CIRCLES

1 Find the equation of each of the following circles.

(a) centre $(3,2)$, radius 4 units **(b)** centre $(-1,-4)$, radius 3 units **(c)** centre $(3,-3)$, radius $\sqrt{5}$ units

(d) centre $\left(-2,\frac{5}{2}\right)$, radius $\frac{7}{2}$ units **(e)** centre $\left(0,-\frac{3}{2}\right)$, radius 4 units **(f)** centre $(4,0)$, radius 3 units

2 The equation of the circle with centre $(-4,4)$ and radius 6 units is:

A $(x-4)^2+(y-4)^2=36$ **B** $(x+4)^2+(y-4)^2=36$ **C** $(x-4)^2+(y+4)^2=36$ **D** $x^2+y^2=36$

3 Find the equation for each of the following circles.

(a) centre $(3,2)$ and passing through the point $(5,-5)$

(b) centre $(-1,4)$ and passing through the origin

(c) centre $(0,0)$ and passing through the point $(-3,4)$

4 Find the coordinates of the centre and the length of the radius for the following circles.

(a) $x^2 + y^2 - 6x + 4y - 3 = 0$

(b) $x^2 + y^2 + 4x + 2y - 4 = 0$

(e) $x^2 + y^2 - 5x + 3y - 1 = 0$

(f) $x^2 + y^2 + 4x + 2y - 5 = 0$

(g) $2x^2 + 2y^2 - 8x + 5y + 3 = 0$

(h) $3x^2 + 3y^2 + 9x - 4y - 24 = 0$

5 Using the fact that the centre of a circle is the midpoint of a diameter, find the equation of the circle with the diameter endpoints given.

(a) $(3,4)$ and $(9,-6)$ **(b)** $(0,0)$ and $(5,-3)$ **(c)** $(5,8)$ and $(-2,3)$

6 For the equation $x^2 + y^2 - 6x + 2y + 10 = 0$, indicate whether each statement is correct or incorrect.

(a) centre $(3,-1)$, radius $= 1$ **(b)** centre $(-3,1)$, radius $= 0$

(c) centre $(3,-1)$, radius $= 2\sqrt{5}$ **(d)** centre $(3,-1)$, radius $= 0$

12 Find the equation of the circle that touches the x-axis at $(4, 0)$ and the y-axis at $(0, 4)$.

13 Show that the point $(4, -3)$ is not on the circle $x^2 + y^2 - 5x + 3y + 2 = 0$. Determine whether the point is inside or outside the circle.

14 Determine whether the origin is inside or outside the circle $x^2 + y^2 - 4x - y + 1 = 0$.

15 **(a)** Find the equation of a circle with a radius of 5 units and its centre at the point $(-1, 2)$.
(b) What is the length of the intercept cut off by this circle on the x-axis?
(c) Find the length of the tangent to this circle from the point $(4, 6)$.

16 The equation of a circle is $x^2 + y^2 + 4x - 2y - 20 = 0$. Find:

(a) the length of the tangent to this circle from the point $(5, 2)$

(b) the length of the intercept on the y-axis.

18 The coordinates of two points A and B are $(-1, 3)$ and $(5, 7)$. Find:

(a) the coordinates of the midpoint of AB

(b) the equation of the circle of which AB is a diameter

(c) the coordinates of the intersection points of the circle with the y-axis.

19 **(a)** Find the coordinates of the centre and the length of the radius for the circle $x^2 + y^2 - 4x - 8y - 5 = 0$.
(b) The point $(3, 2)$ is the midpoint of a chord of this circle. Find the distance of the chord from the centre and the length of the chord.