

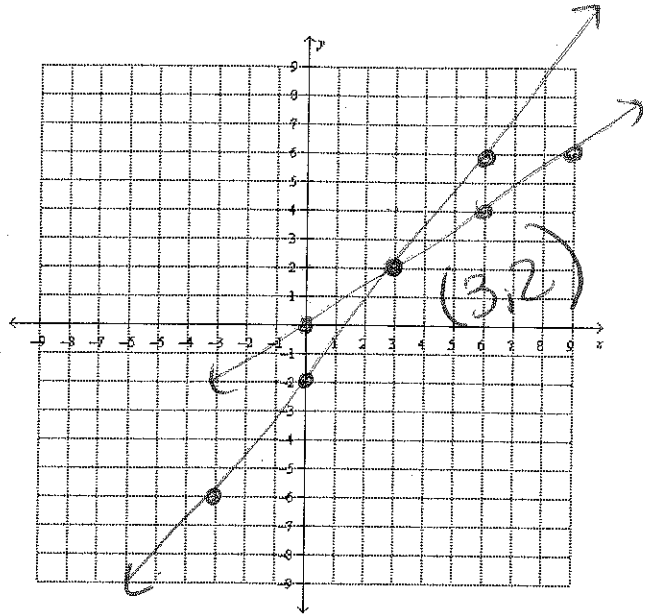
Name: _____

Review Sheet: Solving Systems of Linear Equations

Solve the first three problems using the method specified. For the rest of the problems, you may choose which method you would like to use. Please show all of your work carefully.

1. Solve by graphing.

$$y = \frac{4}{3} \cdot x - 2 \quad \text{and} \quad y = \frac{2}{3} \cdot x$$



2. Solve by substitution.

$$\begin{aligned} y &= 2x + 5 \\ y &= 6x + 1 \\ 2x + 5 &= 6x + 1 \\ -2x \quad -2x & \\ 5 &= 4x + 1 \\ -1 \quad -1 & \\ 4 &= 4x \\ \frac{4}{4} \quad \frac{4}{4} & \\ x &= 1 \end{aligned}$$

$$\begin{aligned} y &= 2(1) + 5 \\ y &= 2 + 5 \\ y &= 7 \end{aligned}$$

$$(1, 7)$$

3. Solve by elimination.

$$\begin{aligned} 2x + 3y &= 11 \\ + \quad -2x + 9y &= 1 \\ \hline 12y &= 12 \\ 12 \quad 12 & \\ y &= 1 \end{aligned}$$

$$\begin{aligned} 2x + 3(1) &= 11 \\ 2x + 3 &= 11 \\ -3 \quad -3 & \\ 2x &= 8 \\ 2 \quad 2 & \\ x &= 4 \end{aligned}$$

$$(4, 1)$$

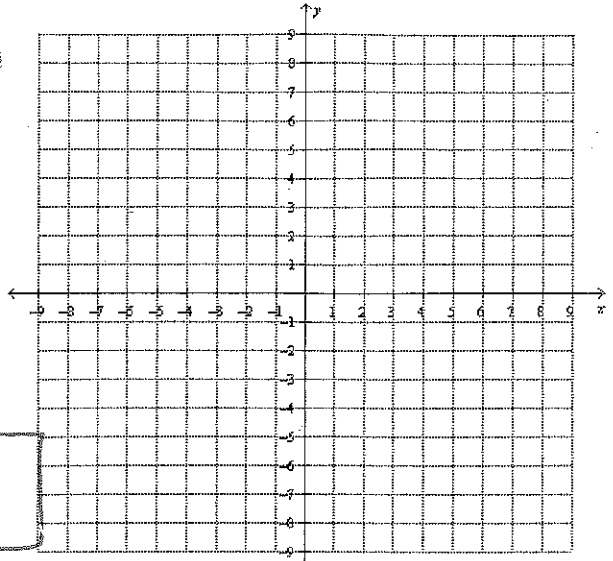
For numbers 4 – 11, circle the method that you used. Try to use each method at least once. (Note: You only need to use the graphing grids for the problems that you choose to solve by graphing.)

4. graphing substitution elimination

$$\begin{array}{r}
 7x + 2y = 10 \\
 + \quad 7x + y = -16 \\
 \hline
 3y = -6 \\
 \frac{3y}{3} = \frac{-6}{3} \\
 y = -2
 \end{array}$$

$$\begin{array}{r}
 7x + 2(-2) = 10 \\
 7x - 4 = 10 \\
 +y \quad +4 \\
 \hline
 7x = 14 \\
 \frac{7x}{7} = \frac{14}{7} \\
 x = 2
 \end{array}$$

(2, -2)

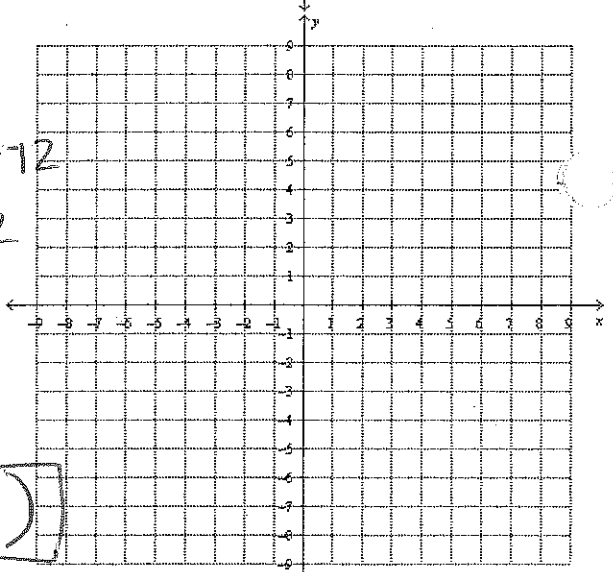


5. graphing substitution elimination

$$\begin{array}{r}
 5x + 2y = -9 \\
 y = -4x - 12 \\
 5x + 2(-4x - 12) = -9 \\
 5x - 8x - 24 = -9 \\
 -3x - 24 = -9 \\
 +24 \quad +24 \\
 \hline
 -3x = 15 \\
 \frac{-3x}{-3} = \frac{15}{-3} \\
 x = -5
 \end{array}$$

$$\begin{array}{r}
 y = -4(-5) - 12 \\
 y = 20 - 12 \\
 y = 8
 \end{array}$$

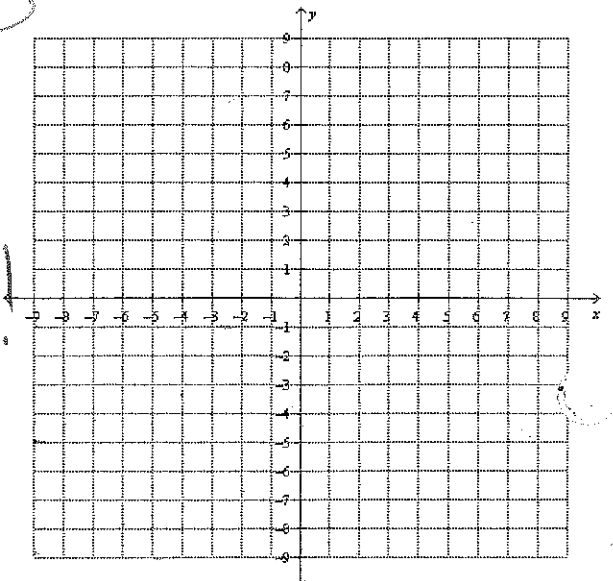
(-5, 8)



6. graphing substitution elimination

$$\begin{array}{r}
 2(3x + y = 4) \\
 6x + 2y = 8 \\
 - \quad 6x + 2y = 8 \\
 \hline
 0 = 0
 \end{array}$$

Infinitely Many Solutions!



7. graphing

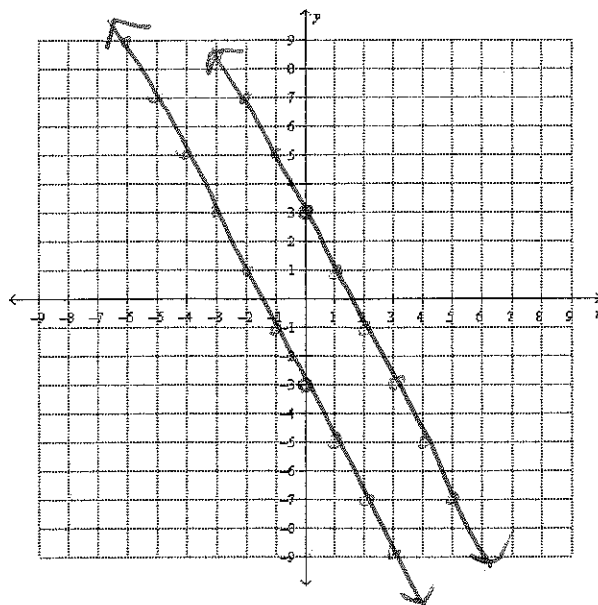
substitution

elimination

$$y = -2x - 3$$

$$y = -2x + 3$$

No solutions!



8. graphing

substitution

elimination

$$y + 5x = 4$$

$$y = 7x - 20$$

$$(7x - 20) + 5x = 4$$

$$7x - 20 + 5x = 4$$

$$12x - 20 = 4$$

$$\begin{array}{r} +20 \\ +20 \end{array}$$

$$\frac{12x = 24}{12 \quad 12}$$

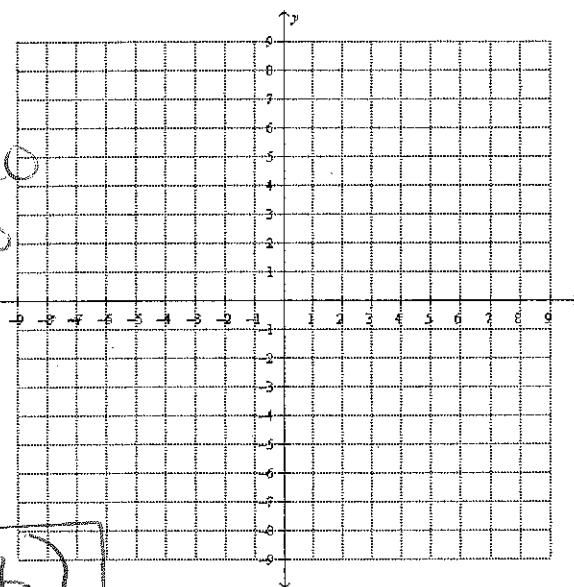
$$x = 2$$

$$y = 7(2) - 20$$

$$y = 14 - 20$$

$$y = -6$$

$(2, -6)$



9. graphing

substitution

elimination

$$y = -x + 5$$

$$y + 4x = 5$$

$$(-x + 5) + 4x = 5$$

$$-x + 5 + 4x = 5$$

$$3x + 5 = 5$$

$$\begin{array}{r} -5 \\ -5 \end{array}$$

$$\frac{3x = 0}{3 \quad 3}$$

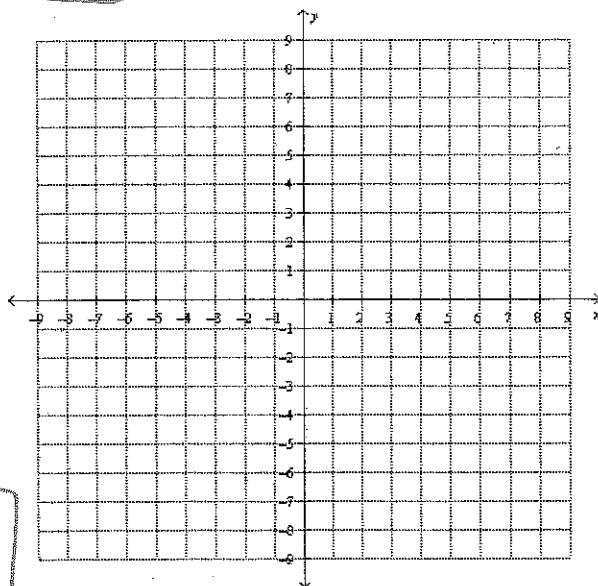
$$x = 0$$

$$y = -(0) + 5$$

$$y = 0 + 5$$

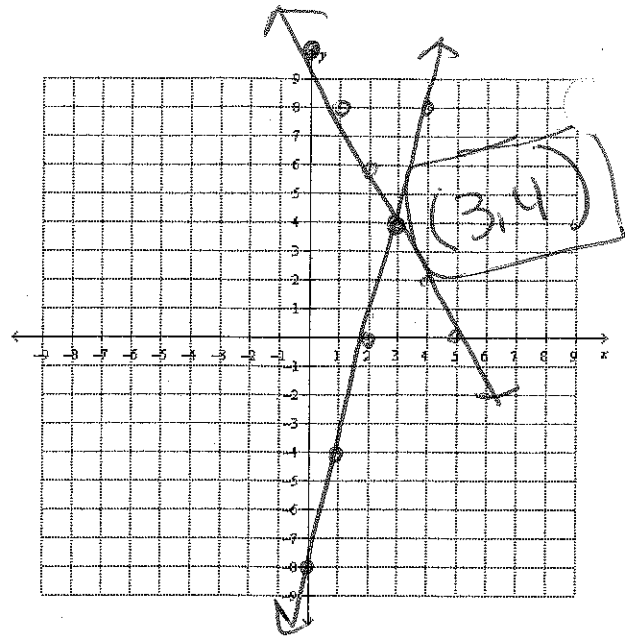
$$y = 5$$

$(0, 5)$



10. graphing substitution elimination

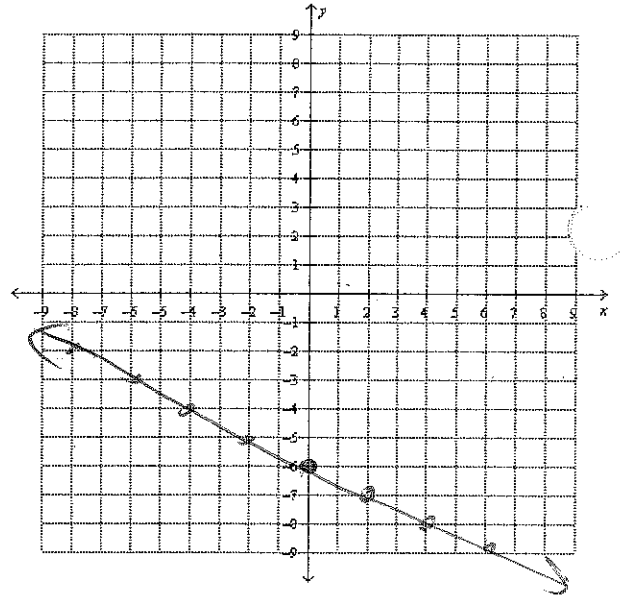
$$y = 4x - 8$$
$$y = -2x + 10$$



11. graphing substitution elimination

$$y = -0.5x - 6$$
$$y = -6 - \frac{1}{2}x$$

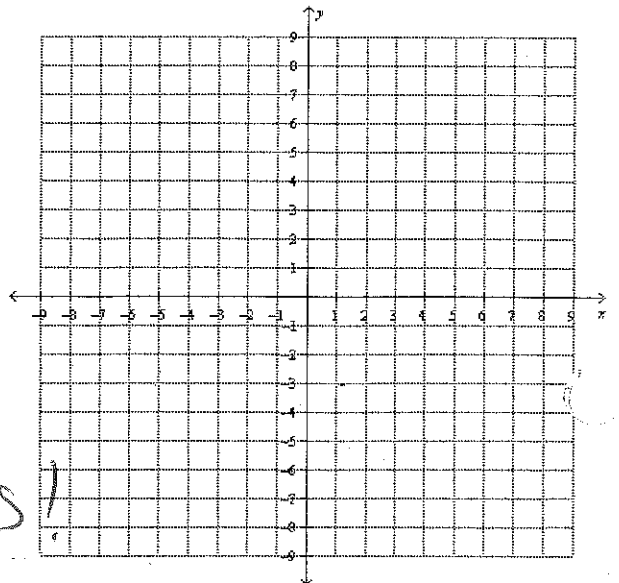
Infinitely Many Solutions!



12. graphing substitution elimination

$$y = 3x - 4$$
$$-6x + 2y = -8$$
$$-6x + 2(3x - 4) = -8$$
$$-6x + 6x - 8 = -8$$
$$0x - 8 = -8$$
$$0 - 8 = -8$$
$$-8 = -8$$

Infinitely Many Solutions!

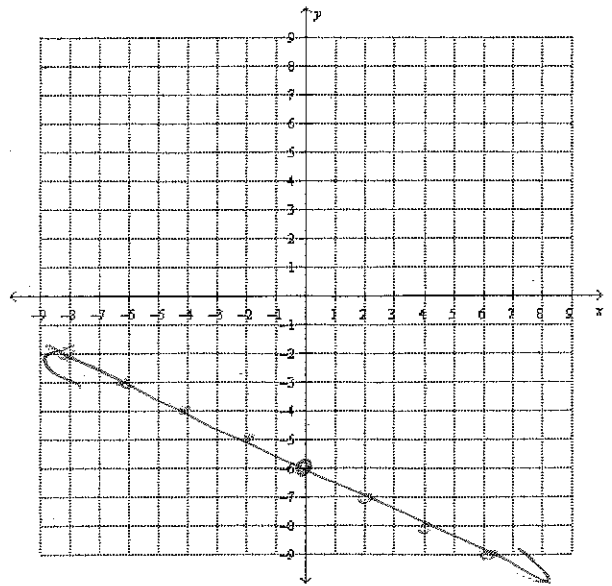


13 graphing substitution elimination

$$y = -0.5x - 6$$

$$y = -6 - \frac{1}{2}x$$

infinitely many solutions



14. You and your friends form a band. You want to record a demo. Studio A rents to \$100 plus \$50 per hour. Studio B rents for \$50 plus \$75 per hour.

a. Write a system of linear equations to find each number.

Studio A: $y = 50x + 100$

Studio B: $y = 75x + 50$

b. Solve the system to find the value of each number.

$$\begin{array}{r} 50x + 100 = 75x + 50 \\ -50x \qquad \qquad -50x \\ \hline 100 = 25x + 50 \\ -50 \qquad \qquad -50 \\ \hline 50 = 25x \\ \frac{50}{25} = \frac{25x}{25} \\ 2 = x \end{array}$$

$$y = 50(2) + 100$$

$$y = 100 + 100$$

$$y = 200$$

2 hours cost \$200 in both studios
(2, 200)

15. There are 14 vehicles in a parking lot. Some are motorcycles and some are cars. There are 38 wheels in all. How many of each type of vehicle are in the parking lot.

a. Write a system of linear equations to find each number.

$M = \text{motorcycles}$

$C = \text{cars}$

$$M + C = 14$$

$$2M + 4C = 38$$

b. Solve the system to find the value of each number.

$$\begin{array}{r} 2(M + C = 14) \\ 2M + 4C = 38 \\ + - 2M + 2C = 28 \\ \hline 2C = 10 \\ \frac{2C}{2} = \frac{10}{2} \\ C = 5 \end{array}$$

$$\begin{array}{r} M + C = 14 \\ M + 5 = 14 \\ -5 \quad -5 \\ \hline M = 9 \end{array}$$

There are 5 cars and 9 motorcycles in the parking lot.

16. For each of the following, determine how many solutions the system will have, without graphing or solving. Explain how you know.

a. $y = 2x + 4$
 $y = 4 + 2x$

Infinitely Many
 because the
 slopes and y-intercepts
 are the same.

b. $y = -3x + 7$
 $y = 5x + 7$

one solution
 because the
 slopes are different.

c. $y = \frac{1}{2}x - 3$
 $y = 0.5x - 4$

No solutions because
 the slopes are the
 same and the
 y-intercepts are different.

d. $-3x + y = 8 \rightarrow y = 8 + 3x$
 $y = 4 + 8x$

one solution because
 the slopes are different.

e. $2x + y = 7$
 $y = -2x + 7$

Infinitely many solutions
 because the slopes
 and y-intercepts
 are the same.

f. $6x + 3y = 12 \rightarrow \frac{6x}{3} + 3y = 12$
 $y = -2x + 2$

No solutions
 because the
 slopes are the
 same and the
 y-intercepts are different.

17. Will the line that runs through the points (6, 8) and (-4, 12) intersect with the line that runs through the points (1, 3) and (-9, 7)? Explain why or why not.

$$\frac{12-8}{-4-6} = \frac{4}{-10} = -\frac{2}{5}$$

$$\frac{7-3}{-1-1} = \frac{4}{-2} = -\frac{2}{5}$$

same
 slopes

$$8 = -\frac{2}{5}(6) + b$$

$$8 = -\frac{12}{5} + b$$

$$8 = -2\frac{2}{5} + b$$

$$+2\frac{2}{5} \quad +2\frac{2}{5}$$

$$10\frac{2}{5} = b$$

$$3 = -\frac{2}{5}(1) + b$$

$$3 = -\frac{2}{5} + b$$

$$+\frac{2}{5} \quad +\frac{2}{5}$$

$$3\frac{2}{5} = b$$

will not
 intersect

because
 the slopes
 are the
 same, but
 the y-intercepts
 are different.

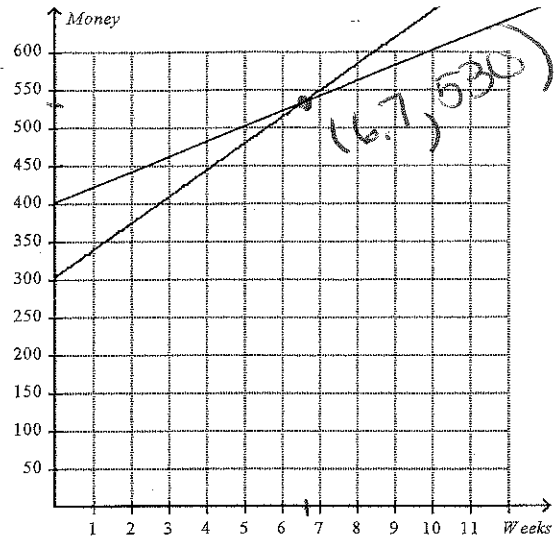
18. Will the line that runs through the points (-10, 2) and (-8, -4) intersect with the line that runs through the points (12, 6) and (-6, 4)? Explain why or why not.

$$\frac{-4-2}{-8+10} = \frac{-6}{2} = -3$$

$$\frac{4-6}{-6-12} = \frac{-2}{-18} = \frac{1}{9}$$

Yes, they will intersect
 because the slopes
 are different.

19. The graph at the right illustrates the rate at which Dave and Joe are saving money.



- a. Estimate the solution to the system and explain what this means in the context.

(6.7, 530)

This means that after approximately 6.7 weeks, both Dave and Joe will have about \$530 saved.

- b. If the equations for each guy are...

Dave: $y = 35x + 300$

Joe: $-20x + y = 400$

Explain how you could you check to see if your estimate is correct?

Plug the (x,y) coordinate (6.7, 530) into each equation & see if it is true.

- c. Use the process you described in letter b to check your estimate.

$y = 35x + 300$

$530 = 35(6.7) + 300$

$530 = 234.5 + 300$

$530 \neq 534.5$

Not true,
so it ~~is~~ is not the exact solution.

Since the 1st equation didn't turn out to be true, I do not even have to check the 2nd.

$$\begin{array}{r} 3 \\ 35 \\ \times 6.7 \\ \hline 245 \\ 2100 \\ \hline 234.5 \end{array}$$