

Explain – Systems of Equations Applications- Notes

Essential Question: How can you write a system of equations from a table, graph, and a real-world situation?

Main Ideas/ Questions	Notes/Examples
What You Will Learn	<ul style="list-style-type: none"> Write systems of linear equations to solve real-life problems.
What is a system of linear equations?	<p>Definition: a set of 2 or more equations</p> <p>Create your own system of equations: $2x + 3y = 1$ $y = 4x - 5$</p>

Writing Systems of Equations Given Tables

Practice: Write a system of equations for the given systems. (USE STAT/EDIT!)

1.

x	y
-1	2
0	0
1	-2
2	-4
3	-6

x	y
-1	2
0	2.5
1	3
2	3.5
3	4

$y = -2x$ $y = \frac{1}{2}x + 2.5$
(5)

2.

x	y
-2	-5
-1	-2
0	1
1	4
2	7

x	y
-2	7
-1	6
0	5
1	4
2	3

$y = 3x + 1$ $y = -1x + 5$

3. What point do the tables in #1 have in common?
(-1, 2)

4. What point do the tables in #2 have in common?
(1, 4) TOTAL

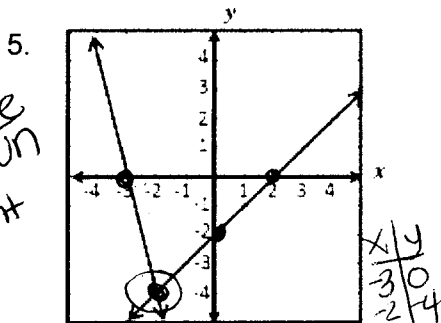
6. The Blackwells and Joneses are going to the Johnson space center in Houston. Write a system of equations.

$2x + 5y = 105.65$
 $2x + 3y = 77.75$

Family	Number of Adults	Number of Children	Total Cost
Blackwell	2x	5y	\$105.65
Jones	2x	3y	\$77.75

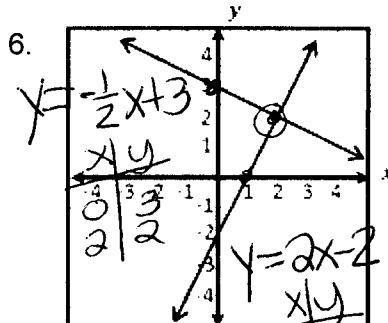
Writing Systems of Equations Given Graphs

Practice: Write a system of equations for the given graphs. (PICK POINTS & USE STAT/EDIT)

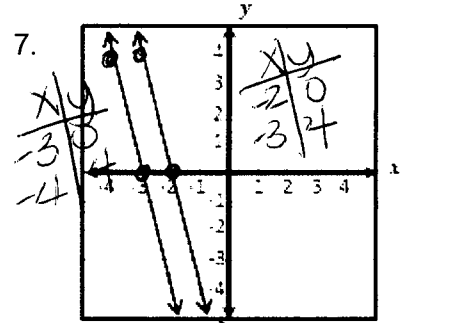


$m = \frac{\Delta y}{\Delta x}$
 $b = y\text{-int}$
 $y = mx + b$

$y = x - 2$ $y = -4x - 4$



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



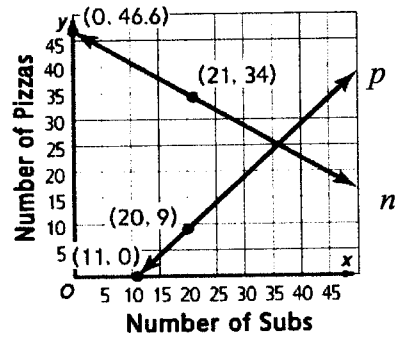
$y = -4x + 12$ $y = -4x - 8$

8. What point do the lines in #5 have in common?
(-2, -4)

9. What point do the lines in #7 have in common?
None. They are parallel

Explain – Systems of Equations Applications- Notes

10. The debate team is selling pizza and subs. Line p represents the total profit the debate team can earn and line n represents the total number of items the debate team can sell.



Use SAT

a. Write a system of linear equations based on the information in the graph.

$n: \begin{array}{c|c} x & y \\ \hline 0 & 46.6 \\ 21 & 34 \end{array} \Rightarrow y = -.6x + 46.6$

$p: \begin{array}{c|c} x & y \\ \hline 11 & 0 \\ 20 & 9 \end{array} \Rightarrow y = x - 11$

Writing Systems of Equations Given a Verbal Situation

1st: Read the problem twice!!

2nd: Define your variables.

3rd: Write the 2 equations using key information from the problem.

Practice: Write a system of equations from the following real world situations.

11. Mr. Frankel bought 8 tickets to a puppet show and spent \$30. He bought a combination of child tickets for \$3 each and adult tickets for \$5 each. Write a system of equations to determine the total number of child tickets, c , and the total number of adult tickets, a , that were purchased.

Define your variables:

$c = \# \text{ of child tickets}$
 $a = \# \text{ of adult tickets}$

Write equations:

$a + c = 8$ (# total tickets)
 $3c + 5a = 30$ (total \$ value)

12. Karen makes \$5 per hour babysitting and \$12 per hour giving music lessons. One weekend, she worked a total of 18 hours and made \$139. Write a system of equations to find the number of hours Karen spent babysitting, b , and giving music lessons, m .

Define your variables:

$b = \# \text{ hours babysitting}$
 $m = \# \text{ hours giving music lessons}$

Write equations:

$b + m = 18$ (# total hours)
 $5b + 12m = 139$ (\$ total value)

13. You have a total of 18 math and science exercises for homework. You have six more math exercises than science exercises. Write a system of equations to find the number of math problems, x , and the number of science problems, y .

$x = \# \text{ of MATH problems}$
 $y = \# \text{ of science problems}$

$x + y = 18$ (# total)

Math has More!

$x = 6 + y$

(math is 6 more than science)

When you have a comparison "six more math than science" put bigger 1st, then = sign!

Algebra 1

Name: _____

Writing Systems of Equations Practice

Part I: Write a system of equations for each of the following systems.

1.

x	y
0	-2
1	-1
2	0
3	1
4	2

x	y
0	6
1	5
2	4
3	3
4	2

2.

x	y
-7	5.5
-6	4
-5	2.5
-4	1
-3	-0.5

x	y
-5	0.5
-4	1
-3	1.5
-2	2
-1	2.5

3. What point do the tables in #1 have in common?

4. What point do the tables in #2 have in common?

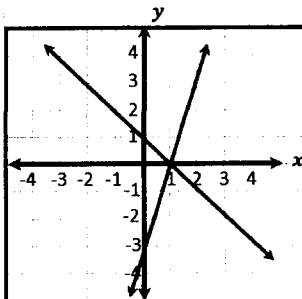
5. A service center charges a fee of x dollars for an oil change plus y dollars per quart of oil used. A sample of its sales record is shown. Write a system of linear equations that represents this situation. Find the fee and cost per quart of oil.

	A	B	C
1	Customer	Oil Tank Size (quarts)	Total Cost
2	A	5	\$22.45
3	B	7	\$25.45
4			

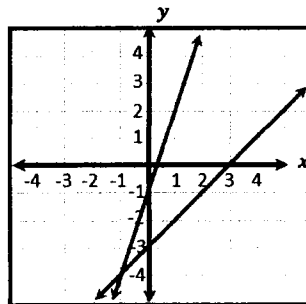
6. An athletic director is comparing the costs of renting two banquet halls for an awards banquet. Write a system of linear equations that represents this situation.

Cost (dollars)		
Hours	Hall A	Hall B
0	75	100
1	175	200
2	275	300
3	375	400

7.



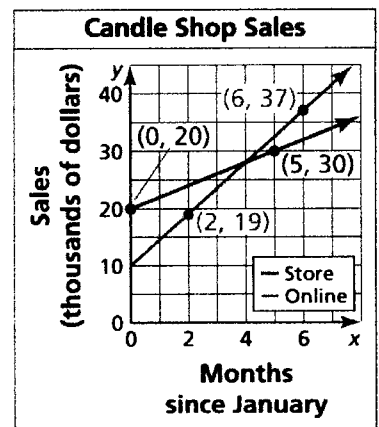
8.



9. What point do the lines in #7 have in common?

10. What point do the lines in #8 have in common?

11. The graph represents the Candle Shop's monthly store and online sales. Write a system of equations.



Algebra 1

Name: _____

Writing Systems of Equations Practice

12. Ms. Martinez purchased 2 kinds of candy for a math game. The Blow Pops cost \$0.50 each and the Snickers cost \$0.60 each. She purchased a total of 30 pieces of candy for \$16.80. Write a system of equations that could be used to determine the number of each candy purchased if s represents the number of snickers and b represents the number of blow pops purchased.

First identify variables.

_____ = _____

_____ = _____

Equation 1: _____

Equation 2: _____

13. The Math Club bought 16 graphing calculators for \$765. The TI-70 model costs \$40 and the TI-83 costs \$65. Write a system of equations that could be used to determine the number of TI-70 calculators, x , and the number of TI-83 calculators, y , that were purchased.

First identify variables.

_____ = _____

_____ = _____

Equation 1: _____

Equation 2: _____

14. Mr. Santos treated his students to a movie for winning the state contest. This also required taking some of the students' parents as chaperones. The movie theatre charges \$4 for each student and \$6 for each adult. If Mr. Santos spent \$180 on movie tickets and took 40 people (including himself), write a system of equations that represents the number of adult tickets, a , and the number of students tickets, s , that were purchased.

First identify variables.

_____ = _____

_____ = _____

Equation 1: _____

Equation 2: _____

15. Pizza-N-More sells pizza and wings. Each pizza sells for \$8.00 and each order of wings sells for \$5.00. Last weekend Pizza-N-More sold a total of 85 items and earned \$569. Which system of equations can be used to find the number of pizzas, p , and the number of orders of wings, w , sold last weekend?

A
$$\begin{cases} 8p + 5w = 85 \\ p + w = 569 \end{cases}$$

B
$$\begin{cases} 8p + 5w = 569 \\ p = 85 + w \end{cases}$$

C
$$\begin{cases} 8p + 5w = 569 \\ p - w = 85 \end{cases}$$

D
$$\begin{cases} 8p + 5w = 569 \\ p = 85 - w \end{cases}$$

16. The length of a rectangle is 5 times the width. The perimeter of the rectangle is 72 m. Which system of equations could be used to find the length, l , and width, w , of the rectangle?

A
$$\begin{cases} l = 5w \\ lw = 72 \end{cases}$$

B
$$\begin{cases} w = 5l \\ 2(l + w) = 72 \end{cases}$$

C
$$\begin{cases} l = 5w \\ 2(l + w) = 72 \end{cases}$$

D
$$\begin{cases} w = 5l \\ lw = 72 \end{cases}$$

17. The perimeter of the trapezoidal piece of land is 48 kilometers. The perimeter of the rectangular piece of land is 144 kilometers. Write and solve a system of linear equations to find the values of x and y .

