3.1 Circles

Question Paper

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

Time allowed: 50

Score: /43

Percentage: /100

Question 1

A circle has centre $(6, -5)$ and goes through the point $(1, 7)$. Find the equation of the circle.

[4 marks]

Question 2

(a) Show that $x^2 + y^2 + 2x - 6y + 9 = 0$ can be written in the form $(x - a)^2 + (y - b)^2 = r^2$, where a, b and r are integers to be found.

[2 marks]

Question 2

(b) Hence write down the centre and radius of the circle with equation $x^2 + y^2 + 2x - 6y + 9 = 0$.

[2 marks]

Question 3

The line $x + y = -7$ meets the circle with equation $(x - 1)^2 + (y - 2)^2 = 50$.

(i) Show that the line and circle meet at one point only.

(ii) Find the coordinates of the point of intersection.

[4 marks]

Question 4

The line $7x + y = -6$ intersects the circle $(x - 2)^2 + (y - 5)^2 = 25$ at the points A and B. Find the coordinates of A and B.

[4 marks]

Question 5

A circle C has centre $(-4, 1)$ and passes through the point $P(0, 3)$.

(a) Find an equation for the circle C.

[4 marks]

Question 5

(b) Find an equation for the tangent to the circle at P.

[3 marks]

Question 6

The points $A(3, 5)$, $B(5, 3)$ and $C(9, 7)$ lie on a circle.

(a) Show that triangle ABC is a right-angle triangle.

[2 marks]

Question 6

(b) Explain why the line segment AC must be the diameter of the circle.

[1 mark]

Question 6

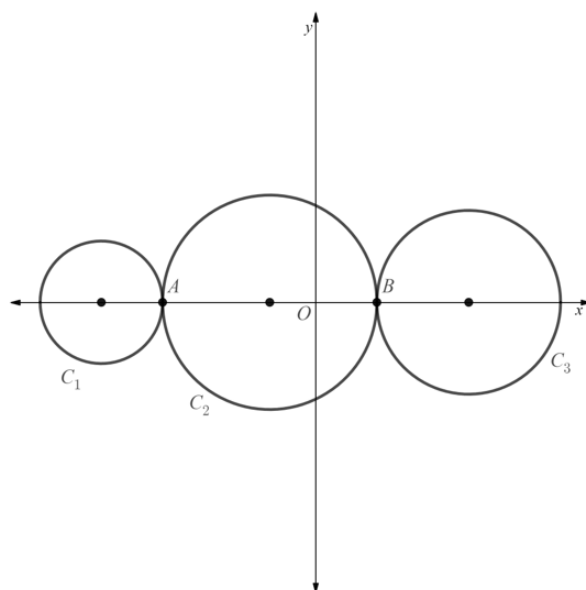(c) Hence find the equation of the circle.

[4 marks]

Question 7

Circles C_1, C_2 and C_3 all have their centres on the x-axis.

Circle C_1 has equation $(x + 7)^2 + y^2 = 4$.

Circle C_3 has equation $x^2 + y^2 - 10x + 16 = 0$.

Circles C_1 and C_2 touch at point A, and circles C_2 and C_3 touch at point B.
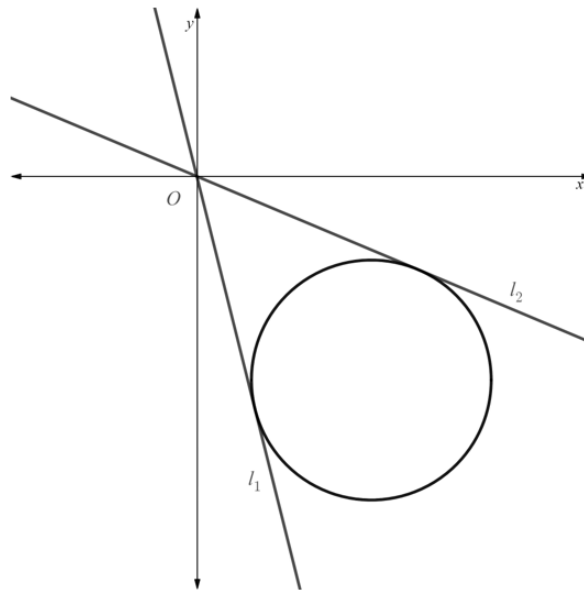

Find the coordinates of the centre of circle C_2.

[6 marks]

Question 8

A circle has equation $x^2 + y^2 - 12x + 14y = -68$.

The lines l_1 and l_2 are both tangents to the circle, and they intersect at the origin.

(a) Explain why the equations for l_1 and l_2 must each be in the form $y = mx$, where m is the gradient of the line.

[1 mark]

Question 8

(b) Show that the gradients of l_1 and l_2 must be the solutions to the equation

$$19m^2 + 84m + 32 = 0$$

[4 marks]

Question 8

(c) Hence find the equations of l_1 and l_2, giving your answers in the form $y = mx$.

[2 marks]