

## Old Past Papers - Circles

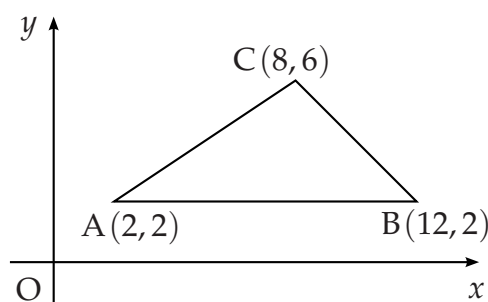
[SQA] 1. Triangle ABC has vertices  $A(2,2)$ ,  $B(12,2)$  and  $C(8,6)$ .

(a) Write down the equation of  $l_1$ , the perpendicular bisector of AB.

(b) Find the equation of  $l_2$ , the perpendicular bisector of AC.

(c) Find the point of intersection of lines  $l_1$  and  $l_2$ .

(d) Hence find the equation of the circle passing through A, B and C.



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[SQA] 2. (a) Find the equation of AB, the perpendicular bisector of the line joining the points  $P(-3,1)$  and  $Q(1,9)$ .

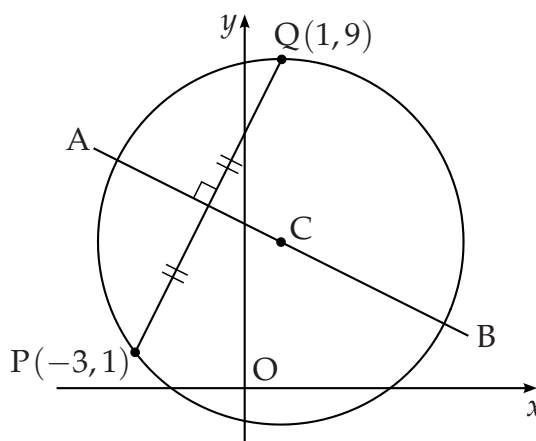
(b) C is the centre of a circle passing through P and Q. Given that QC is parallel to the y-axis, determine the equation of the circle.

(c) The tangents at P and Q intersect at T.

Write down

(i) the equation of the tangent at Q

(ii) the coordinates of T.



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[SQA] 3. 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 circle P is  $4\sqrt{2}$ .

(ii) Hence show that circles P and Q touch.

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

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

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- [SQA] 4. The point  $P(2, 3)$  lies on the circle  $(x + 1)^2 + (y - 1)^2 = 13$ . Find the equation of the tangent at  $P$ . 4
- [SQA] 5. For what range of values of  $k$  does the equation  $x^2 + y^2 + 4kx - 2ky - k - 2 = 0$  represent a circle? 5

[END OF QUESTIONS]