1

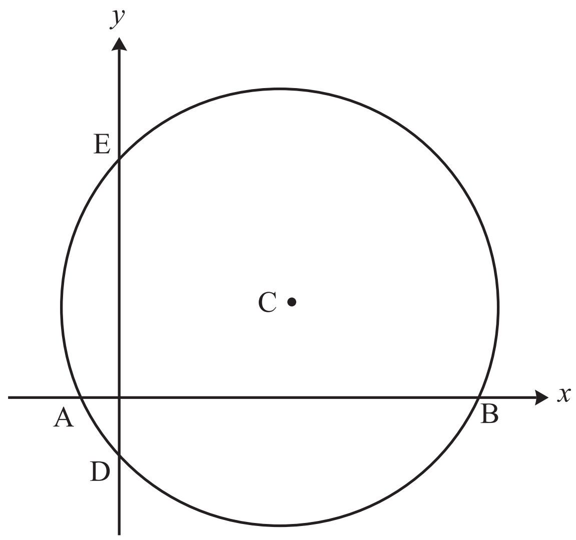

Fig. 11

Fig. 11 shows a sketch of the circle with equation $(x-10)^2+(y-2)^2=125$ and centre C. The points A, B, D and E are the intersections of the circle with the axes.

(i) Write down the radius of the circle and the coordinates of C. **[2]**

(ii) Verify that B is the point (21, 0) and find the coordinates of A, D and E. **[4]**

(iii) Find the equation of the perpendicular bisector of BE and verify that this line passes through C. **[6]**

2 Fig. 10 shows a sketch of a circle with centre C (4, 2). The circle intersects the x-axis at A (1, 0) and at B.

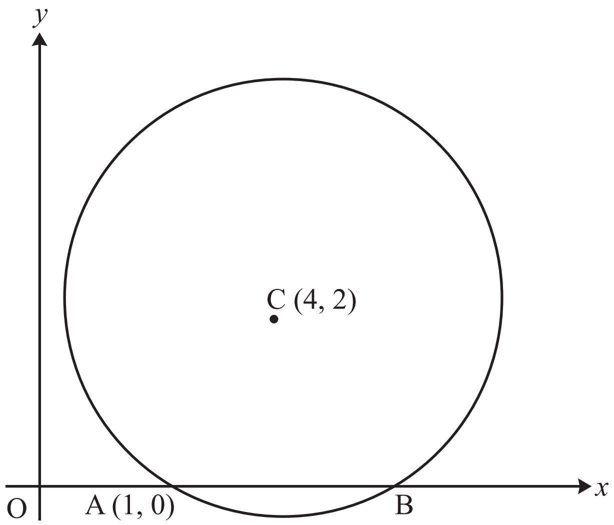

Fig. 10

(i) Write down the coordinates of B. **[1]**

(ii) Find the radius of the circle and hence write down the equation of the circle. **[4]**

(iii) AD is a diameter of the circle. Find the coordinates of D. **[2]**

(iv) Find the equation of the tangent to the circle at D. Give your answer in the form $y = ax + b$. **[4]**

3 The circle $(x-3)^2 + (y-2)^2 = 20$ has centre C.

(i) Write down the radius of the circle and the coordinates of C. **[2]**

(ii) Find the coordinates of the intersections of the circle with the x- and y-axes. **[5]**

(iii) Show that the points $A(1,6)$ and $B(7,4)$ lie on the circle. Find the coordinates of the midpoint of AB. Find also the distance of the chord AB from the centre of the circle. **[5]**

4 A circle has diameter d, circumference C, and area A. Starting with the standard formulae for a circle, show that $Cd = kA$, finding the numerical value of k. **[3]**

5 A circle has equation $(x - 2)^2 + y^2 = 20$.

(i) Write down the radius of the circle and the coordinates of its centre. **[2]**

(ii) Find the points of intersection of the circle with the y-axis and sketch the circle. **[3]**

(iii) Show that, where the line $y = 2x + k$ intersects the circle,

$$5x^2 + (4k - 4)x + k^2 - 16 = 0.$$ **[3]**

(iv) Hence find the values of k for which the line $y = 2x + k$ is a tangent to the circle. **[4]**