

MODELLING AND SOLVING LINEAR SYSTEMS

Model each situation using a linear system. Define two variables for each problem, then solve the system to answer the questions.

PART A: SOLVING BY SUBSTITUTION

1. The sum of two numbers is 72. If their difference is 48, find the numbers.
2. Susan wants to rent a car for a day so she can visit her sister at Queen's. She has called two car-rental agencies. Rent-a-Heap charges \$50 for one day, plus \$0.15/km. Rent-a-Car charges \$40 for one day, plus \$0.20/km. At what distance will the cost of renting a car be the same from both companies?
3. Jim has a total of \$103 in \$2 and \$3 pizza coupons. If he has 40 coupons in all, how many of each kind does he have?
4. The sum of John's age and Marie's age is 36 years. John is four years younger than Marie. How old are John and Marie?
5. Erica's job is to collect money from the pop machines. From one machine she collects a total of 76 coins, in dimes and quarters. If the total value is \$13, how many dimes and quarters are there?
6. Provincial Express charges \$4 plus \$1.50/kg to deliver a package overnight. The Package People charge \$5 plus \$1/kg. For what mass is the cost of an overnight delivery the same?
7. Ray drove at a speed of 50 km/h from Ancaster to Oakville. From Oakville to Sudbury, he drove 80 km/h. If the whole trip was 550 km and took 8 h, what is the distance from Oakville to Sudbury?

PART A: ANSWERS:

1. 60, 12
2. 200 km
3. 17 \$2 coupons, 23 \$3 coupons
4. John is 16 yrs, Marie is 20 yrs
5. 40 dimes, 36 quarters
6. 2 kg
7. 400 km

PART B: SOLVING BY ELIMINATION

8. Sean earns an hourly wage plus tips. One week he worked 12 h and made a total of \$117. The next week he worked 10 h and earned the same amount in tips as the week before, for a total of \$110. What is Sean's hourly wage?
9. A candy store is preparing a mixture of chocolate raisins and chocolate peanuts. The raisins sell for \$2.25/kg and the peanuts for \$1.75/kg. How much of each type must be mixed to make 20 kg of a mixture that will sell for \$41?
10. It took the high school hockey team 5 h to travel to a tournament in Thunder Bay. They travelled by bus and by plane a total distance of 1320 km. If the bus averaged 40 km/h and the plane averaged 600 km/h, determine the time they spend travelling by plane.
11. A rugby coach bought 20 rugby balls for a total of \$700. If the practice balls cost \$30 each and the official game balls cost \$50 each, how many of each did the coach buy?
12. Twice Sam's age plus half her mother's age is 48. Three times Sam's age less half her mother's age is 27. How old are Sam and her mother?
13. Victoria owns a candy store. She sells hard candy for \$2/kg and soft candy for \$4/kg. How can she mix the two kinds of candy to create 60 kg of a mixture that will be sold for \$3/kg?
14. Gary drove to Sarnia. Part of his trip was along major highways and the rest was along country roads. The speed limit is 100 km/h on the highways and 80 km/h on the other roads. He spent a total of 12 h driving 1050 km. How much time did he spend on each type of road?

PART B: ANSWERS:

8. \$3.50/h 9. 12 kg raisins, 8 kg peanuts 10. 2 hours 11. 15 practice balls, 5 game balls
12. Sam is 15 yrs, mom is 36 yrs 13. 30 kg of each type 14. 4.5 h on hwy, 7.5 h on country roads