medians and altitudes
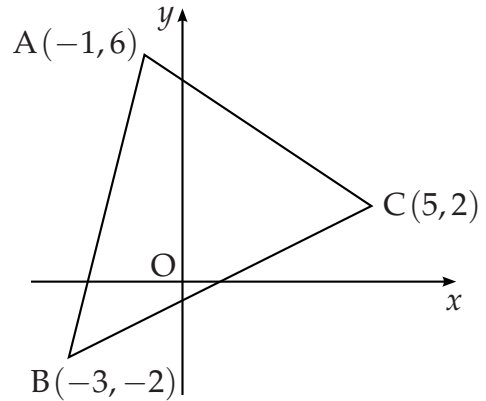
1. Find the equation of the median AD of triangle ABC where the coordinates of A, B and C are $(-2,3)$, $(-3,-4)$ and $(5,2)$ respectively. **3**

2. Triangle ABC has vertices $A(-1,6)$, $B(-3,-2)$ and $C(5,2)$.

Find

   (*a*) the equation of the line p, the median from C of triangle ABC. **3**

   (*b*) the equation of the line q, the perpendicular bisector of BC. **4**

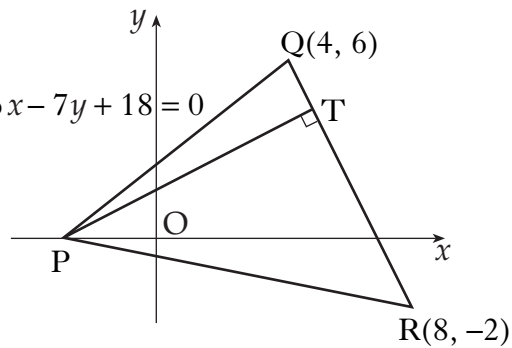   (*c*) the coordinates of the point of intersection of the lines p and q. **1**

3. Triangle PQR has vertex P on the x-axis, as shown in the diagram.

Q and R are the points $(4,6)$ and $(8,-2)$ respectively.

The equation of PQ is $6x - 7y + 18 = 0$.

   (*a*) State the coordinates of P. **1**

   (*b*) Find the equation of the altitude of the triangle from P. **3**

   (*c*) The altitude from P meets the line QR at T. Find the coordinates of T. **4**
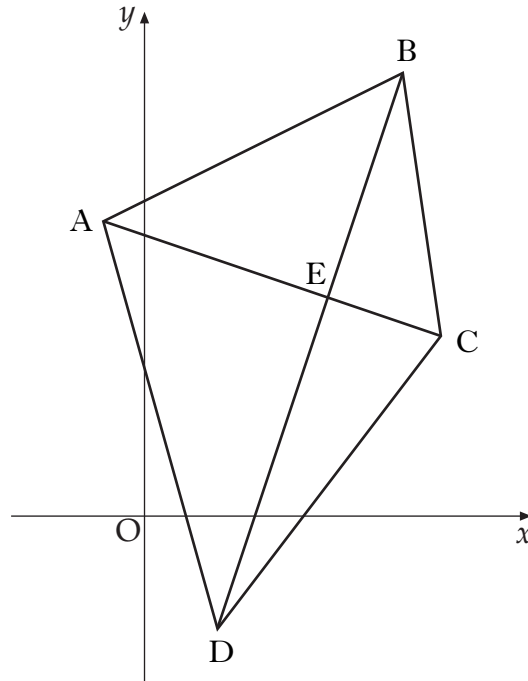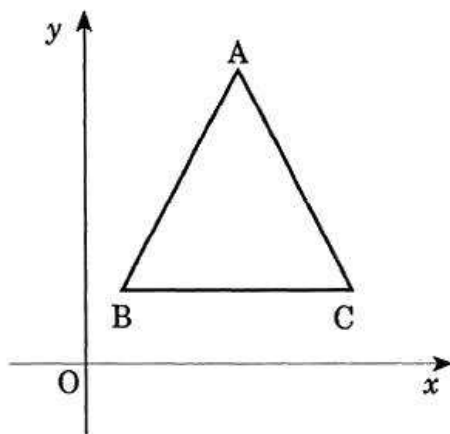
4. A quadrilateral has vertices $A(-1,8)$, $B(7,12)$, $C(8,5)$ and $D(2,-3)$ as shown in the diagram.

(a) Find the equation of diagonal BD.　　**2**

(b) The equation of diagonal AC is $x + 3y = 23$.

Find the coordinates of E, the point of intersection of the diagonals.　　**3**

(c)　(i) Find the equation of the perpendicular bisector of AB.

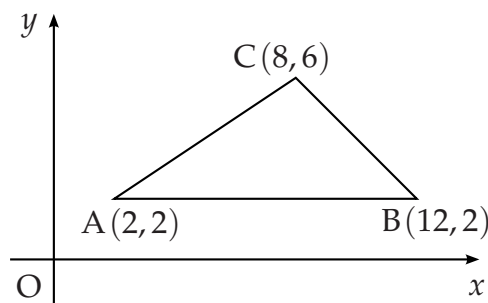　　(ii) Show that this line passes through E.　　**5**

5. A triangle ABC has vertices A(4, 8), B(1, 2) and C(7, 2).

(a) Show that the triangle is isosceles. **(2)**

(b) (i) The altitudes AD and BE intersect at H, where D and E lie on BC
and CA respectively. Find the coordinates of H. **(7)**

(ii) Hence show that H lies one quarter of the way up DA. **(1)**

6. Triangle ABC has vertices $A(2,2)$, $B(12,2)$ and $C(8,6)$.

(a) Write down the equation of l_1, the perpendicular bisector of AB. **1**

(b) Find the equation of l_2, the perpendicular bisector of AC. **4**

(c) Find the point of intersection of lines l_1 and l_2. **1**

(d) Hence find the equation of the circle passing through A, B and C. **2**

7. Triangle ABC has vertices A $(4, 0)$, B $(4, 16)$ and C $(18, 20)$, as shown in the diagram opposite.

Medians AP and CR intersect at the point T $(6, 12)$.
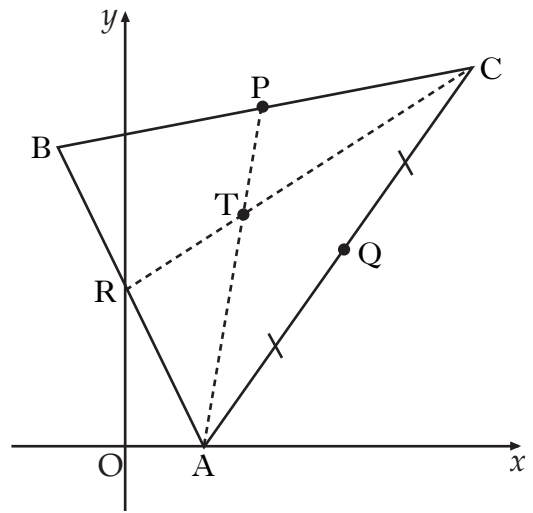
(a) Find the equation of median BQ. **3**

(b) Verify that T lies on BQ. **1**

(c) Find the ratio in which T divides BQ. **2**

[END OF QUESTIONS]