



Maths
Leaving Certificate
Ordinary Level

Past Exam Questions
Marking Scheme on
The Circle

Q4 2013 Project Maths Paper Two Ordinary Level Section A

Question 4

(25 marks)

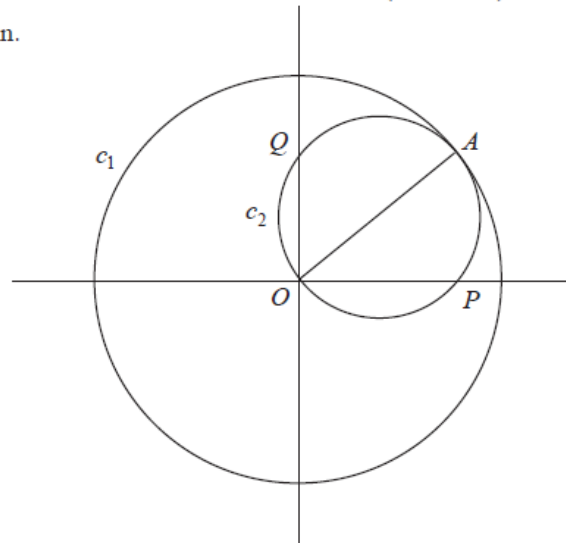
The point A has co-ordinates $(8, 6)$ and O is the origin.

The diagram shows two circles c_1 and c_2 .

c_1 has centre $(0, 0)$ and radius $|OA|$.

c_2 has a diameter of $[OA]$.

- (a) Find the equation of c_1 .



$$|OA| = \sqrt{(8-0)^2 + (6-0)^2}$$

$$= \sqrt{64 + 36} = \sqrt{100} = 10$$

$$x^2 + y^2 = 10^2 = 100$$

- (b) Find the equation of c_2 .

$$\left(\frac{8+0}{2}, \frac{6+0}{2}\right) = (4, 3)$$

$$(x-4)^2 + (y-3)^2 = 5^2 = 25$$

- (c) The circle c_2 cuts the x -axis at the point P . Find the co-ordinates of P .

$$(x-4)^2 + (y-3)^2 = 25$$

$$y = 0 \Rightarrow (x-4)^2 + (0-3)^2 = 25 \Rightarrow (x-4)^2 = 25 - 9 = 16$$

$$\Rightarrow x-4 = \pm 4 \Rightarrow x = 8 \text{ or } x = 0$$

Co-ordinates of P : $(8, 0)$

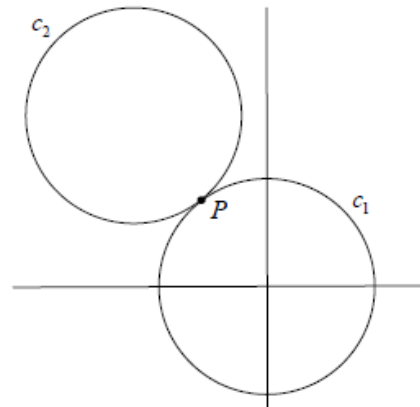
Q4 2012 Project Maths Paper Two Ordinary Level Section A

Question 4

(25 marks)

The diagram shows two circles c_1 and c_2 of equal radius.

c_1 has centre $(0, 0)$ and it cuts the x -axis at $(5, 0)$.



- (a) Find the equation of c_1 .

$$x^2 + y^2 = 5^2 = 25$$

- (b) Show that the point $P(-3, 4)$ is on c_1 .

$$x^2 + y^2 = (-3)^2 + 4^2 = 9 + 16 = 25 = r^2$$

- (c) The two circles touch at $P(-3, 4)$.
 P is on the line joining the two centres.
 Find the equation of c_2 .

$$(0, 0) \rightarrow (-3, 4) \text{ maps } (-3, 4) \rightarrow (-6, 8)$$

$$c_2 : (x + 6)^2 + (y - 8)^2 = 25$$

- (d) Find the equation of the common tangent at P .

$$\text{Slope of line of centres: } \frac{8 - 0}{-6 - 0} = -\frac{4}{3}$$

$$\text{Perpendicular slope, the slope of the tangent: } \frac{3}{4}$$

$$\text{Equation of tangent: } y - 4 = \frac{3}{4}(x + 3) \Rightarrow 3x - 4y + 25 = 0$$