97. The circle C has centre A and equation

$$x^2 + y^2 - 4x + 6y + 1 = 0.$$

(a) Find the coordinates of A and the radius of C. [3]

(b) The point R lies on the circle C. The tangent to the circle at R passes through the point $T(8, 2)$. Find the length of RT. [3]

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98. The circle C has centre A and equation

$$x^2 + y^2 + 6x - 10y + 14 = 0.$$

(a) (i) Find the coordinates of A and the radius of C.

(ii) The point P has coordinates $(-6, 2)$. Determine whether P lies inside C, on C or outside C. [5]

(b) The line L has equation

$$y = 2x + 1.$$

(i) Show that L is a tangent to the circle C and find the coordinates of Q, the point of contact of L and C.

(ii) The point R has coordinates $(4, 9)$ and R lies on L. Find $A\hat{R}Q$. [8]

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