Topical Revision Paper 10

Term 3 Unit 10: Points, Lines and Shapes

Question 1:

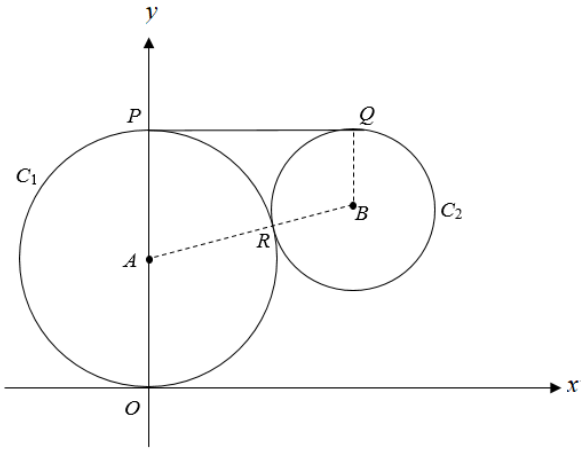
The equation of a circle C_1 is $x^2 + y^2 + 20x - 4y + 100 = 0$. Find

(i) the radius and the coordinates of the centre of the circle, [2]

(ii) the value(s) of k if the circle touches the line $y = k$. [2]

(iii) the equation of the another circle, C_2 that has the same centre as C_1, and passes through the point $(-11, 2)$. [2]

Question 2:



The diagram shows two circles C_1 and C_2 centred at A and B respectively. C_1 passes through O and P and touches C_2 at R. Q is on C_2 such that QB is parallel to the y-axis. The length of PQ is 12 units and PQ is a tangent to both circles.

Given that the equation of C_1 is $x^2 + y^2 - 18y = 0$, find

(i) the centre and radius of C_1, [3]

(ii) the equation of C_2, [4]

(iii) the equation of the perpendicular bisector of *AB*. [4]

Question 3:

The equation of a circle, *C*, is given by $x^2 + y^2 - 4x - 10y + m = 0$ where *m* is a constant.

A line $y = 2x - 4$ is a tangent to the circle.

(i) Write down the coordinates of the centre, *O*, of the circle. [1]

(ii) Find the radius of the circle and the value of *m*. [5]

(iii) The circle, *C*, is reflected in the line $y = 2x - 4$. Find the equation of the reflected circle. [3]

Question 4:

(i) The equation of a circle is given by $x^2 + y^2 - 10x + 2y + 1 = 0$.
Find the centre and the radius of the circle. [2]

(ii) The tangent to the circle at a point *A* is parallel to the straight line $x - y + 2 = 0$.
Find the equation of the diameter of the circle through *A*. [2]

(iii) The circle is then reflected about the *y*-axis.
State the equation of the new circle formed. [1]