

# Applications of simultaneous equations

1. The cost of an apple is  $a$  cents and the cost of a banana is  $b$  cents. Write expressions for the following.
  - a. The cost of 3 apples.
  - b. The cost of 7 apples.
  - c. The cost of  $n$  apples.
  - d. The cost of 2 bananas.
  - e. The cost of 6 bananas.
  - f. The cost of  $m$  bananas.
  - g. The cost of 3 apples and 2 bananas.
  - h. The cost of 2 apples and 3 bananas.
  - i. The cost of  $n$  apples and  $m$  bananas.
  
2. I have  $n$  exercise books. Write expressions for the following.
  - a. The total cost if an exercise book costs 60 cents.
  - b. The total cost if an exercise book costs 87 cents.
  - c. The total cost if an exercise book costs  $c$  cents.
  
3. I have  $a$  apples and  $b$  bananas. Write expressions for the following.
  - a. The total cost if an apple costs 40c and a banana costs 30c.
  - b. The total cost if an apple costs 80c and a banana costs 20c.
  - c. The total cost if an apple costs  $n$  cents and a banana costs  $m$  cents.
  
4. Movie tickets cost \$12 for adults and \$8 for children. Let  $a$  be the number of adults and  $c$  be the number of children watching a movie. Write an expression for
  - a. the number of people watching the movie.
  - b. the total amount paid by the adults.
  - c. the total amount paid by the children.
  - d. the total amount paid altogether.
  
5. Write the equations for each of the following. Then solve them.
  - a. If 3 is added to  $y$ , the result is 12.
  - b. If 7 is subtracted from  $y$ , the result is 5.
  - c. If 3 is multiplied by  $n$ , the result is 12.
  
6. Consider this problem:

At a school play, adults were charged \$5 and students were charged \$2. Four hundred tickets were sold. The total taken in was \$1100. How many adults attended the play? How many students attended the play?

  - a. Identify the two unknown quantities and give each a variable name.
  - b. Form an equation using the total number of tickets sold.
  - c. Form an equation using the total taken in.
  - d. Solve these equations simultaneously.
  - e. Check your answer with the original problem above.

7. A rectangular shed is 8 metres longer than it is wide. Its perimeter is 60 metres. Find the length of the shed. Find the width of the shed.
- Identify the two unknown quantities and give each a variable name.
  - Draw a diagram, labelling as necessary.
  - Form an equation using the fact that the length of the shed is 8 metres longer than the width.
  - Form an equation using the fact that the perimeter is 60 metres.
  - Solve these equations simultaneously.
  - Check your answer with the original problem above.
8. Sarah bought five exercise pads and six pens for \$5.90. James bought three exercise pads and four pens for \$3.70.
- Identify the two unknown quantities and give each a variable name.
  - Form an equation using Sarah's purchase.
  - Form an equation using James' purchase.
  - Solve these equations simultaneously.
  - Check your answer with the original problem above.

**Use these steps to solve the remaining questions.**

- Identify the two unknown quantities.
  - Draw a diagram, if possible.
  - Form two equations.
  - Solve these equations simultaneously.
  - Check your answer with the original problem above.
9. The sum of two numbers is 37. The difference of the two numbers is 11. Find the two numbers.
10. Chris bought seven candy bars and six packets of chips for \$14.40. Nikki bought three candy bars and ten packets of chips for \$13.40. What is the cost of a candy bar and what is the cost of a packet of chips?
11. Three kg of rump steak plus 5 kg of sausages cost \$57. Five kg of rump steak plus 1 kg of sausages cost \$51. How much does a kilogram of rump cost? How much does a kilogram of sausages cost?
12. a. Make up a question that requires the student to solve it using simultaneous equations. The question should be very different to those above (i.e. don't just change the numbers).
- b. Now provide a full worked solution to your question.

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13. Travelling down a river from A to B with the current took 5 hours. Travelling up the river against the current took 6 hours. The distance from A to B is 60 kilometres. What is the speed of the current?
14. Here is a question with **three** unknowns. See if you can solve it.  
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