3.1 Circles

Question Paper

Course	Edexcel IAL Maths: Pure 2
Section	3. Coordinate Geometry
Topic	3.1 Circles
Difficulty	Easy

Time allowed: 40

Score: /30

Percentage: /100

Question 1

Write down the equations of the circles with the following centres and radii
    (i)   Centre: $(0,0)$ Radius: $r = 4$,
    (ii)   Centre: $(3,-4)$ Radius: $r = 2$,
    (iii)   Centre: $(-5,0)$ Radius: $r = 5$.

[3 marks]

Question 2

Write down the centre and the radius for each of the following circles
    (i) $x^2 + y^2 = 5^2$,
    (ii) $(x + 3)^2 + (y - 2)^2 = 49$,
    (iii) $x^2 + (y + 4)^2 = 144$.

[3 marks]

Question 3

On separate diagrams sketch the circles with the following equations
    (i) $x^2 + y^2 = 9$
    (ii) $(x - 4)^2 + (y - 3)^2 = 4^2$

[4 marks]

Question 4

(a) (i) Complete the square of $x^2 + 4x$.
   (ii) Complete the square of $y^2 - 6y$.

[2 marks]

Question 4

(b) (i) Use your answers to part (a) to show that the equation
   $x^2 + y^2 + 4x - 6y + 4 = 0$ can be written in the form $(x + 2)^2 + (y - 3)^2 = 9$.
   (ii) Hence, write down the centre and the radius of the circle with equation
   $x^2 + y^2 + 4x - 6y + 4 = 0$.

[4 marks]

Question 5

The line segment connecting the two points $(1,0)$ and $(9,4)$ is the diameter of a circle. Find the centre and radius of the circle.

[4 marks]

Question 6

Determine if the circles with equations

$$(x+4)^2 + y^2 = 9 \quad \text{and} \quad (x-2)^2 + y^2 = 9$$

intersect once, twice or not at all. Fully explain your answer.

[3 marks]

Question 7

On the same sketch show how a circle and a line can either have 0, 1 or 2 intersections.

[2 marks]

Question 8

The line with equation $y = x - 1$ intersects the circle with equation $(x - 5)^2 + (y - 4)^2 = 18$ at two distinct points.

Find the coordinates of the two points of intersection.

[5 marks]