

Name: _____

APPLICATIONS

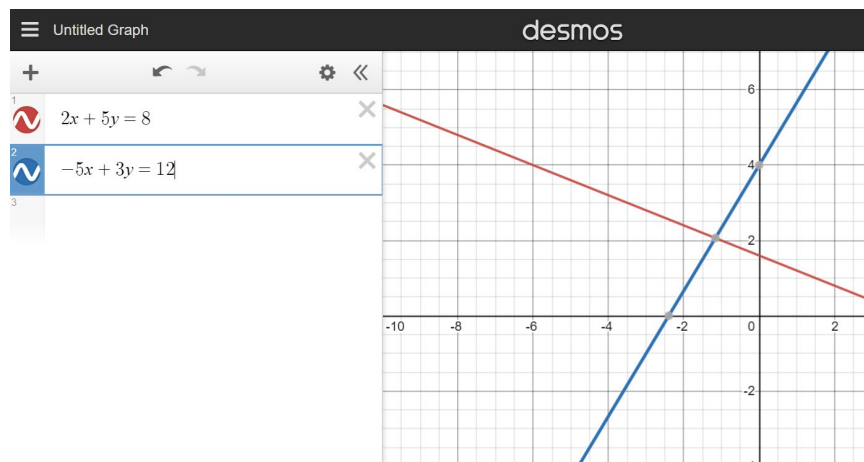
SYSTEMS OF LINEAR EQUATIONS

Success Criteria: To create a linear system: (Application Word problems)

1. I can Interpret the question to Identify the unknown variables (x and y)
2. I can Interpret the question to create 2 equations to represent the information in the question in one of 3 formats:
 - a. $y=mx+b$
 - b. $x + y = \text{total (sum)}$
 - c. _____ x + _____ y = _____ total where _____ is a #, \$ or %
 - i. $\$4x + \$2y = \$ 250$
 - ii. $13\% x + 35\% y = 25\% \text{ total}$
3. I can Solve the system using graphing, substitution or elimination (see above criteria)
4. I can state the solution, ensuring that it answers the question.
5. I can check the solution.

We know 3 ways to Solve a system Graphing, Substitution and Elimination.

We will start with graphing and solving the systems using www.desmos.com



Identify the variable (x = # of burgers) Find the solution (POI) the following problems, state the solution as an ordered pair and then answer using "Therefore, a bag of chips cost me"

1. You buy 5 bags of chips and 9 bags of pretzels for \$16.95. Later you buy 10 bags of chips and 10 bags of pretzels for \$25.50. How much did you pay for each bag of chips?

Variables	Equations	Solution
Let x = <i>cost of chips</i>	$5x + 9y = 16.95$	POI (<u>1.5</u> , <u>1.05</u>)
Let y = <i>cost of pretzels</i>	$10x + 10y = 25.50$	<i>n</i> <i>y</i>

2. You dump the 49 coins from your piggy bank into a Coinstar Count 'emUp machine. You have only dimes and quarters which the Coinstar Count 'emUp machine counts as \$7.45. How many quarters did you have?

Variables	Equations	Solution
Let x = <i># dimes</i>	$x + y = 49$	POI (<u>17</u> , <u>32</u>)
Let y = <i># quarters</i>	$0.25x + 0.10y = 7.45$	

3. An army of goblins and orcs eats breakfast before a busy day of burning and pillaging. Each orc eats 4 pieces maggot bread while each goblin eats 3 pieces of maggot bread. The army eats 265 pieces of maggot bread. Each orc has 3 weapons. Each goblin has 2 weapons. The army has 190 weapons. How many goblins are in the army?

Variables	Equations	Solution
Let x = <i># orcs</i>	$4x + 3y = 265$	POI (<u>40</u> , <u>35</u>)
Let y = <i># goblins</i>	$3x + 2y = 190$	

4. The "Pay Upfront" car rental company charges an insurance and gas fee of \$33 and daily rental fee of \$8 per day. The "Drive Now Pay Later" car rental company charges an insurance and gas fee of \$18 and has a daily rental fee of \$11 per day.

Variables	Equations	Solution
Let x = # days Let y = Total money spent	$y = 33 + 8x$ $y = 18 + 11x$	POI (<u>5</u> , <u>73</u>)

On what day do the companies charge the same amount? day 5

How much would you pay on that day? \$73

Use your graph:

If you only rent for 3 days which company should you choose? D.N.P.L.

If you rent for 6 or more days which company should you choose? P.U.

5. Katherine is deciding which catering company she should use for Mom's 50th birthday party. At Bashful's Birthday Blast there is a fee of \$16.95 and a charge of \$9.00 per person. At Bertha's Ballroom Blitz there is a fee of \$25.50 and a charge of \$5.00 per person.

Variables	Equations	Solution
Let x = # guests Let y = Total cost	$y = 9x + 16.95$ $y = 5x + 25.50$	POI (<u>2.21</u> , <u>36.56</u>)

Which company should Katherine choose? Why?

Identify each variable ie x = orcs , y = goblins, then create 2 equations and solve the systems with an ordered pair (x,y)

6. Jill bought one hot dog and two soft drinks for a cost of \$ 4.95. Jack bought three hot dogs and one soft drink for a cost of \$ 6.85. What was the price of a hot dog?

Variables	Equations	Solution
x = cost of hotdog y = " " soft drink	$x + 2y = 4.95$ $3x + y = 6.85$	POI (<u>1.75</u> , <u>1.6</u>)

7. The Slow Fix auto shop charges \$28 for parts and \$48 per hour of labor. The We Work Cheaper auto shop charges \$59 for parts and \$44.90 per hour of labor. After how many hours do they charge the same total amount?

Variables	Equations	Solution
x = # hours y = Total money	$y = 28 + 48x$ $y = 59 + 44.9x$	POI (<u>10</u> , <u>508</u>)

8. There are a total of 34 animals, lions and hyenas. Each lion eats 4 antelope. Each hyena eats 3 antelope. 117 antelope are eaten. How many lions are there?

Variables	Equations	Solution
$x = \# \text{ lions}$ $y = \# \text{ hyenas}$	$4x + 3y = 117$ $x + y = 34$	$\text{POI}(15, 19)$

9. There are 17 vehicles, cars and trucks, get gasoline at the gas station. Each car gets 8 gallons of gasoline. Each truck gets 19 gallons of gasoline. The station sells 169 gallons of gasoline. How many trucks are there?

Variables	Equations	Solution
$x = \# \text{ cars}$ $y = \# \text{ trucks}$	$8x + 19y = 169$ $x + y = 17$	$\text{POI}(14, 3)$

10. Ms. Smith decided to purchase M&M Bags and Hershey Bars for all of her students. Each M&M Bag costs \$3.00, while each Hershey Bar costs \$2.00. She ended up spending \$16.00 on her purchase of 6 items.
How many bags of M&M's does she buy?

Variables	Equations	Solution
$x = \# \text{ M\&M}$ $y = \# \text{ Hersheys}$	$3x + 2y = 16$ $x + y = 6$	$\text{POI}(4, 2)$

11. Last weekend, the Knights of the Round Table held a Jousting contest. During the contest, each knight had 3 spears, and each squire had 2 spears, for a total of 32 spears. Also, each knight had 2 swords, and each squire had only 1 sword, for a total of 19 swords.

How many knights were there?

Variables	Equations	Solution
Let $x = \# \text{ Knights}$ $y = \# \text{ Squire}$	$3x + 2y = 32$ $2x + y = 19$	

12. ^{minutes} Farmer Peter and Farmer Paula are picking apples from their apple trees. Farmer Peter as already picked 287 apples. Farmer Peter picks another 5 apples each minute. Farmer Paula has already picked 154 apples. Farmer Paula picks another 6 apples each minute.

After how many minutes have Peter and Paula picked the same amount of apples?

Variables	Equations (hint $y=mx+b$)	Solution
Let $x = \#$ of ^{minutes} hours	$y = 287 + 5x$	(133, 952)
Let $y =$ total apples picked	$y = 154 + 6x$	

13. Two countries are keeping track of the cost of a barrel of oil in their country. In the country, Weneeda oil, a barrel of oil costs of \$40.05 and the price increases ^{each} \$0.08 each day. In the country, Wehavea oil, a barrel of oil costs of \$48.74 and the price ^{each} decreases \$0.03 each day.

After how many days will the two countries have the same cost of a barrel of oil?

Variables	Equations	Solution
Let $x = \#$ days being recorded	$y = 40.05 + 0.08x$	(79, 46.37)
$y =$ Total cost	$y = 48.74 - 0.03x$	

14. ^{catching} The cats Killer and Croaker are ~~catch~~ mice on the waterfront. Killer has already caught 29 mice and catches 87 more mice each month. Croaker has already caught 282 mice and catches 64 more mice each month.

_____?

← Come up with your own questions and find answers to them

Variables	Equations	Solution
Let $x = \#$ months	$y = 29 + 87x$	
$y =$ Total Mice Caught	$y = 282 + 64x$	

15. Ted and Ara are saving money. Ara has saved \$1,477 and saves 64 more dollars each payday. Ted has saved \$948 and saves 87 more dollars each pay day.

_____?

Variables	Equations	Solution
Let $x = \#$ paydays	$y = 1477 + 64x$	
$y =$ Total Money saved	$y = 948 + 87x$	