



Ross High School: Mathematics Department

Higher Mathematics: Homework 10

1. A circle has centre $(-2, 3)$ and passes through $P(1, 6)$.

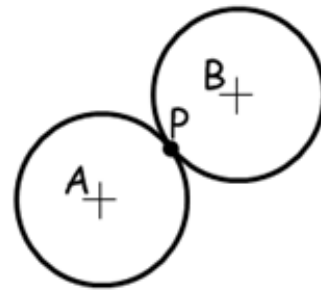
a) Find the equation of the circle. (2)

b) PQ is a diameter of the circle. Find the equation of the tangent to this circle at Q . (4)

2. Two congruent circles, with centres A and B , touch at P . Relative to suitable axes, their equations are:

$$x^2 + y^2 + 6x + 4y - 12 = 0$$

$$x^2 + y^2 - 6x - 12y + 20 = 0$$



a) Find the coordinates of P . (3)

b) Find the length of AB . (2)

3. The line $y + 2x = k$ where $k > 0$ is a tangent to the circle with equation $x^2 + y^2 - 2x - 4 = 0$.

a) Find the value of k .

(7)

b) Deduce the coordinates of the point of contact. (2)

4. Circle P has equation $x^2 + y^2 - 8x - 10y + 9 = 0$.

Circle Q has centre $(-2, -1)$ and radius $2\sqrt{2}$.

a) (i) show that the radius of P is $4\sqrt{2}$. (2)

(ii) hence, show that the circles P and Q touch. (2)

b) Find the equation of the tangent to the circle Q at the point $(-4, 1)$. (3)

c) The tangent in part (b) intersects circle P at two points. Find the x -coordinates of the points of intersection, expressing your answers in the form $a \pm b\sqrt{3}$. (3)