

Systems of Equations Assessment

A 1. The Stevens family is going to the county fair. They have two ticket options as shown in the chart below.

Ticket	Admission	Price Per
Option	Price	Ride
A	\$6	\$.30
B	\$4	\$.70

$$y = .30x + 6$$

$$y = .70x + 4$$

- I. Write an equation that shows the cost per person for each option.
- II. Use graphing to solve the system of equations.
- III. Find the number of rides for which the total cost is the same with both ticket options.

- a. I. $C = 6 + 0.3r$
 $C = 4 + 0.7r$
 II. (5, 7.5)
 III. 5 rides

- b. I. $C = 4 + 0.7r$
 $C = 6 + 30r$
 II. (0.05, 0.075)
 III. 0.05 ride

- c. I. $C = 6 + 0.3r$
 $C = 4 + 70r$
 II. (5, 7.5)
 III. 5 rides

- d. I. $C = 6 + 30r$
 $C = 4 + 70r$
 II. (0.05, 0.075)
 III. 0.005 ride

$$.30x + 6 = .70x + 4$$

$$-.70x - 6 \quad -.70x - 6$$

$$\frac{-.40x = -2}{-.40 \quad -.40}$$

$$x = 5$$

$$y = .30(5) + 6$$

$$y = 1.5 + 6$$

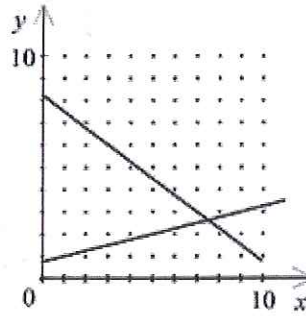
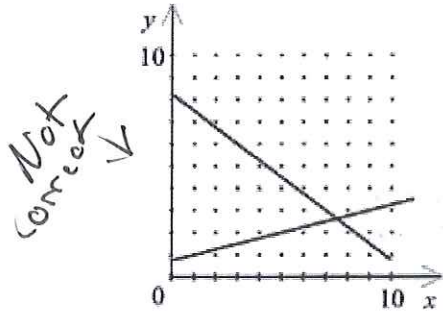
$$y = 7.5$$

x
(5, 7.5)

2. Lena made 32 ounces of a fruit drink mix using pineapple juice and grapefruit juice. The number of ounces of pineapple juice in the fruit drink mix is 5 more than 2 times the number of ounces of grapefruit juice in the fruit drink mix. Which graph shows the number of ounces pineapple juice, x , and the number of ounces of grapefruit juice, y , in the fruit drink mix? What system of equations was used to create the graph?

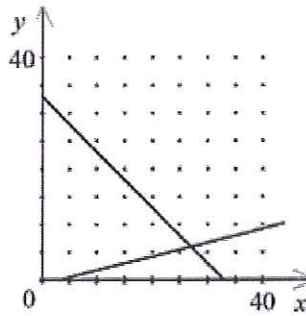
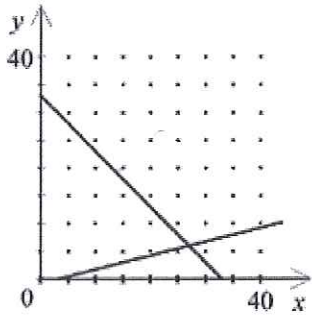
a. $x + y = 32$
 $x - 5 = 2y$

c. $5x + 2y = 32$
 $x - 5 = 2y$



b. $x + y = 32$
 $x + 5 = 2y$

d. $5x + 2y = 32$
 $x + 5 = 2y$



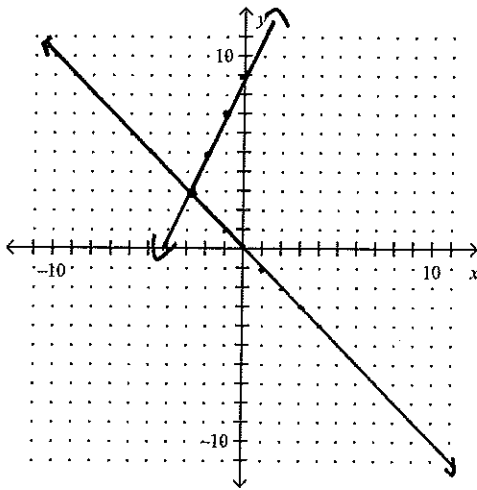
3. Find the solution to the system by graphing.

$$x + y = 0$$

$$2x - y = -9$$

$$-y = -2x - 9$$

$$y = 2x + 9$$



$(-3, 3)$

4. Solve the linear system by graphing.

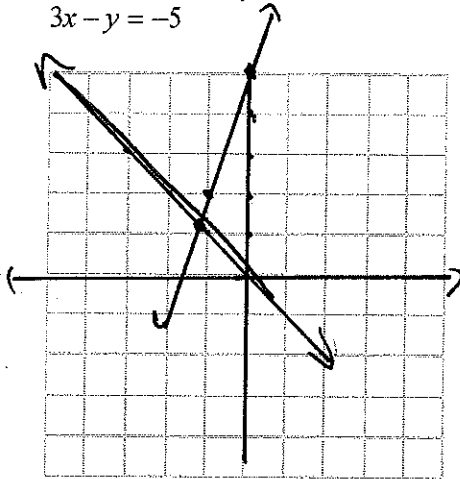
$$x + y = 1$$

$$3x - y = -5$$

$$y = -x + 1$$

$$-y = -3x - 5$$

$$y = 3x + 5$$



$$x + 3x + 5 = 1$$

$$4x = -4$$

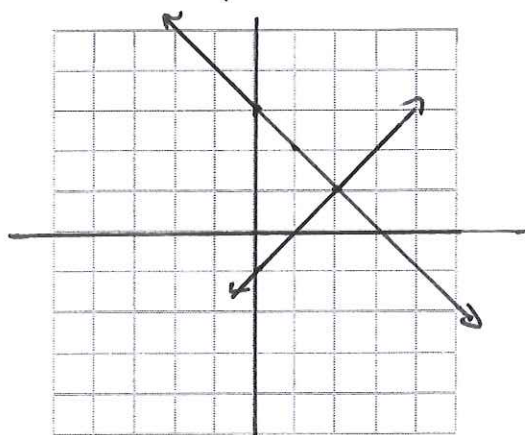
$$x = -1$$

$$y = 0 \quad (-1, 0)$$

5. Solve the linear system by graphing.

$$x - y = 1 \rightarrow y = 1 - x \quad y = x - 1$$

$$x + y = 3 \quad y = -x + 3$$



(2, 1)

Open-ended:

6. Write two different systems of equations that have the solution
- $(-1, 4)$
- .

$$2x + 2y = 6$$

$$x + y = 3$$

7. Write two different systems of equations that have the solution
- $(2, -3)$
- .

$$2x + 2y = -2$$

$$x + y = -1$$

A

8. The length of a rectangle is 8 cm more than four times the width. If the perimeter of the rectangle is 46 cm, what are the dimensions?

a. width = 3 cm, length = 20 cm

b. width = 3 cm, length = 40 cm

c. width = 6 cm, length = 32 cm

d. width = 6 cm, length = 40 cm

$$l = 4w + 8$$

$$w + w + 4w + 8 + 4w + 8 = 46$$

$$10w + 16 = 46$$

$$10w = 30$$

$$w = 3$$

$$l = 4(3) + 8$$

$$l = 20$$

A

9. Mr. Jarvis invested a total of \$9,112 in two savings accounts. One account earns 7.5% simple interest per year and the other earns 8.5% simple interest per year. Last year, the two investments earned a total of \$884.88 in interest. Write a system of equations that could be used to determine the amount Mr. Jarvis initially invested in each account. Let
- x
- represent the amount invested at 7.5% and let
- y
- represent the amount invested at 8.5%.

a. $x + y = 9,112$

$$0.075x + 0.085y = 884.88$$

b. $x + y = 884.88$

$$7.5x + 8.5y = 9,112$$

c. $x + y = 884.88$

$$0.075x + 0.085y = 9,112$$

d. $x + y = 9,112$

$$7.5x + 8.5y = 884.88$$

10. Solve the system by substitution: $y = 3x + 3$

$y = 2x$
 $y = 2(3)$
 $y = 6$

$2x = 3x + 3$
 $-2x - 2x$
 $0 = x + 3$
 $-3 -3$
 $x = 3$

(3, 6)

11. Use substitution to solve the linear system.

$x + 4y = -1$
 $2x - y = 7$

$x = -4y - 1$
 $2(-4y - 1) - y = 7$
 $-8y - 2 - y = 7$
 $-9y - 2 = 7$
 $-9y = 9$
 $-4y = 9$
 $y = -1$

$x = -4(-1) - 1$
 $x = 4 - 1$
 $x = 3$

(3, -1)

12. A rental car agency charges \$15 per day plus 11 cents per mile to rent a certain car. Another agency charges \$18 per day plus 8 cents per mile to rent the same car. How many miles will have to be driven for the cost of a car from the first agency to equal the cost of a car from the second agency? Express the problems as a system of linear equations and solve using the method of your choice.

$y = .11x + 15$
 $y = .08x + 18$

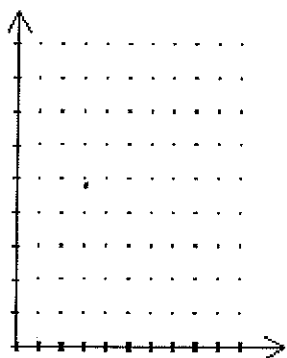
$.11x + 15 = .08x + 18$
 $-.08x - .08x$
 $.03x = 3$
 $\frac{.03x}{.03} = \frac{3}{.03}$
 $x = 100$

$y = .11(100) + 15$
 $y = 11 + 15$
 $y = 26$

(100, 26)

13. Suzy can run 3 m/sec and Tim can run 9 m/sec. They both start running at the same time. How far ahead of Tim must Suzy start so that she does not fall behind Tim in the first 10 seconds of running? Use a graph to check your answer.

don't do



14. The length of a rectangle is 7 cm more than four times the width. If the perimeter of the rectangle is 44 cm, what are its dimensions?

$l = 7 + 4w$
 $44 = 2l + 2w$
 $44 = 2(7 + 4w) + 2w$
 $44 = 14 + 8w + 2w$
 $44 = 14 + 10w$
 $-14 -14$
 $30 = 10w$
 $\frac{30}{10} = \frac{10w}{10}$
 $3 = w$

$l = 7 + 4(3)$
 $l = 19$

15. At a high school basketball game, 400 tickets were sold. Adult tickets cost \$5 and student tickets cost \$2.50. If the total amount collected was \$1375, how many student tickets were sold?

$5(x + y) = 400$
 $5x + 2.5y = 1375$
 $-5x + 5y = 2000$

$-2.5y = -625$
 $-2.5 -2.5$
 $y = 250$

$x + 250 = 400$
 $-250 -250$
 $x = 150$

$x = \text{Adult tickets}$
 $y = \text{Student tickets}$

16. **Writing:** A mistake has been made in the solution. Explain the error and how to correct it.

$$y = 3x + 4$$

$$3x - 2y = 13$$

$$3x - 2(3x + 4) = 13$$

$$3x - 6x + 8 = 13$$

$$-3x + 8 = 13$$

$$-3x = 5$$

$$x = -\frac{5}{3}$$

$$y = 3\left(-\frac{5}{3}\right) + 4$$

$$y = -5 + 4$$

$$y = -1$$

Solution: $x = -\frac{5}{3}$ and $y = -1$

This should be a negative

Solve by elimination:

17. $3x - 4y = 5$
 $5x + 4y = -13$

$$3x - 4y = 5$$

$$5x + 4y = -13$$

Solve the system:

B 18. $3x + 4y = -9$
 $3x + y = 0$

a. $(4, -\frac{21}{4})$

b. $(1, -3)$

c. no solution

d. $(-\frac{1}{3}, 1)$

$$3x + 4y = -9$$

$$-3x + y = 0$$

$$\frac{3y}{3} = \frac{-9}{3}$$

$$y = -3$$

19. $2x + 4y = -3$

$$+ 4x - 4y = 6$$

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

$$x = \frac{1}{2}$$

$$\left(\frac{1}{2}, -1\right)$$

$$2\left(\frac{1}{2}\right) + 4y = -3$$

$$1 + 4y = -3$$

$$4y = -4$$

$$y = -1$$

Which ordered pair is a solution to the system of equations?

- b 20. $3x + y = 5$
 $y = 5x - 5$
 a. (0, 5) $3x + 5x - 5 = 5$
 $8x - 5 = 10$
 $8x = 15$
 $x = \frac{15}{8}$
 b. (1.25, 1.25) c. (1.5, 0.5)
d. (-3, 14)

21. Solve the system.

$$y = -\frac{3}{4}x + \frac{1}{4}$$

$$y = \frac{3}{4}x - \frac{3}{4}$$

$$\frac{3}{4}(\frac{2}{3}) - \frac{3}{4}$$

$$\frac{6}{12} - \frac{9}{12} = -\frac{3}{12} = -\frac{1}{4}$$

~~$-\frac{3}{4}x + \frac{1}{4} = \frac{3}{4}x - \frac{3}{4}$~~
 ~~$\frac{3}{4}x + \frac{1}{4} = \frac{3}{4}x - \frac{3}{4}$~~
 ~~$\frac{3}{4}x - \frac{3}{4} = \frac{3}{4}x - \frac{3}{4}$~~
 ~~$\frac{3}{4}x - \frac{3}{4} - \frac{3}{4}x = \frac{3}{4}x - \frac{3}{4} - \frac{3}{4}x$~~
 ~~$-\frac{3}{4} = -\frac{3}{4}$~~
 $-\frac{3}{4}x + \frac{1}{4} = \frac{3}{4}x - \frac{3}{4}$
 $-\frac{3}{4}x + \frac{1}{4} - \frac{3}{4}x = \frac{3}{4}x - \frac{3}{4} - \frac{3}{4}x$
 $-\frac{6}{4}x + \frac{1}{4} = -\frac{3}{4}$
 $-\frac{6}{4}x + \frac{1}{4} - \frac{1}{4} = -\frac{3}{4} - \frac{1}{4}$
 $-\frac{6}{4}x = -1$
 $\frac{6}{4}x = 1$
 $x = \frac{2}{3}$
 $\frac{3}{4}(\frac{2}{3}) - \frac{3}{4} = \frac{1}{2} - \frac{3}{4} = -\frac{1}{4}$
 $(\frac{2}{3}, -\frac{1}{4})$

22. The table below shows the costs of two different combinations of hot dogs and sodas at a ballgame. What is the cost h of one hot dog and the cost s of one soda?

Number of hot dogs	Number of sodas	Total Cost
4	4	\$20
4	6	\$24

$4h + 4s = 20$
 $4h + 6s = 24$
 $4h = 20 - 4s$
 $20 - 4s + 6s = 24$
 $20 + 2s = 24$
 $2s = 4$
 $s = 2$
 $4h + 4(2) = 20$
 $4h + 8 = 20$
 $4h = 12$
 $h = 3$

$4h + 4s = 20$
 $-4h + 6s = 24$
 $2s = -4$
 $s = -2$
 not dogs 3
 sodas = 2

- A 23. Marc sold 461 tickets for the school play. Student tickets cost \$3 and adult tickets cost \$4. Marc's sales totaled \$1624. How many adult tickets and how many student tickets did Marc sell?
 a. 220 adult, 241 student c. 236 adult, 225 student
 b. 225 adult, 236 student d. 241 adult, 220 student

$3x + y = 461$
 $3x + 4y = 1624$
 $-3x + 3y = 1383$
 $y = 241$
 $x + 241 = 461$
 $x = 220$

24. Use elimination to solve the linear system.

$$3x - 4y = 21 \quad 3x - 4y = 21 \quad 3(3) - 4y = 21$$

$$2(4x + 2y = 6) + 8x + 4y = 12$$

$\frac{11x}{11} = \frac{33}{11} \quad x = 3$
 $9 - 4y = 21$
 $-4y = 12$
 $-\frac{4y}{-4} = \frac{12}{-4}$
 $y = -3$

$(3, -3)$

$x + 241 = 461$
 $x = 220$

25. Solve the linear system by any method.

$$3x - 2y = 3$$

$$+ 6x + 2y = 3$$

$$\frac{9x}{9} = \frac{6}{9} \quad x = \frac{2}{3}$$

$$3(\frac{2}{3}) - 2y = 3$$

$$2 - 2y = 3$$

$$-2 - 2y = 3$$

$$\frac{-2y}{-2} = \frac{1}{-2} \quad y = -\frac{1}{2}$$

$(\frac{2}{3}, -\frac{1}{2})$

26. Solve the linear system by any method.

$$3(5x - 2y = 3)$$

$$-x + 6y = -2$$

$$+ 15x - 6y = 9$$

$$\frac{-14x}{-14} = \frac{7}{-14} \quad x = -\frac{1}{2}$$

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

$$-(-\frac{1}{2}) + 6y = -2$$

$\frac{1}{2} + 6y = -2$
 $\frac{1}{2} + 6y = -2$
 $-\frac{1}{2} - \frac{1}{2}$
 $6y = -\frac{5}{2}$
 $\frac{6y}{6} = -\frac{5}{2} \cdot \frac{1}{6}$
 $y = -\frac{5}{12}$

$(-\frac{1}{2}, -\frac{5}{12})$

27. Solve the linear system by any method.

$$\begin{array}{r} 6x - 4y = -1 \\ -3(2x + 5y = 1) \rightarrow -6x - 15y = -3 \\ \hline -19y = -4 \\ -19 -19 \\ \hline y = \frac{4}{19} \end{array}$$

$$\left(\frac{-3}{114}, \frac{4}{19} \right)$$

$$y = \frac{-4}{-19} \\ y = \frac{4}{19}$$

$$\begin{array}{r} 6x - 4\left(\frac{4}{19}\right) = -1 \\ 6x - \frac{16}{19} = -\frac{19}{19} + \frac{16}{19} \\ + \frac{16}{19} \\ \hline \frac{1}{6} \cdot 6x = \frac{-3}{19} \cdot \frac{1}{6} \\ x = \frac{-3}{114} \end{array}$$

28. Solve the system.

$$2x - 6y = -18$$

$$3x + 7y = 37$$

A

29. Which system of equations has no solution?

a. $\begin{array}{r} 7x + 9y = 5 \\ -21x - 27y = 14 \\ \hline 21x + 27y = 15 \\ -21x - 27y = 14 \\ \hline 0 = 19 \end{array}$

b. $\begin{array}{r} 7x + 9y = 5 \\ 4x + 7y = 14 \end{array}$

c. $\begin{array}{r} 7x - 9y = 10 \\ 7x - 36y = 40 \end{array}$

d. $\begin{array}{r} 7x - 9y = 5 \\ 14x - 19y = 10 \end{array}$

Describe the solution(s) of the system.

A

30. $\begin{array}{r} -3(6x + 4y = 10) \rightarrow -18x - 12y = -30 \\ 18x + 12y = -20 \\ \hline 0 = -50 \end{array}$

a. no solution

b. $(-7, 13)$

c. $(7, -8)$

d. $(-1, 4)$

A

31. Which choice best describes the solution(s) of the system of equations?

$\begin{array}{r} (-24x + 8y = 24) \cdot 5 \rightarrow -120x + 40y = 120 \\ (-15x + 5y = 15) \cdot 8 \rightarrow -120x + 40y = 120 \\ \hline 0 = 0 \end{array}$

a. many solutions

b. $(-1, 0)$ is the only solution.

c. $(1, 48)$ is the only solution.

d. no solution

32. Find the solution of the system, if it exists.

$$7x - y = 8$$

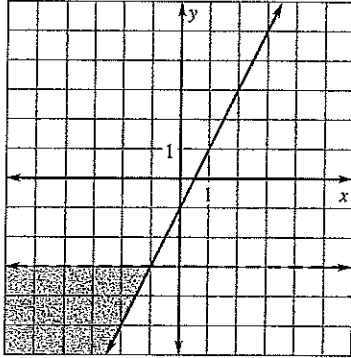
$$\begin{array}{r} + \quad -7x + y = 4 \\ \hline 0 + 0 = 12 \\ 0 = 12 \end{array}$$

No solution

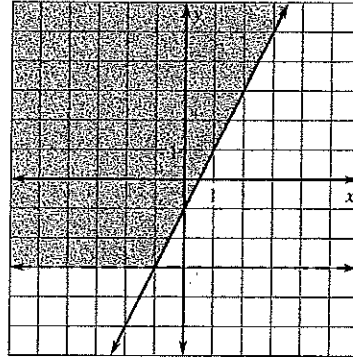
Solve the system of inequalities graphically:

B 33. $y \leq 2x - 1$ $0 \leq -1$
 $y < -3$

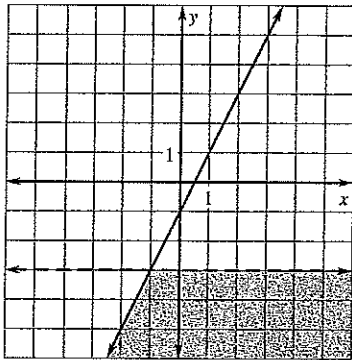
a.



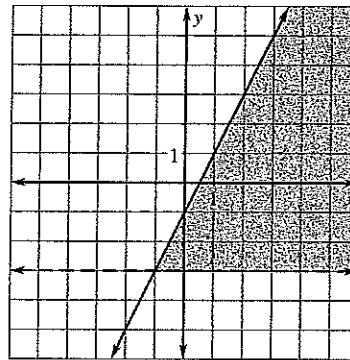
c.



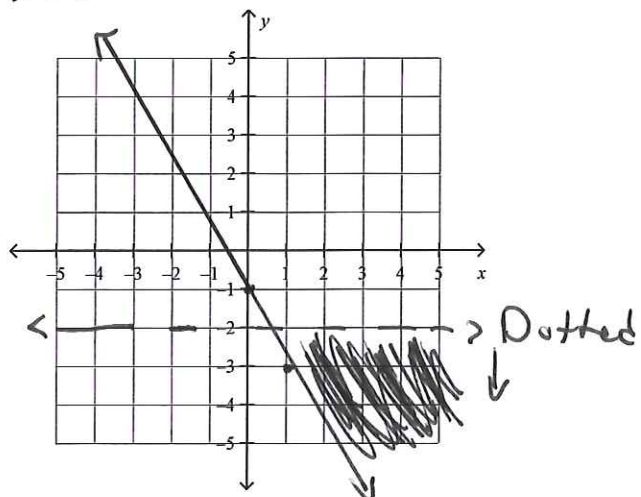
b.



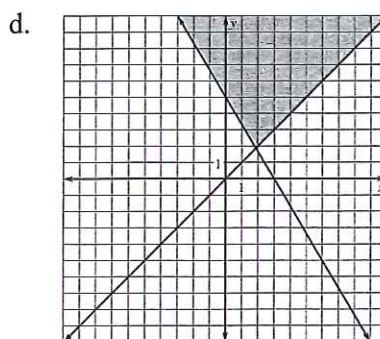
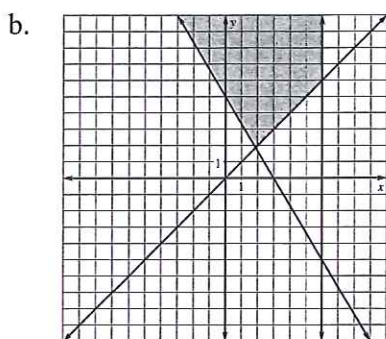
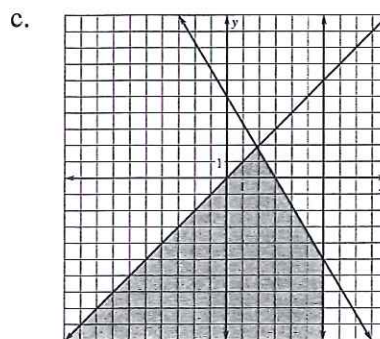
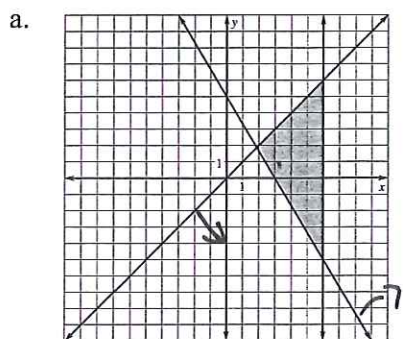
d.



34. $y \geq -2x - 1$ $0 \geq -1$
 $y < -2$



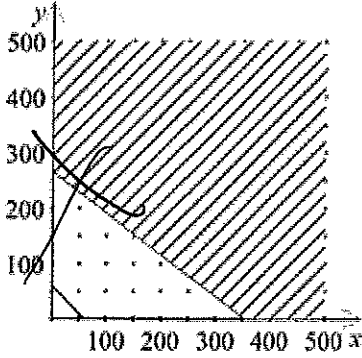
A 35. Graph the solution set of the system of inequalities:
 $5x + 3y \geq 15$, $0 \geq 15$
 $x \geq y$, $3 \geq 2$
 $x \leq 6$



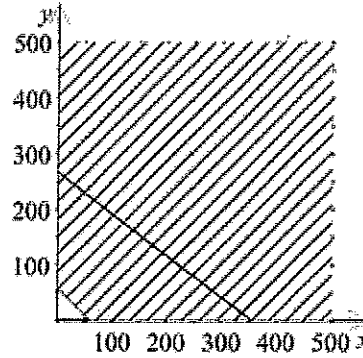
b

36. The owner of a restaurant determines she can spend no more than \$1600 to buy coffee for the next month. At wholesale prices, the regular coffee she uses costs \$4.50 per pound and the decaffeinated coffee costs \$6.00 per pound. The owner estimates she will need at least 60 pounds of coffee for the month. Which graph represents the possible combinations of the number of pounds of regular coffee, x , and the number of pounds of decaffeinated coffee, y , that meet these conditions?

a.

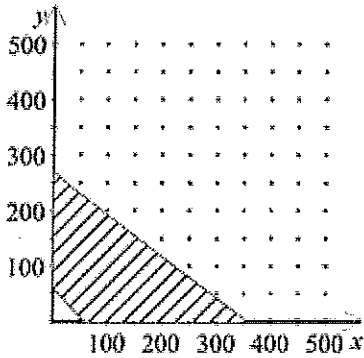


c.

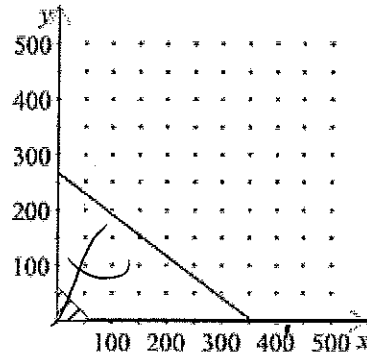


$$\begin{aligned}
 x + y &\geq 60 \\
 4.5x + 6y &\leq 1600 \\
 y &\geq -x + 60 \\
 0 &\geq 60 \\
 \frac{6y}{6} &\leq \frac{-4.5x + 1600}{6} \\
 y &\leq -\frac{3}{4}x + \frac{800}{3} \\
 0 &\leq \frac{800}{3}
 \end{aligned}$$

b.



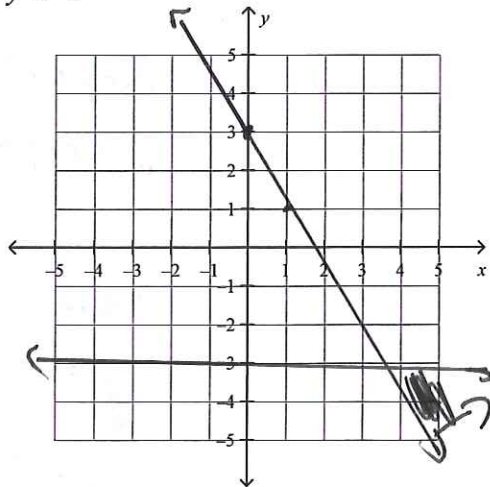
d.



37. Graph the system of linear inequalities.

$$y \geq -2x + 3 \quad 0 \leq 3$$

$$y \leq -3$$

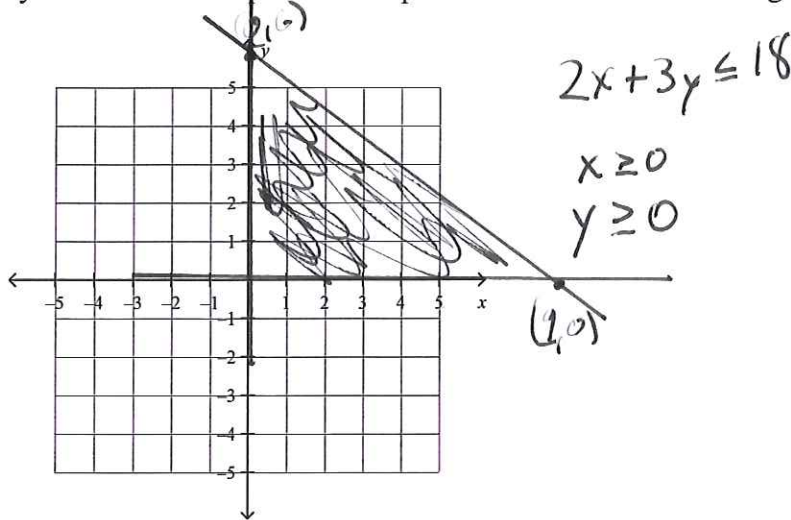


38. You can work a total of no more than 36 hours per week at your two jobs. Housecleaning pays \$5 per hour, and your sales job pays \$11 per hour. You need to earn at least \$266 per week to cover your expenses. Write a system of inequalities that shows the various numbers of hours you can work at each job.

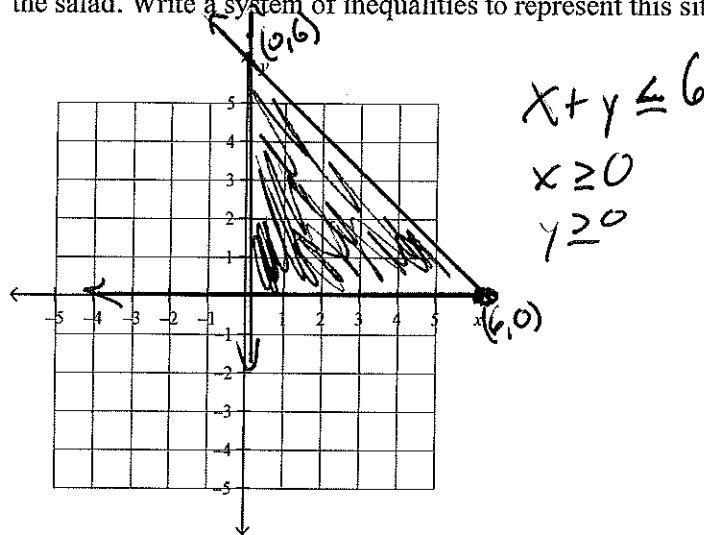
$$x + y \leq 36$$

$$5x + 11y \geq 266$$

39. Fuel x costs \$2 per gallon and Fuel y costs \$3 per gallon. You have at most \$18 to spend on fuel. Write a system of linear inequalities to represent this situation. Sketch a graph of the system.



40. A salad contains x pounds of ham and y pounds of chicken. There are at most 6 pounds of ham and chicken in the salad. Write a system of inequalities to represent this situation. Sketch a graph of the system.



41. A college student decides that school work limits him to a total of no more than 32 hours per week at his two part-time jobs. He earns \$10 per hour hanging wall paper and he has a sales job that pays \$6 per hour. He needs to earn at least \$269 per week to cover his expenses. Write a system of inequalities that shows the various numbers of hours he can work at each job. Let h represent the number of hours spent hanging wall paper and let s represent the number of hours spent working at the sales job.

$$\begin{aligned} x + y &\leq 32 \\ 6x + 10y &\geq 269 \end{aligned}$$

42. It costs \$9 to buy 3 containers of orange juice and 2 containers of milk. To buy 9 containers of orange juice and 6 containers of milk, it costs \$27. Find the cost of one container of orange juice.

$$\begin{array}{r} (3x + 2y = 9) \cdot 3 \\ 9x + 6y = 27 \\ + -9x + 6y = -27 \\ \hline 0 + 12y = 0 \\ y = 0 \end{array} \quad (3, 0)$$

$$\begin{aligned} 3x + 2(0) &= 9 \\ 3x &= 9 \\ x &= 3 \end{aligned}$$

