1. A jewellery designer has two types of gold alloy: one that is 60% gold, and another that is 90% gold. How much of each type of alloy will she have to combine to create a 30 g piece that is 80% gold?

2. At a charity car-wash for your school, you washed a total of 168 vehicles. You charged $6 per car and $8 per SUV, and collected a total of $1148. How many cars and how many SUVs came to the car wash?

3. A math test has 50 questions—some are multiple choice, some are short answer. A perfect test is 110 marks. If multiple choice quesions are worth 1 mark and short answer questions are worth 5 marks, how many of each type of question are there?

4. At present, Jemma is 6 years older than her sister Heather. Two years ago, Jemma was twice as old as Heather. What are the sisters' current ages?

5. Allison is making 120 kg of a new blend of coffee that will sell for $15/kg. The blend is made from two kinds of coffee: one that sells for $18/kg, and another that sells for $10/kg. How much of each type of coffee should Jemma use to make the new blend?

6. Taxi company A charges $5 plus $0.35 per km travelled. Taxi company B charges $3.50 plus 50¢ per km.

   (a) For what distance is the charge the same using either taxi company?

   (b) In what situations would you choose company A?

7. A motor boat took 5 h to travel a distance of 60 km up a river, against the current. The return trip took 3 h. Find the average speed of the boat in still water and the speed of the current.

8. Find the point of intersection of $3x - 2y = 14$ and $4x + y = 15$ by graphing.

9. Fibonacci C.I. sold 473 tickets for the spring concert. Student tickets cost $2 each and adult tickets cost $5 each. The concert raised a total of $1450. How many students and how many adults attended the concert?

10. Yasmin mixes cinnamon and nutmeg to make 25 g of a spice mix. Cinnamon costs 9¢/g and nutmeg costs 12.5¢/g. How much of each spice does Yasmin need to make a spice mix that will cost 9.7¢/g?

11. Ms. Card plans to buy new books for her math class. She has 28 students and wants to buy a book for every student. The books cost $5 each for softcovers and $8 each for hardcovers. Ms. Card has $173 dollars to spend. How many of each type of book can she buy?

12. The length of a rectangle is 6 cm more than its width. The perimeter of the rectangle is 84 cm. What are the dimensions of the rectangle?

13. FunNGames Video rents game machines for $10 and video games for $3 each. Big Vid rents game machines for $7 and video games for $4 each. Let y be the rental cost and x the number of games rented.

    (a) Write and equation to represent the total cost for a rental from FunNGames Video.
    (b) Write and equation to represent the total cost for a rental from Big Vid.
    (c) Find the point of intersection.
    (d) What does this point of intersection represent.

14. Logan is selling dog tags to raise money for SaveTheDogs.org. The company that makes the tags charges a flat fee of $348 plus $2 per tag. Logan plans to sell the tags for $5 each.

    (a) Write an equation to show the total cost for the dog tags.
    (b) Write an equation to show the revenue.
    (c) How many dog tags must Logan sell to break even?
    (d) Graph the two equations to verify your answer to part (c).

15. Silvio plans to go to college in a year and needs to save for tuition. He invests his summer earnings of $3050, part at 8% per year, and part at 7.5% per year. After one year Silvio has earned a total of $234 in interest. How much did he invest at each rate?

16. 82 people, including adults, students and children attended a play at a small theatre. Adult tickets cost $15, student tickets cost $10, children are free, and the theatre made $845 on ticket sales. If 16 children saw the play, how many adults and how many students were there?

17. The same theatre staged a different play, which cost $12 for adults, $8 for students and $5 for children. The total attendance was 77 and tickets sales amounted to $738. If there were 8 more students than children, how many adults, how many students and how many children saw the play?

18. Kadheem needs to mix some powdered Gatorade for the football team. He has one jug that contains 100 g of powder per litre and another jug that contains 75 g of powder per litre. The coach has asked for 10 litres of a mixture that contains 80 g per litre. How much from each jug should Kadheem use to make the correct mixture?

19. Carlie has a jar of quarters and dimes. She tells her sister that the jar has 45 coins all together and their combined value is $6.30. Find the number of each type of coin in the jar.

20. Harvinder drives 400 km in 5.5 h. For the first part of his trip, his average speed is 80 km/h. For the second part of his trip, his average speed is 60 km/h.

(a) Let x represent the distance Harvinder travels at 80 km/h. Let y represent the distance he drove at 60 km/h. Write a system of equations to represent this situation

(b) How far does Harvinder drive at each speed?

21. Nadia rode her motorcycle at constant speed. It took her 2 hours to travel 216 km with the behind her. The return trip took her 3 hours riding into the wind.

(a) Let s represent the speed of the motorcycle and w represent the speed of the wind. Write a linear system to represent this situation.

(b) Find the speed of the motorcycle and the speed of the wind.

22. The Tee-Shop manufactures custom t-shirts. Orders for 50 or fewer shirts cost $10 per shirt plus a $100 set-up fee. Orders for more than 50 shirts cost $8 per shirt plus a $75 dollar set-up fee.

(a) Write equations that represent the total cost of any t-shirt order.

(b) What are the independent and dependent variables?

(c) What are the domain and range for your equations in part (a)?

23. Solve the following system of three linear equations by substitution. Hint: you will first have to solve one equation for one variable, then substitute that expression into a second equation. Next, solve the second equation for one variable then substitute that expression into the third equation.

$$x + y + z = 77$$

$$12x + 8y + 5z = 738$$

$$y = z + 8$$