CIRCLE (Q 1, PAPER 2)

2011

1. **(a)** The following parametric equations define a circle:
$$x = 2 + 3\sin\theta, \ y = 3\cos\theta \ \text{ where } \theta \in \mathbb{R}.$$
What is the Cartesian equation of the circle?

   (b) Find the equation of the circle that passes through the points $(0, 3)$, $(2, 1)$ and $(6, 5)$.

   (c) The circle c_1: $x^2 + y^2 - 8x + 2y - 23 = 0$ has centre A and radius r_1.

   The circle c_2: $x^2 + y^2 + 6x + 4y + 3 = 0$ has centre B and radius r_2.

   (i) Show that c_1 and c_2 intersect at two points.

   (ii) Show that the tangents to c_1 at these points of intersection pass through the centre of c_2.

ANSWERS

1 (a) $(x - 2)^2 + y^2 = 9$

(b) $x^2 + y^2 - 6x - 8y + 15 = 0$

(c) (i) $(-2, 1)$, $\left(-\frac{6}{5}, -\frac{23}{5}\right)$