

REVIEW: Systems of Linear Equations

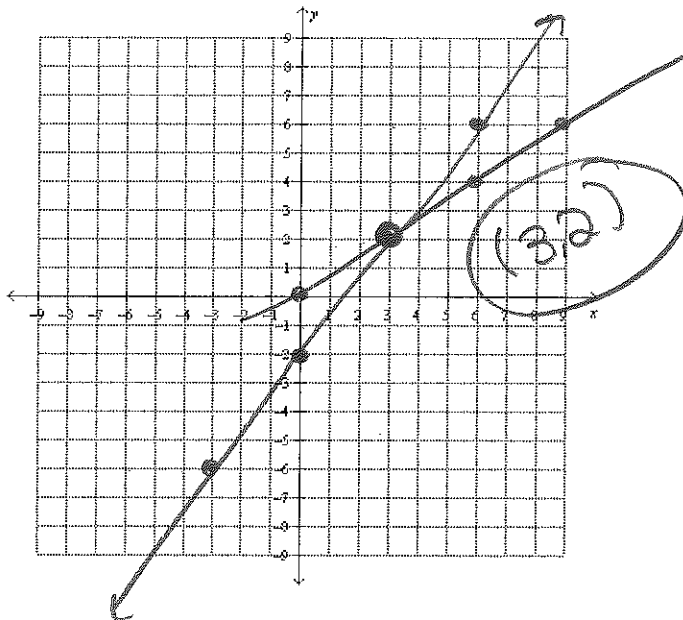
Accelerated 7th Grade Math

Name: _____

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.

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



2. Solve by substitution.

$$y = 2x + 5$$
$$y = 6x + 1$$

$$y = 2x + 5$$
$$6x + 1 = 2x + 5$$
$$\begin{array}{r} -2x \\ \hline 4x + 1 = 5 \end{array}$$

$$\begin{array}{r} 4x + 1 = 5 \\ \hline -1 \quad -1 \\ \hline 4x = 4 \end{array}$$

$$\begin{array}{r} 4x = 4 \\ \hline 4 \quad 4 \\ \hline x = 1 \end{array}$$

$$x = 1$$

$$y = 2(1) + 5$$

$$y = 2 + 5$$

$$y = 7$$

$$(1, 7)$$

3. Solve by elimination.

$$\begin{array}{r} 2x + 3y = 11 \\ -2x + 9y = 1 \end{array}$$

$$\begin{array}{r} 12y = 12 \\ \hline 12 \quad 12 \end{array}$$

$$y = 1$$

$$2x + 3y = 11$$
$$2x + 3(1) = 11$$

$$2x + 3 = 11$$
$$\begin{array}{r} -3 \\ \hline 2x = 8 \end{array}$$

$$\begin{array}{r} 2x = 8 \\ \hline 2 \quad 2 \end{array}$$

$$x = 4$$

$$(4, 1)$$

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

$$\begin{array}{r} 7x + 2y = 10 \\ -7x + y = -16 \end{array}$$

$$\frac{3y}{3} = \frac{-6}{3}$$

$$y = -2$$

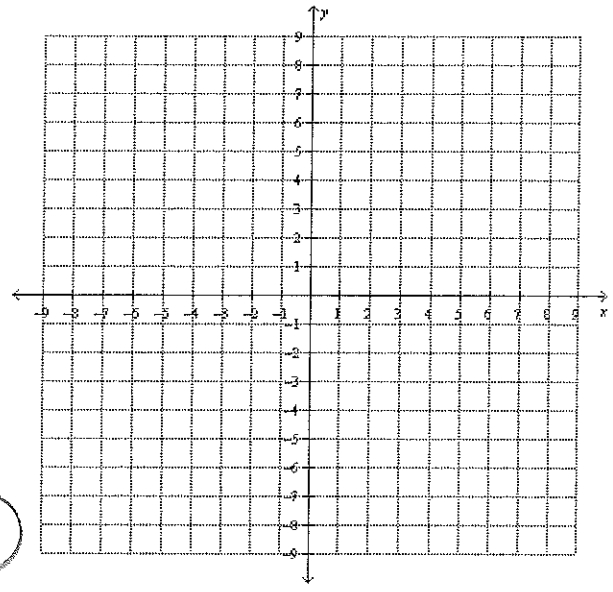
$$7x + 2(-2) = 10$$

$$7x + \frac{-4}{+4} = 10$$

$$\frac{7x}{7} = \frac{14}{7}$$

$$x = 2$$

(2, -2)



5. graphing

substitution

elimination

$$\begin{array}{r} 5x + 2y = -9 \\ y = -4x - 12 \end{array}$$

$$5x + 2(-4x - 12) = -9$$

$$5x + -8x - 24 = -9$$

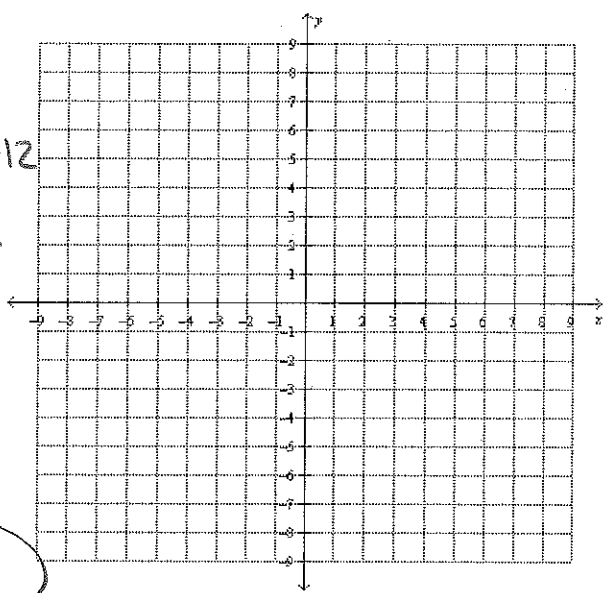
$$\begin{array}{r} -3x - 24 = -9 \\ +24 \quad +24 \end{array}$$

$$\frac{3x}{3} = \frac{15}{3}$$

$$x = 5$$

$$\begin{array}{r} y = -4(5) - 12 \\ y = -20 - 12 \\ y = -32 \end{array}$$

(5, -32)



6. graphing

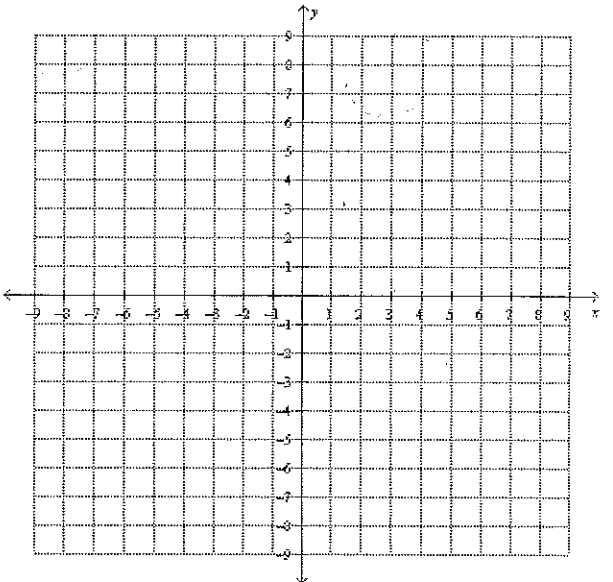
substitution

elimination

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

$$0 = 0$$

infinitely many solutions



7. graphing

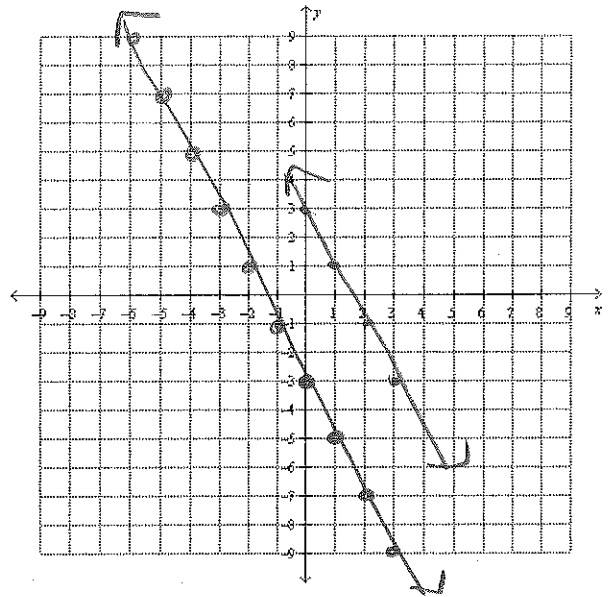
substitution

elimination

$$y = -2x - 3$$

$$y = -2x + 3$$

No Solution!



8. graphing

substitution

elimination

$$y + 5x = 4$$

$$y = 7x - 20$$

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

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

$$12x - 20 = 4$$

$$+20 \quad +20$$

$$\underline{12x = 24}$$

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

$$x = 2$$

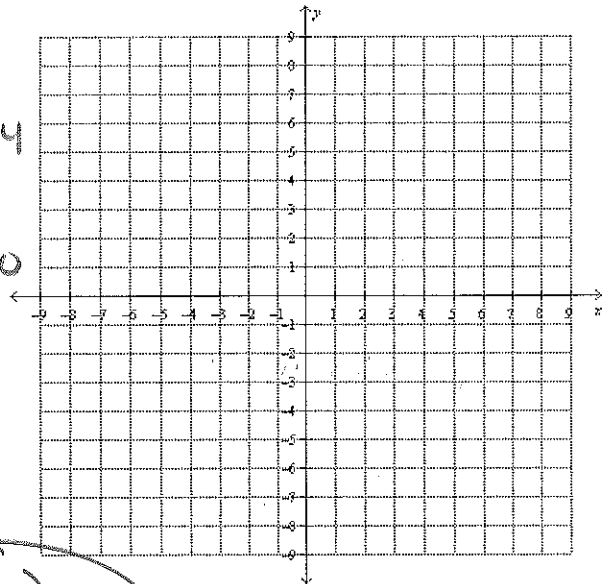
$$y + 5(2) = 4$$

$$y + 10 = 4$$

$$-10 \quad -10$$

$$y = -6$$

(2, -6)



9. graphing

substitution

elimination

$$y = -x + 5$$

$$y + 4x = 5$$

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

$$3x + 5 = 5$$

$$-5 \quad -5$$

$$\underline{3x = 0}$$

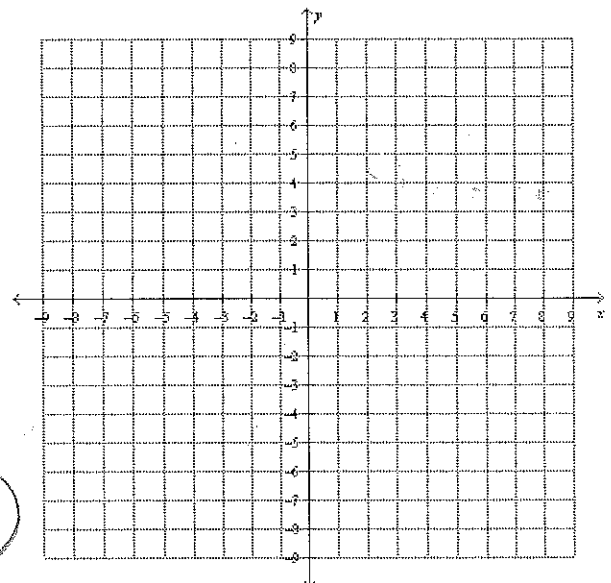
$$\frac{3x}{3} = \frac{0}{3}$$

$$x = 0$$

$$y = -0 + 5$$

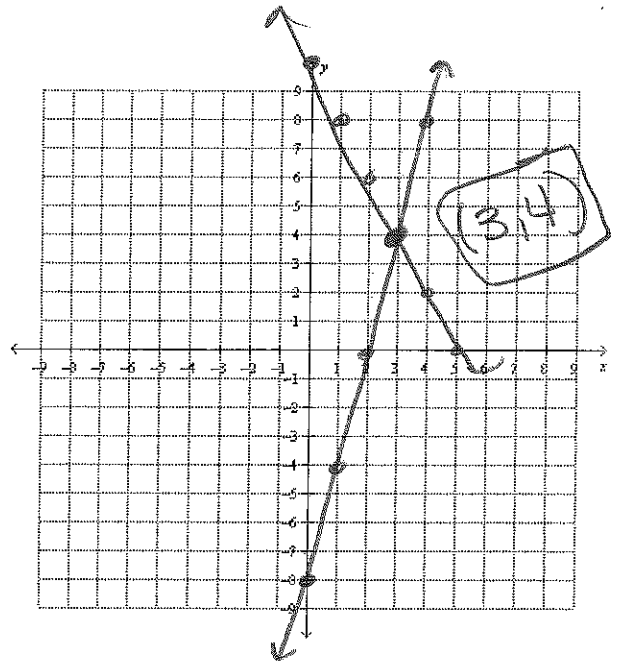
$$y = 5$$

(0, 5)



10. graphing substitution elimination

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

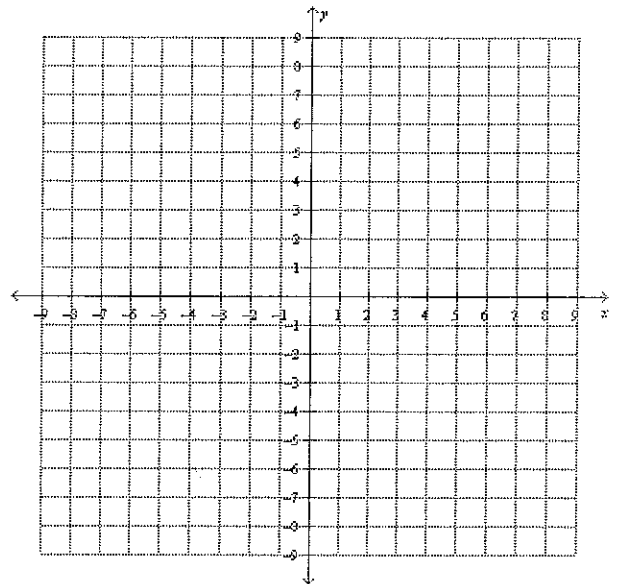


11. graphing substitution elimination

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

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

infinitely many solutions



12. graphing substitution elimination

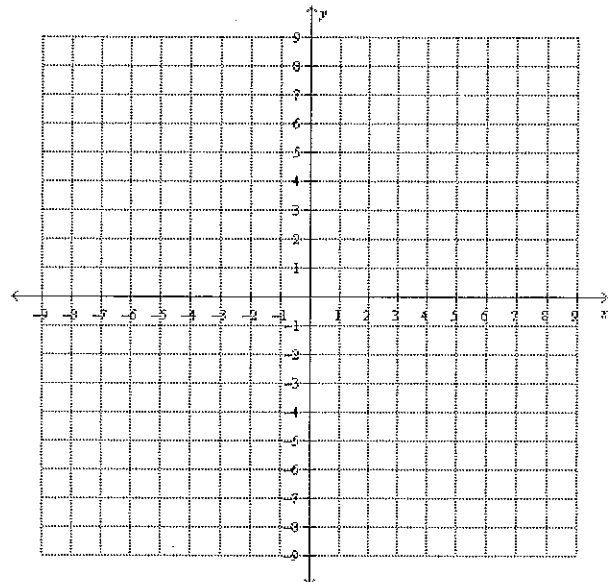
$$y = 3x - 4$$
$$-6x + 2y = -8$$

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

$$~~-6x + 6x - 8 = -8~~$$

$$-8 = -8$$

infinitely many solutions



13. 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.

$$y = 50x + 100$$

$$y = 75x + 50$$

b. Solve the system to find the value of each number. Then EXPLAIN what your solution means on the context of the story.

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

$$\begin{array}{l} y = 50(2) + 100 \\ y = 100 + 100 \\ y = 200 \end{array}$$

for 2 hours, both studios will cost \$200. (2, 200)

14. You ride an express bus from the center of town to your street. You have two payment options. Option A is to buy a monthly pass and pay \$2 per ride. Option B is to pay \$4.50 per ride. A monthly pass costs \$50.

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

$$y = 2x + 50$$

$$y = 4.50x$$

b. Solve the system to find the value of each number. Then EXPLAIN what your solution means on the context of the story.

$$\begin{array}{r} 2x + 50 = 4.50x \\ -2x \quad -2x \\ \hline 50 = 2.50x \\ \frac{50}{2.50} = \frac{2.50x}{2.50} \\ x = 20 \end{array}$$

$$\begin{array}{r} 20 \\ 2.50 \overline{) 50.00} \\ \underline{50.00} \\ 0 \end{array}$$

$$\begin{array}{l} 2(20) + 50 \\ 40 + 50 \\ y = 90 \end{array}$$

(20, 90)

20 rides will cost \$90 at both options

15. 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 -
same slope &
y-intercept

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

one solution
different slopes

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

No solutions
Same slope but
different y-intercepts

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

one solution -
different slopes

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

infinitely many -
Same slope & y-intercepts

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

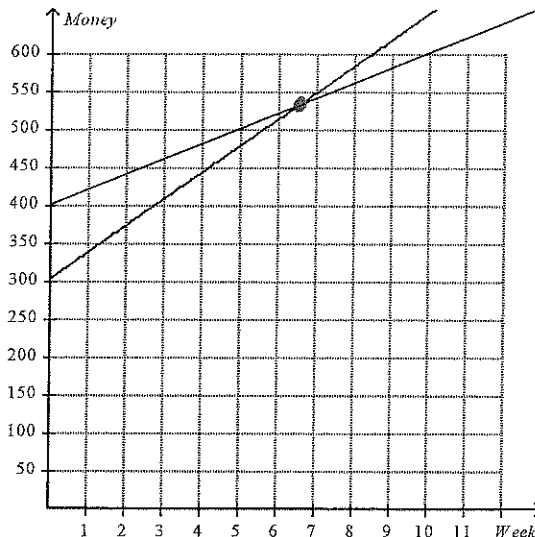
No solutions -
same slope, different y-intercepts

16. 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.

$$(6.5, 530)$$

After 6.5 weeks both Dave & Joe will have \$530 saved.



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

Dave: $y = 35x + 300$

Joe: $-20x + y = 400$

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

Use substitution to solve the system.

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

$$-20x + 35x + 300 = 400$$

$$15x + 300 = 400$$

$$\quad -300 \quad -300$$

$$\frac{15x}{15} = \frac{100}{15}$$

$$x = 6\frac{2}{3}$$

$$35(6\frac{2}{3}) + 300$$

$$233\frac{1}{3} + 300$$

$$533\frac{1}{3}$$

$$(6\frac{2}{3}, 533\frac{1}{3})$$

Answers:

- 1) (3, 2)
- 2) (1, 7)
- 3) (4, 1)
- 4) (2, -2)
- 5) (-5, 8)
- 6) Infinitely many solutions
- 7) NS
- 8) (2, -6)
- 9) (0, 5)
- 10) (3, 4)

- 11) Infinitely many solutions
- 12) Infinitely many solutions
- 13) (2, 200)
- 14) (20, 90)
- 15) a. Inf
- b. 1
- c. 0
- d. 1
- e. Inf
- f. 0
- 16) Answers vary