

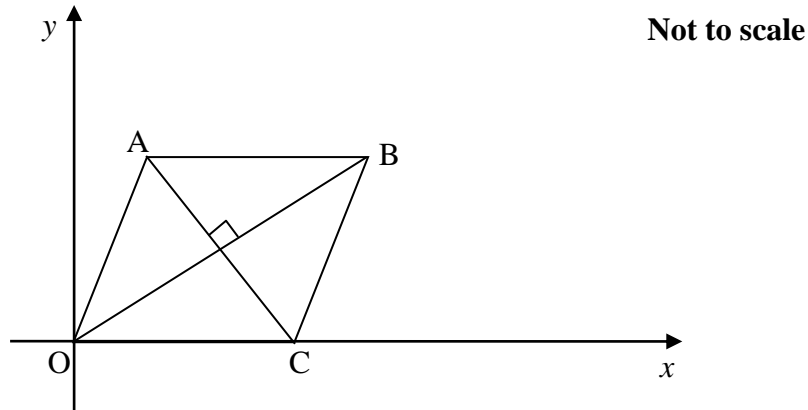
## Section 1: Straight lines

### Exercise

1. (a) For the points A(3, 1) and B(7, 4) calculate
  - (i) the gradient of AB
  - (ii) the gradient of a line perpendicular to AB
  - (iii) the midpoint of AB
  - (iv) the distance AB
  - (v) the coordinates of the point C which divides AB in the ratio 3:2.(b) Repeat part (a) for the points A(-2, 9) and B(3, -1).
2. For the points P(2, -1) and Q(-4, 8), find
  - (i) the midpoint M of PQ
  - (ii) the coordinates of the point R such that PR:QR is 1:3
  - (iii) the coordinates of the point S such that PS:QS is 7:3.
3. Given the points A(3, 1), B(6, y) and C(12, -2) find the value(s) of y for which
  - (i) the line AB has gradient 2
  - (ii) the distance AB is 5
  - (iii) A, B and C are collinear
  - (iv) AB is perpendicular to BC
  - (v) the lengths AB and BC are equal
4. P is the point (2, 1), Q is (6, 9) and R is (10, 2).
  - (i) Sketch the triangle PQR.
  - (ii) Prove that triangle PQR is isosceles.
  - (iii) Work out the area of triangle ABC.
5. The point E is (2, -1), F is (1, 3), G is (3, 5) and H is (4, 1). Show, by calculation, that EFGH is a parallelogram.
6. Find the equations of the following lines.
  - (i) parallel to  $y = 4x - 1$  and passing through (2, 3)
  - (ii) perpendicular to  $y = 2x + 7$  and passing through (1, 2)
  - (iii) parallel to  $3y + x = 10$  and passing through (4, -1)
  - (iv) perpendicular to  $3x + 4y = 12$  and passing through (-3, 0)
  - (v) parallel to  $x + 5y + 8 = 0$  and passing through (-1, -6)
7. Find the equation of the perpendicular bisector of AB in each of the following cases.
  - (i) A(1, 6), B(3, 2)
  - (ii) A(8, -1), B(-2, 3)
  - (iii) A(-5, 2), B(7, -4)
  - (iv) A(-3, -5), B(5, 1)
8. A triangle has vertices E(2, 5), F(4, 1) and G(-2, -3).
  - (i) Find the midpoint of each side and hence find the equations of the three medians. (Medians are the lines from the midpoint of each side to the opposite vertex).
  - (ii) Show that the point  $(\frac{4}{3}, 1)$  lies on each median.

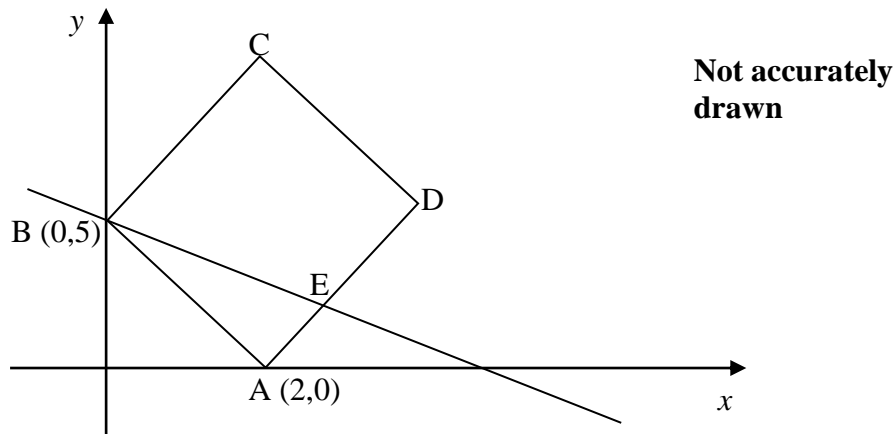
## AQA FM Coordinate geometry 1 Exercise

9. ABCD is a parallelogram. The equation of AB is  $y = 4x - 3$  and the equation of BC is  $y = 2x + 1$ .
- Find the coordinates of B.
  - The coordinates of A are (3, 9). Find the equation of AD.
  - The coordinates of C are (7, 15). Find the equation of CD.
  - Find the coordinates of D.
10. The diagram shows a rhombus OABD. O is the origin. B is the point with coordinates (6, 4). D lies on the  $x$ -axis.



Find the coordinates of point A.

11. ABCD is a square. Point E cuts AD in the ratio 1:2.



Find the coordinates of the point where line BE crosses the  $x$ -axis.