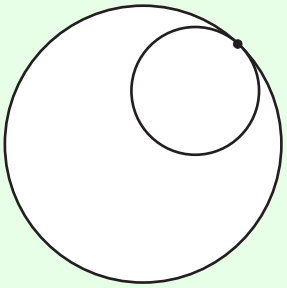
CIRCLE (Q 1, PAPER 2)

2007

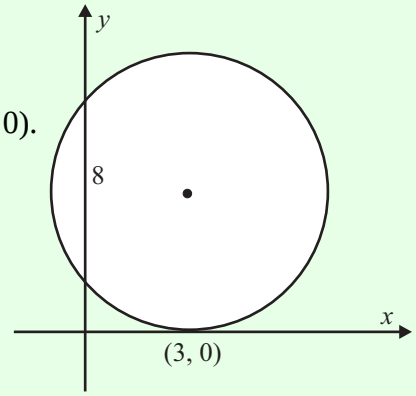
1 (a) The following parametric equations define a circle:
$x = 5 + 7\cos\theta,\ y = 7\sin\theta,$ where $\theta \in \mathbf{R}$.
What is the Cartesian equation of the circle?



(b) $x^2 + y^2 - 4x - 6y + 5 = 0$ and $x^2 + y^2 - 6x - 8y + 23 = 0$ are two circles.
(i) Prove that the circles touch internally.

(ii) Find the coordinates of the point of contact of the two circles.

(c) A circle has its centre in the first quadrant.
The *x*-axis is a tangent to the circle at the point (3, 0).
The circle cuts the *y*-axis at points that are 8 units apart.
Find the equation of the circle.



ANSWERS

1 (a) $(x-5)^2 + y^2 = 49$ or $x^2 + y^2 - 10x - 24 = 0$
(b) (ii) (4, 5)
(c) $(x-3)^2 + (y-5)^2 = 25$ or $x^2 + y^2 - 6y - 10y + 9 = 0$