CIRCLE (Q 1, PAPER 2)

2009

1 (a) Show that, for all values of $t \in \mathbf{R}$, the point $\left(\frac{2t}{1+t^2}, \frac{1-t^2}{1+t^2}\right)$ lies on the circle $x^2 + y^2 = 1$.

(b) (i) Find the equation of the tangent to the circle $x^2 + y^2 = 10$ at the point (3, 1).

(ii) Find the values of $k \in \mathbf{R}$ for which the line $x - y + k = 0$ is a tangent to the circle $(x-3)^2 + (y+4)^2 = 50$.

(c) Two circles intersect at $p(2, 0)$ and $q(-2, 8)$. The distance from the centre of each circle to the common chord $[pq]$ is $\sqrt{20}$.
Find the equations of the two circles.

ANSWERS

1 (b) (i) $3x + y - 10 = 0$ (ii) $k = -17, 3$

(c) $x^2 + y^2 + 8x - 4y - 20 = 0$, $x^2 + y^2 - 8x - 12y + 12 = 0$