89. The circle C has centre A and radius r. The points $P(1, -4)$ and $Q(9, 10)$ are at either end of a diameter of C.

(a) (i) Write down the coordinates of A.

(ii) Show that $r = \sqrt{65}$.

(iii) Write down the equation of C. [4]

(b) Verify that the point $R(4, 11)$ lies on C. [2]

(c) Find $\hat{QPR}$. [3]

June 2008

90. The circle C_1 has centre A and equation

$$x^2 + y^2 + 4x - 2y - 20 = 0.$$

(a) Find the coordinates of A and the radius of C_1. [3]

(b) The line L has equation $y = -x + 6$. Find the coordinates of the points of intersection of L and C_1. [4]

(c) The circle C_2 has centre (10, 6) and radius r. Given that C_1 and C_2 touch externally, find the value of r. [3]

Jan 2009

91. The circle C_1 has centre A and equation

$$x^2 + y^2 - 6x + 2y - 15 = 0.$$

(a) Find the coordinates of A and the radius of C_1. [3]

(b) The point P has coordinates $(7, 2)$ and lies on C_1. Find the equation of the tangent to C_1 at P. [4]

(c) The circle C_2 has centre $B(11, 14)$ and radius 8. A point Q lies on C_1 and a point R lies on C_2. Find the shortest possible length of the line QR. [3]

June 2009

92. The circle C has centre A and equation

$$x^2 + y^2 + 4x - 8y + 10 = 0.$$

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

(b) The line L has equation

$$x - 3y + 4 = 0.$$

Show that L is a tangent to the circle C. [4]

Jan 2010