

1 Find the equations of the circles specified as follows:

(a) Centre (1,-4), radius 3.

(b) Centre (-1,5) and passing through the point (5,13)

(c) Passing through the points P(3,13) and Q(-2,1) and having PQ as diameter.

2 State the centre and radius of each circle below:

(a) $x^2 + y^2 = 81$ (b) $x^2 + y^2 + 8x - 10y - 5 = 0$ (c) $2x^2 + 2y^2 - 4x + 3y = -\frac{1}{2}$

3 Show that $y = -2x + 10$ is a tangent to the circle $x^2 + y^2 + 20y + 20 = 0$.

4 Verify that the point P(3,4) lies on the circumference of the circle $x^2 + y^2 + 2x - 4y - 15 = 0$.

Find the equation of the tangent to the circle at P.

5 Find the equation of the circle through the points A(2,3), B(3,2) and C(2, -1).

6 Find possible values of k for which the line $x + y = k$ is a tangent to the circle $x^2 + y^2 = 2$.

Find the coordinates of the point of contact.

7 A symmetrical logo design is based on two circles. Relative to the axes shown, the equation of the larger circle is

$$x^2 + y^2 - 20x - 24y + 195 = 0.$$

Find the equation of the smaller circle.

