

## Application of simultaneous equations

Many applied problems involve more than one unknown quantity. Although some problems with two unknowns can be solved by using just one variable, it is often easier to use two variables and a system of equations.

### Steps to Solving an Applied Problem

- **READ** the problem carefully until you understand what is given and what is to be found.
- **ASSIGN VARIABLES** to represent the unknown values, using diagrams or tables as needed. Write down what each variable represents.
- **WRITE A SYSTEM OF EQUATIONS** that relates the unknowns.
- **SOLVE** the system of equations.
- **STATE THE ANSWER** to the problem. Does it seem reasonable?
- **CHECK** the answer in the words of the original problem.

### Problems

1. The cost of buying a coffee and a tea in a cafe is £4. The cost of buying a coffee and three teas in a cafe is £7. Work out the cost of buying a coffee and the cost of buying a tea.

coffee: £2.50, tea £1.50

2. The sum of Rosemary's age and Hannah's age is 102 years. The difference between Rosemary's age and Hannah's age is 52 years. Rosemary is older than Hannah. Find the age of each woman by using simultaneous equations.

Rosemary 77 y.o., Hannah 25 y.o.

3. Five adult tickets and three child tickets for a movie cost £58. Two adult tickets and eight child tickets for a movie cost £47. Find the cost of each type of ticket.

Adult ticket costs £9.50. Child ticket costs £3.50.

4. Four chairs and two tables cost £218. Six chairs and seven tables cost £587. Find the total cost of buying twenty chairs and five tables.

The total cost of buying 20 chairs and 5 tables is £765.

5. A plumber charges a price for each hour, £ $h$ , and a fixed charge, £ $c$ . A 5 hour job costs £155 in total. A 8 hour job costs £230 in total. How much would a job that lasts 2 hours cost?

A 2-hour job would cost £80.

6. Barry buys 200 pieces of stationery for £76. Of the 200 pieces of stationery,  $x$  of them are rulers that cost 50p each and  $y$  of them are pens that cost 20p each. Find how many rulers Barry buys and how many pens he buys.

Barry buys 120 rulers and 80 pens.

7. In a greengrocers, 4kg of bananas and 3kg of apples costs £7.50 In the same greengrocers, 3kg of bananas and 5kg of apples costs £8.10 How much would 2kg of bananas and 2kg of apples cost?

The cost of 2 kg of bananas and 2 kg of apples is £4.20.

8. Tickets for an ice-skating show are sold at £5 for adults and £2 for children. If 101 tickets were sold for a take of £394, find the number of adults and children who attended.

64 adults and 37 children