 4A - 90$

Solution: 42 Home fans
33 Away team fans

Show work here

$4A - 90 + A = 75$
$5A = 165$
$A = 33$
$H + 33 = 75$
$H = 42$

What is the solution of the system of equations?

5) $\begin{cases} y = \frac{3}{5}x + 2 \\ 2x + 5y = 85 \end{cases}$ Solution: (15, 11)

$2x + 5\left(\frac{3}{5}x + 2\right) = 85$

$2x + 3x + 10 = 85$

$5x = 75$

$x = 15$

$y = \frac{3}{5}(15) + 2$

$y = 9 + 2 = 11$

6) $\begin{cases} y = -\frac{2}{3}x + 4 \\ 2x + 3y = -6 \end{cases}$ Solution: NS

$2x + 3\left(-\frac{2}{3}x + 4\right) = -6$

$2x + -2x + 12 = -6$

$12 = -6$

NS

7. A fashion designer makes and sells hats. The material for each hat costs $5.50. The hats sell for $12.50 each. The designer spends $1400 on advertising. How many hats must the designer sell to break even?

Variable(s): h = # of hats

Break even

- expense income - expense

Equation(s): $-5.5h + 12.5h + -1400 = 0$

Show work here

$7h = 1400$

$h = 200$

Solution: 200 hats

8) Solve each system. (similar to #8-10)

a) $\begin{cases} -8x - 10y = 28 \\ 4x + 10y = -24 \end{cases}$ Solution: (-1, -2)

$-4x = 4$

$x = -1$

$4(-1) + 10y = -24$

$-4 + 10y = -24$

$10y = -20$

$y = -2$

b) $\begin{cases} 7x + 4y = -4 \\ 5x + 8y = 28 \end{cases}$ Solution: (-4, 6)

·-2 → $-14x - 8y = 8$

$-9x = 36$

$x = -4$

$5(-4) + 8(y) = 28$

$-20 + 8y = 28$

$8y = 48$

$y = 6$

c) $\begin{cases} x + y = 6 \\ 5x + 5y = 10 \end{cases}$ Solution: NS

·-5 → $-5x - 5y = -30$

$0 = -20$

d) $\begin{cases} -2x - 7y = 22 \\ -7x - 5y = -1 \end{cases}$ Solution: (3, -4)

-7 → $14x + 49y = -154$

2 → $-14x + -10y = 2$

$39y = -156$

$y = -4$

$-2x + 7(-4) = 22$

$-2x + 28 = 22$

$-2x = -6$

$x = 3$

#14 17

11) Jackson and Gabe are selling fruit for a school fundraiser. Customers can buy small boxes of oranges and large boxes of oranges. Jackson sold 3 small boxes of oranges and 14 large boxes of oranges for a total of $203. Gabe sold 11 small boxes of oranges and 11 large boxes of oranges for a total of $220. Find the cost each of one small box of oranges and one large box of oranges.

Show work here

Variable(s): S: Small box Cost
L: Large box Cost

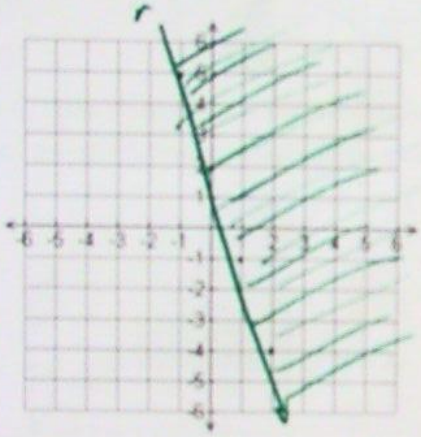
Equation(s): $3S + 14L = 203$
$11S + 11L = 220$

$\cdot -11 \rightarrow -33S + -154L = -2233$
$\cdot 3 \rightarrow 33S + 33L = 660$
$-121L = -1573$
$L = 13$
$11S + 11(13) = 2$
$11S + 143 = 2$
$11S = 7$
$S =$

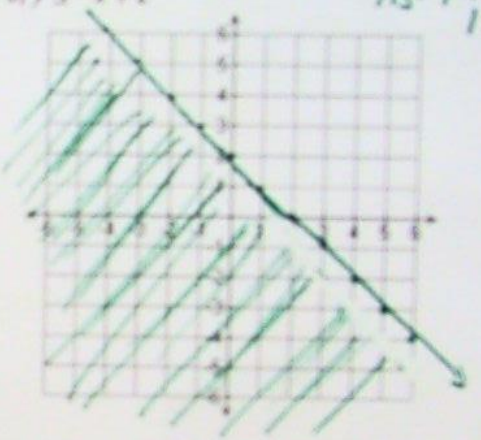
Solution: $7 for small; $13 for large

12) Graph the inequalities.

a) $y \geq -3x + 2$

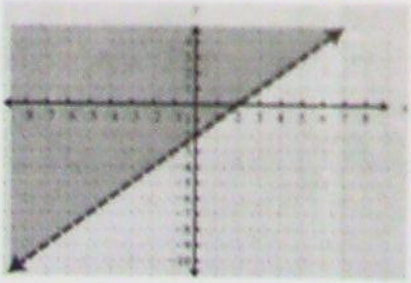


b) $y \leq -x + 2$



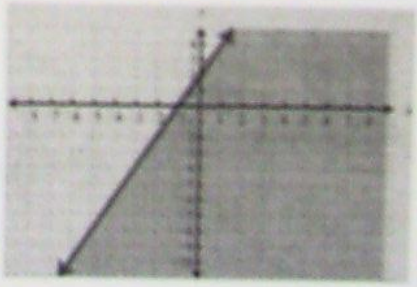
13) Write the inequality for the graph.

a)



Inequality: $y > x + -2$

b)



Inequality: $y \leq 2x + 2$

IF

14) If the area below a dashed line through the points $(-4, 5)$ and $(8, 5)$ is shaded. Write an inequality for the graph.

Inequality: $y < 5$

$y = 5$

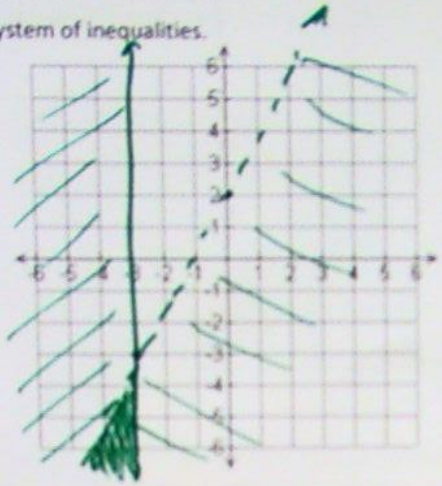
$x = 4$

15) In the graph of an inequality, the region to the right of a solid vertical line through the point (4, 6) is shaded. What inequality does the graph represent?

Inequality: $x \geq 4$

16) Graph the system of inequalities.

a) $\begin{cases} x \leq -3 \\ y < \frac{5}{3}x + 2 \end{cases}$



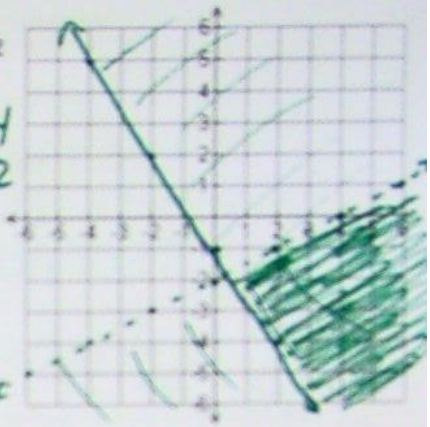
b) $\begin{cases} 3x + 2y \geq -2 \\ x - 2y < 4 \end{cases}$

$2y \geq -3x + -2$

$y \geq -\frac{3}{2}x + -1$

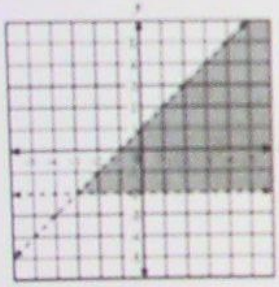
$-2y < -x + 4$

$y < \frac{1}{2}x + -2$



17) Choose the best answer to each of the following

a) What system of inequalities best represents the graph shown below?



$y < x + 1$

$y > -2$

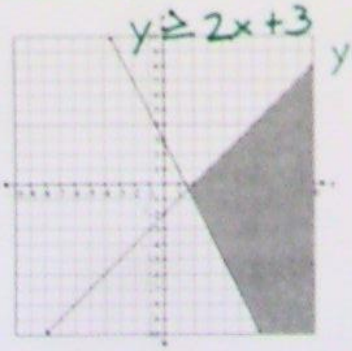
A. $y > -2$ and $y > x + 1$

B. $y > -2$ and $y < x + 1$

C. $y < -2$ and $y > x + 1$

D. $y < -2$ and $y < x + 1$

b) Which system of linear inequalities is represented by the graph?



$y \geq 2x + 3$

$y \leq x + -2$

A. $\begin{cases} y \geq \frac{1}{2}x + 3 \\ y \geq x - 2 \end{cases}$

B. $\begin{cases} y \geq 2x + 3 \\ y \leq x - 2 \end{cases}$

C. $\begin{cases} 2x - y \geq 3 \\ x + y \leq 2 \end{cases}$

D. $\begin{cases} 2x + y \geq 3 \\ x - y \geq 2 \end{cases}$

18) Karsen and Grace are selling cookie dough for a school fundraiser. Customers can buy packages of chocolate chip cookie dough and packages of gingerbread cookie dough. Karsen sold 8 packages of chocolate chip cookie dough and 12 packages of gingerbread cookie dough for a total of $364. Grace sold 1 package of chocolate chip cookie dough and 4 packages of gingerbread cookie dough for a total of $93. Find the cost each of one package of chocolate chip cookie dough and one package of gingerbread cookie dough.

Show work here

Variables: c: choc. chip cost
g: gingerbread cost

Equations: $8c + 12g = 364$
$1c + 4g = 93$

$8c + 12g = 364$
$-8c - 32g = -744$
$-20g = -380$
$g = 19$
$c + 4(19) = 93$
$c + 76 = 93$
$c = 17$

Solution: $19 for gingerbread
$17 for choc. chip

19) The administration at the school Karsen and Grace attend from item 18 wants to make at least $1000 with the fundraiser. Let x be the number of packages of chocolate chip cookie dough and y be the number of packages of gingerbread cookie dough sold. Write an inequality to show the number of packages that need to be sold.

Inequality: $17x + 19y \geq 1000$