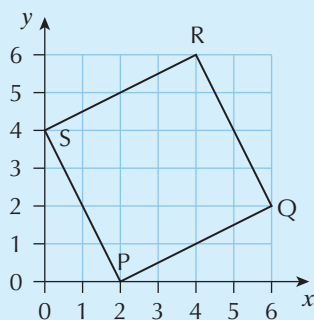# 2 Algebra

2.1 Coordinates

I can

• use and interpret positive coordinates

Example

PQRS is a square.

a Write down the coordinates of the vertices.

b Work out the coordinates of the centre of the square.

Solution

The vertices are the corners of the square.

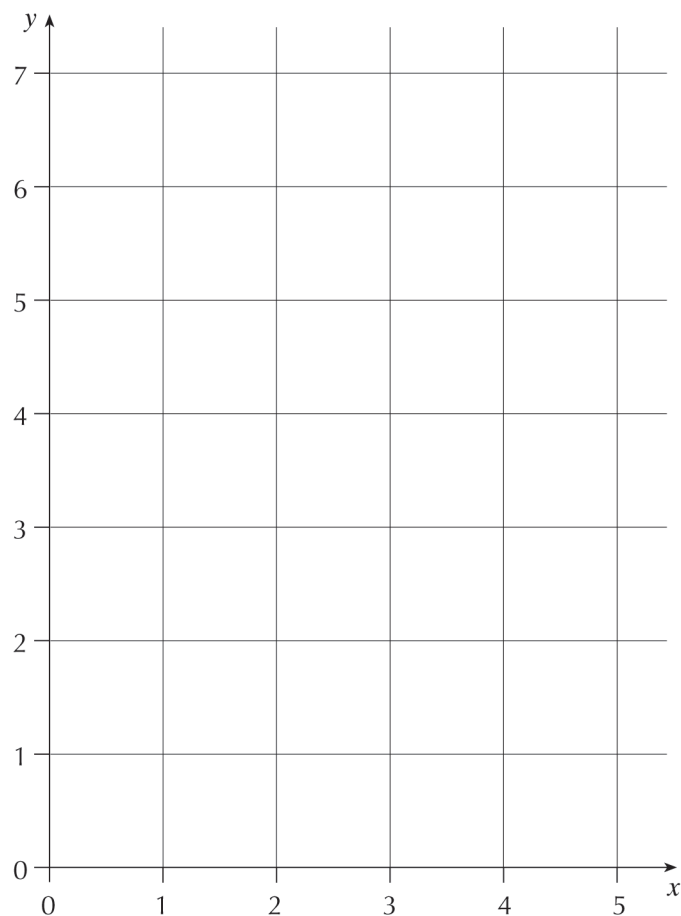**a** Remember to write down the *x*-coordinate first.

   P is (2, 0), *Q* is (6, 2), *R* is (4, 6) and *S* is (0, 4).

b Draw the diagonals *PR* and *QS*.

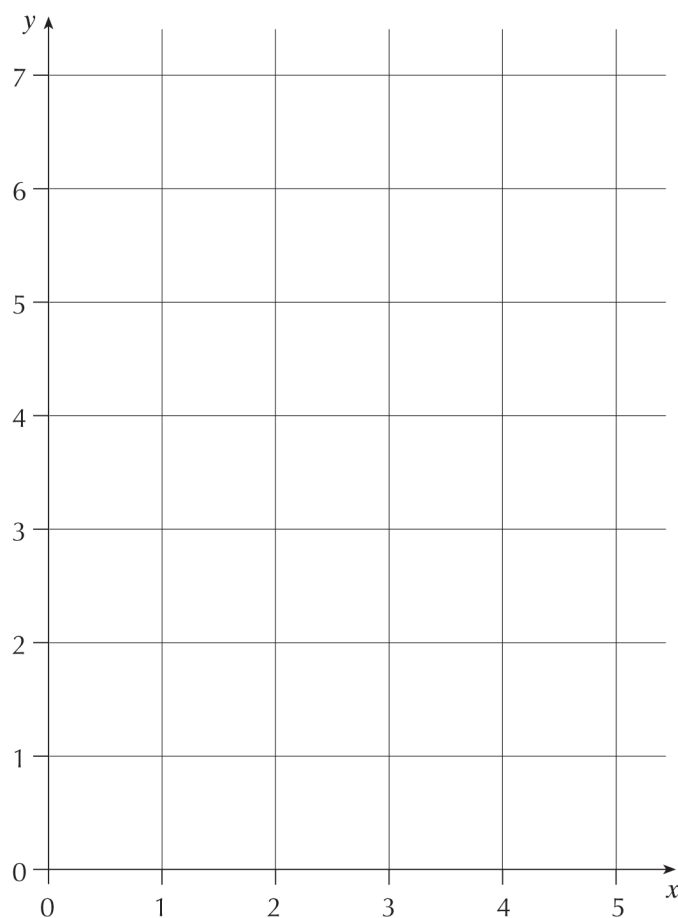   They cross at the centre of the square. The centre is at (3, 3).

1

a On the grid plot the following points.

A(0,1), B(2,4), C(5,4), D(5,7), E(4,2)

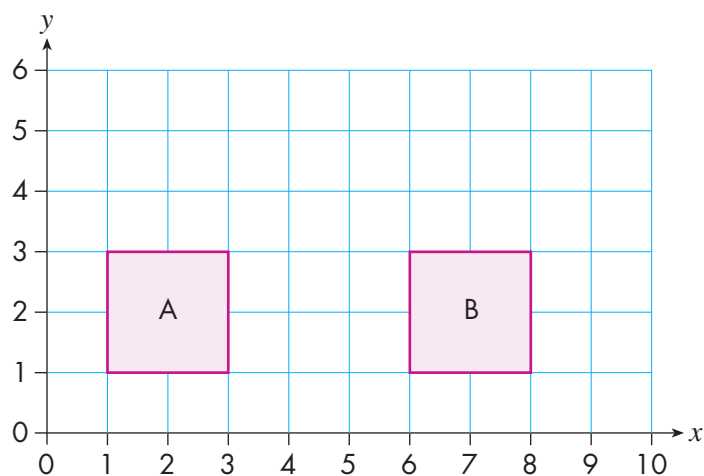**b** Join the two points that make a horizontal line.

c Join the two points that make a vertical line.

d B, C and D are three vertices of a square. Draw the square.

e Write down the coordinates of the fourth vertex of the square. (_____, _____)

2

a Write down the coordinates of the vertices of square A.

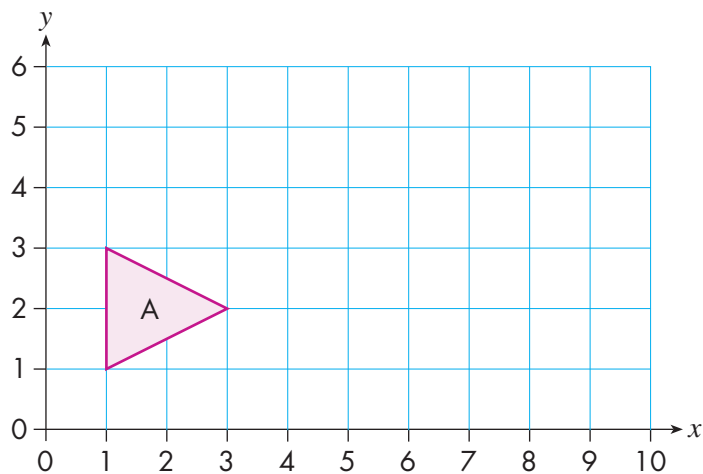(_____, _____), (_____, _____), (_____, _____), (_____, _____)

b Write down the coordinates of the vertices of square B.

(_____, _____), (_____, _____), (_____, _____), (_____, _____)

c Write down the coordinates of the centre of square A.   (_____, _____)

d Write down the coordinates of the centre of square B.   (_____, _____)
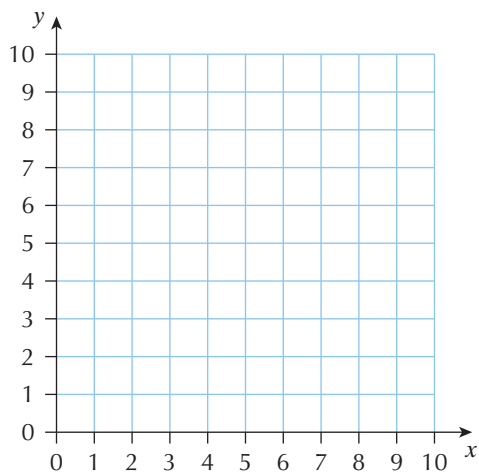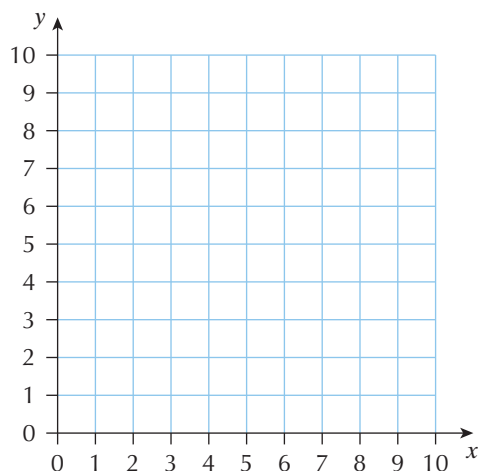
3

a Write down the coordinates of the vertices of the triangle.

(_____, _____), (_____, _____), (_____, _____)

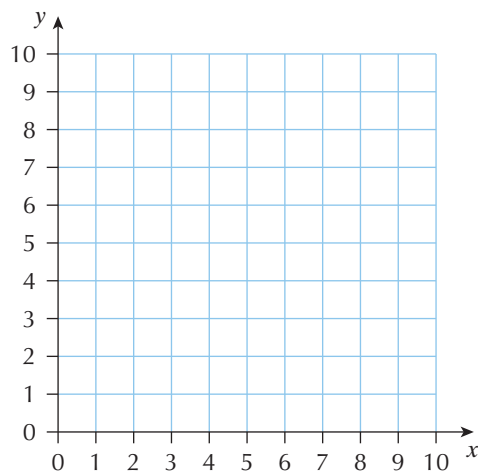**b** Draw triangle B with these vertices.   (5, 0), (9, 2), (5, 4)

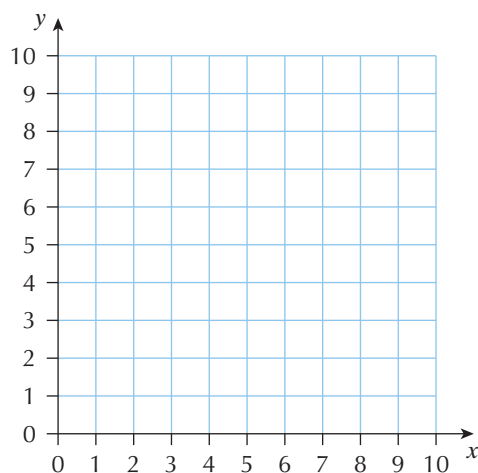**c** Draw triangle C with these vertices.   (0, 6), (4, 4), (8, 6)

4 Plot the following sets of coordinates on the grid. Join the points with straight lines, in order. Try to guess what you are drawing.

a (3, 10), (4, 10), (5, 9), (6, 9), (7, 10), (8, 10), (10, 8), (9, 7), (8, 8), (8, 3), (3, 3), (3, 8), (2, 7), (1, 8), (3, 10)

b (4, 7), (3, 7), (0, 9), (0, 3), (3, 5), (4, 5), (4, 4), (6, 4), (6, 5), (7, 5), (10, 3), (10, 9), (7, 7), (6, 7), (6, 5), (6, 8), (4, 8), (4, 5)

2.2 Formulae

I can

• use simple formulae expressed in words

Practice questions

1 A postman uses the formula **time taken = number of houses × 2** to work out how many minutes he takes to deliver the post.
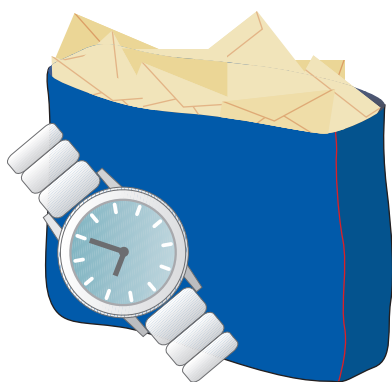
How many minutes does it take him to deliver to

a 30 houses? _____

b 50 houses? _____

c 200 houses? _____

2 A fairground ride charges £3 per person. The formula to work out how much money the fairground ride takes is **total money taken = number of people × £3.**
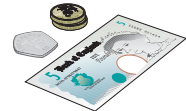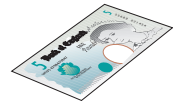
How much money does the fairground ride take if there are

a 5 people on the ride? _____

b 10 people on the ride? _____

c 16 people on the ride? _____

3 Sarah charges £2.50 to wash one car. The formula to work out the money she makes is
money made = number of cars washed × £2.50.

Match up the number of cars she washed to the amount of money she made.

4 Mr and Mrs George decide to give their three children monthly pocket money. They use the
formula **pocket money in pounds = child's age + 4.**

Julianna is 7, Rachel is 12 and Liselle is 14.

How much will they each receive?

a Julianna _____

b Rachel _____

c Liselle _____

5 The distance travelled along a motorway can be calculated using the formula **distance in
miles = number of hours driving × 70.**

How far would you travel on a motorway in

a 2 hours? _____

b 5 hours? _____

6 A DJ charges for discos using the formula **charge = £70 + £40 for every hour past midnight.**

How much would the DJ charge for the following discos?

a Finish at 1.00 am _____

b Finish at 3.00 am _____

7 Jade makes and sells bead bracelets. She uses the formula **number of beads = number of bracelets × 12** to work out how many beads she will need for each order of bracelets.

a How many beads will she need for an order of

i 5 bracelets? _____

ii 10 bracelets? _____

iii 30 bracelets? _____

b Jade has 60 spare beads left over.

How many extra bracelets can she make? _____

8 Simon runs laps around a running track. He uses the formula **number of miles = number of laps ÷ 4** to work out how many miles he has run around the track.
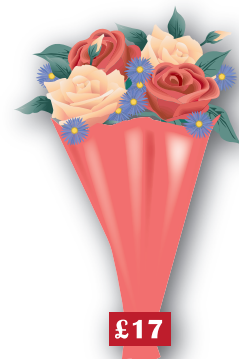
a How many miles did he run if he completed

i 8 laps? _____

ii 20 laps? _____

iii 32 laps? _____

b Simon wants to run 3 miles around the track.

How many laps should he complete? _____

9 A florist uses the formula **total cost = cost of bouquet + £4** to work out how much to charge a customer for delivery of a bouquet of flowers.

£17

a How much would the total cost be, including delivery, for

    i   a bouquet costing £10?   _____

    ii a bouquet costing £17?   _____

    iii a bouquet costing £29?   _____

b A customer was charged £26 in total. How much was the bouquet worth? _____

Comments, next steps, misconceptions