

Math 6a/d: Homework 19

Deadline: Friday, March 5, 2021

Systems of linear equations: words to system

Systems of linear equations are two or more linear equations that are using the same variables, hold true at the same time and have to be solved together. Knowing how to solve systems of equations is useful especially when solving word problems. We will formally discuss various method to solve systems of linear equations next time. In this homework we are learning to **make** systems of linear equations to solve word problems. In many of the problems you will recognize the scenarios you worked on at the end of last class. **Notice that you are asked to come up with reasonable variables and a system of equations corresponding to the problem. I'm not asking you to solve them, yet...since we haven't discussed the methods properly.** However, you are welcome to try!

Remember that often we set variables (unknowns) for what we are trying to solve a problem for. For example, in the cupcake problem we set the two variables for the number of cupcakes that one adult eats and the number of cupcakes that one child eats. Then we used these variables to represent algebraically the two pieces of information that we had. In the Troll and Bridge problem we set the two variables for the number of \$5 bills and the number of \$10 dollar bills (exactly, what the troll asked for) and used them to represent algebraically the two pieces of information the troll gave us. In the following problems try to find those pieces of information, set appropriate variables and represent the information using your variables.

Problems

1. *(Thank you, Alex and Amogh)* The king is sad again. He has another problem and he's asking you for help. For the last two parties he bought some new forks and spoons and he wants to buy some for the party in your honor but he doesn't want to pay more for a spoon and a fork than he paid the last two times. Unfortunately, he forgot the prices. He remembers only the number of forks and spoons bought for each party and the total sums paid. For the first party the king paid \$400 for 200 forks and 150 spoons. For the second party he paid \$200 for 50 forks and 100 spoons. Can you figure out the prices for a fork and a spoon he paid last two times? *Set some variables and represent the information given in the problem algebraically using a system of equations.*

2. *(Thank you, Rishika, Shagun and Valentina)* Three VERY non-suspicious kids were walking to the candy store. When suddenly BOOM they had been hit on the head by a psychopath that escaped the mental hospital. When they woke, they were trapped in an escape-less room. A monstrous voice spoke above them and the words were: "Young children, you must solve my riddle or you will never see the light of day again. Listen closely for I will only say this ONCE." The man said this riddle: I just stole the total of 50 Snickers and Twixes (didn't pay a dime, ha-ha-ha), but I know that if I had to pay for them, I would pay \$85. I also looked at the price tags and know that one Snickers costs \$1 and one Twix costs \$2. How many Sneakers and how many Twixes did I steal? *Set some variables and represent the information given in the problem algebraically using a system of equations.*
3. *(Thank you, Terrence and his partner (Kevin?))* At the last party 600 adults and 800 children ate 250 pizzas. At the party before that 600 adults and 1000 children ate 275 pizzas. Every adult always eats the same amount of pizza and every child always eats the same (but different from the adult) amount of pizza. How much pizza do a child and an adult eat altogether? *Set some variables and represent the information given in the problem algebraically using a system of equations.*
4. *(Thank you, Clarence and Michelle)* Now the king has another problem, he is preparing to attack deadly monsters but needs just enough troops to kill them. If he has too few, his army will be killed. If he has too many, his army will be stuck in the cave. The king has battled these monsters before and he needed 5k troops to defeat 5 Basilisks and 4 Acromantulas, and he needed 7k troops to defeat 3 Basilisks and 8 Acromantulas (he needs a fixed number of troops to defeat 1 Basilisk and another fixed number of troops to defeat 1 Acromantulas but he doesn't know what those numbers are). He knows that this time he is attacking 4 Basilisks and 10 Acromantulas. How many troops will he need? *Set some variables and represent the information given in the problem algebraically using a system of equations.*
5. *(Thank you, Ben and his partner. I'm sorry I forgot who it was.)* A king's daughter had a birthday party. They invited 69 adults and 138 children. In total, the king ordered 276 pizza slices. Last year, the king invited 69 adults and 236 children. He had to order 374 slices of pizza. How many pizza slices does a child eat, and how many pizza slices does an adult eat? *Set some variables and represent the information given in the problem algebraically using a system of equations.*
6. *(Thank you, Savir and Deia)* Purple pea has a problem. He wants to throw a party with pita chips, but he doesn't know if he'll have enough. So, he asks the town prob-

lem solvers, Deia and Savir, how many pita chips he will need. He also gives them this information. Three types of peas will come to his party, the purple, yellow, and blue peas. There'll be three purple peas, five yellow and 4 blue peas. The same type of peas will always eat the same amount of pita chips. A few weeks ago his mom threw a party for the same three kinds of peas. There were six purple peas, four yellow peas, and ten blue peas. The peas ate thirty-four pita chips in total. The next day, his dad threw a party just to one-up Purple pea's mom. This time, seven purple peas, five yellow peas, and eleven blue peas attended. They ate forty pita chips this time. Purple pea also heard from his grandma that at her party four purple peas, eight yellow peas and two blue peas ate forty-five pita chips in total. How many pita chips should Purple pea buy? 🧀🥖🥞🍞😎 *Set some variables and represent the information given in the problem algebraically using a system of equations.*

7. The sum of two numbers is $\frac{41}{35}$ and the difference is $\frac{1}{35}$. What are the two numbers? *Set some variables and represent the information given in the problem algebraically using a system of equations.*
8. The sum of two numbers is 27. Twice the larger number is 11 less than 3 times the smaller number. What are the two numbers? *Set some variables and represent the information given in the problem algebraically using a system of equations.*
9. A motor boat can travel 45 miles downstream in 3 hours and 22 miles upstream in 2 hours. Find the speed of the boat in still water and find the speed of the current. (Hint: speed=distance/time) *Set some variables and represent the information given in the problem algebraically using a system of equations.*
10. The sum of digits in a two-digit number is 9. The ratio of this number and the number with switched digits is $\frac{3}{8}$. Find the number. (Hint: we can represent any 2-digit number as $10 \times A + B$ where A and B are the digits of that number). *Set some variables and represent the information given in the problem algebraically using a system of equations.*