



## Lines, shapes and coordinates

- Classifying quadrilaterals by their geometric properties
- Calculating the midpoint of a line segment

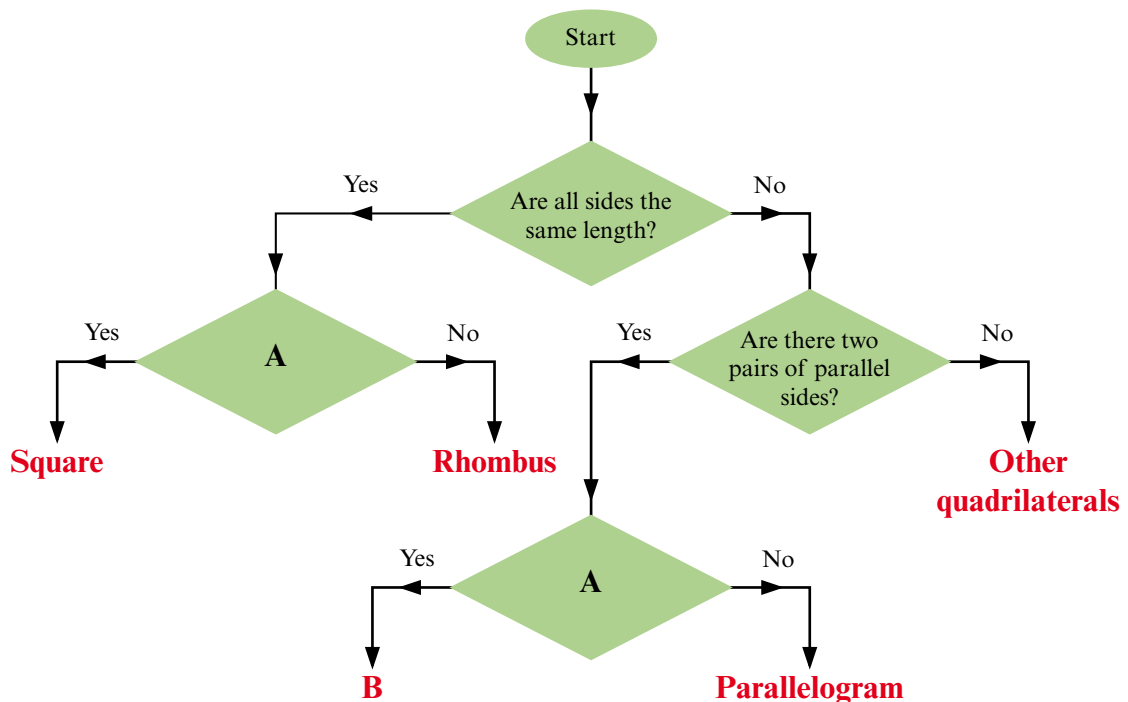
Keywords

You should know

### explanation 1

**1** Look at this flow chart. It shows a possible way to classify quadrilaterals.

- The boxes labelled **A** should both contain the same question. What question should they contain?
- What is the name of quadrilateral **B**?
- One of the categories in this classification is 'Other quadrilaterals'. Name three types of quadrilaterals that are included in this category.



**2 a** For each property below, name all of the types of quadrilateral shown that *always* have that property.

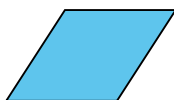
- i** All sides are the same length.
- ii** All angles are the same size.
- iii** Opposite sides are equal.
- iv** Opposite angles are equal.
- v** There are two pairs of parallel sides.
- vi** There is only one pair of parallel sides.
- vii** Diagonals are of the same length.
- viii** The diagonals intersect at right angles.
- ix** There is only one line of reflection symmetry.
- x** It has rotational symmetry of order 2.
- xi** There are at least two lines of reflection symmetry.
- xii** There are four lines of reflection symmetry.



square



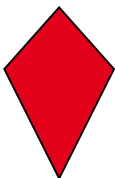
rectangle



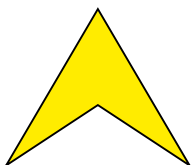
rhombus



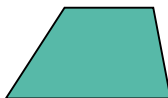
parallelogram



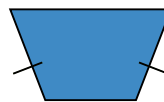
kite



arrowhead



trapezium

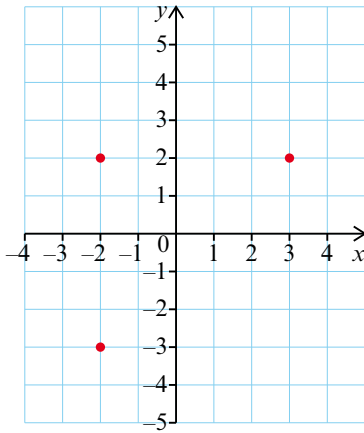


isosceles  
trapezium

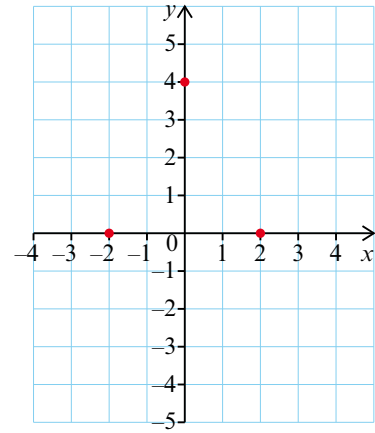
- b i** Which property from part **a** do all trapeziums have?
- ii** Which of the properties do all rhombuses have, but squares never have?

- 3** In each grid, three vertices of a quadrilateral are plotted. What are the coordinates of the fourth vertex?

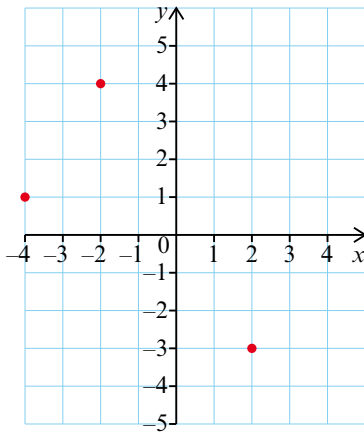
**a** A square



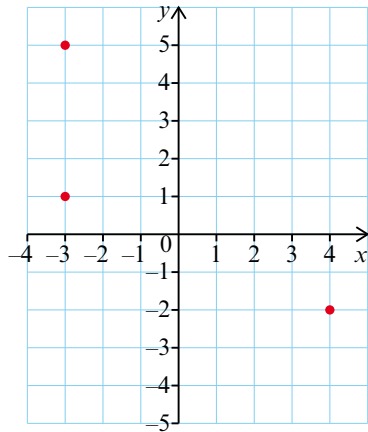
**b** A rhombus



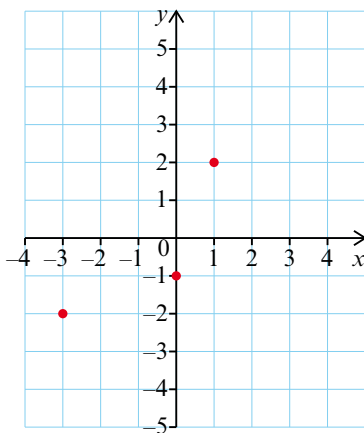
**c** A rectangle



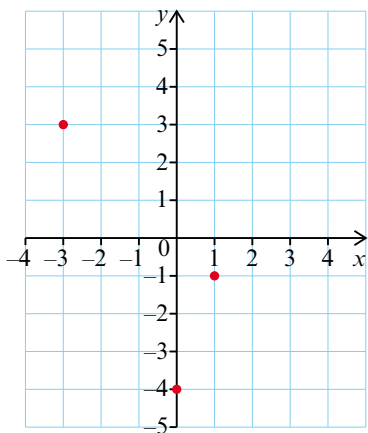
**d** A kite



**e** A rhombus



**f** An arrowhead

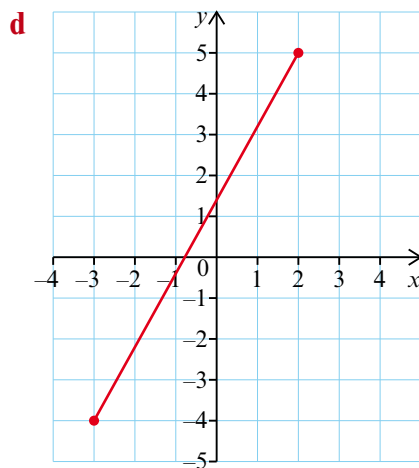
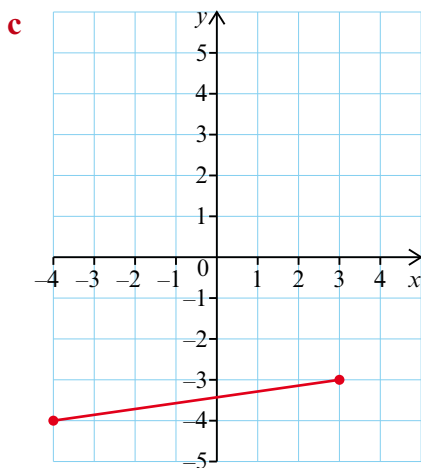
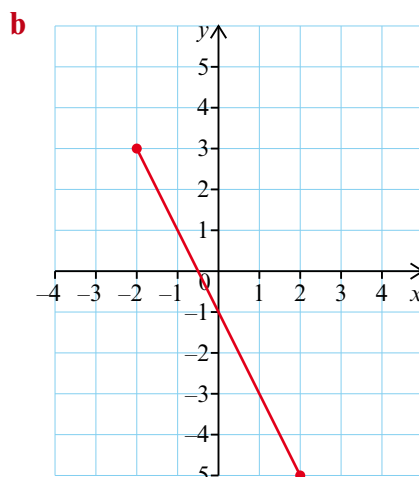
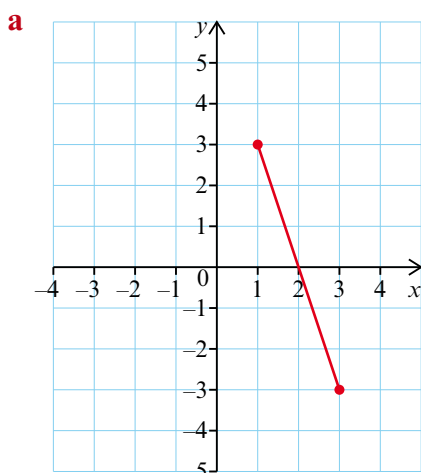


explanation 2a

explanation 2b

explanation 2c

**4** Write the coordinates of the midpoint of each line segment.



**5** These are the coordinates of the end points of line segments. Calculate the coordinates of the midpoint of each line segment.

**a** (2, 4) and (4, 8)

**b** (0, 2) and (6, 2)

**c** (-6, 1) and (2, 0)

**d** (-4, 2) and (0, -4)

**e** (1, -3) and (0, 0)

**f** (2, -3) and (-1, 6)

**6** Point M is the midpoint of line segment AB. The coordinates of points A and M are given. In each case, calculate the coordinates of point B.

**a** A(1, 2), M(5, 3)

**b** A(-2, 1), M(4, -1)

**c** A(3, -8), M(1, -4)