# 2.2 Circles

## Question Paper

| | |
|---|---|
| Course | CIE AS Maths |
| Section | 2. Coordinate Geometry |
| Topic | 2.2 Circles |
| Difficulty | Very Hard |

**Time allowed:** 70

**Score:** /54

**Percentage:** /100

**Question 1**

The points $A(2, -21)$ and $B(-5, 3)$ are the two endpoints of the diameter $AB$ of a circle. Find the equation of the circle in the form $ax^2 + ay^2 + bx + cy + d = 0$, where $a$, $b$, $c$ and $d$ are integers to be found.

**[6 marks]**

**Question 2**

Find the centre and radius of the circle with equation $x^2 + y^2 + x - 3y + 2 = 0$

**[4 marks]**

**Question 3**

The line $x + y = c$ intersects the circle $x^2 + y^2 - 6x + 10y - 16 = 0$ at exactly two points. Find the range of possible values of $c$.

**[7 marks]**

**Question 4**

The points $A(-2, 3)$, $B(0, 6)$ and $C(k, -1)$ lie on a circle, where $BC$ is the diameter of the circle.

Find the value of $k$.

**[4 marks]**

**Question 5**

A circle $C$ has equation $x^2 + y^2 - 10x - 4y + 19 = 0$. Point $P$ lies on the circle, and the tangent to the circle at point $P$ has a gradient of $-3$. Find the two possible sets of coordinates for point $P$.

**[7 marks]**

**Question 6**

The points $A(4, 6)$, $B(7, 2)$ and $C(12, 12)$ lie on a circle.

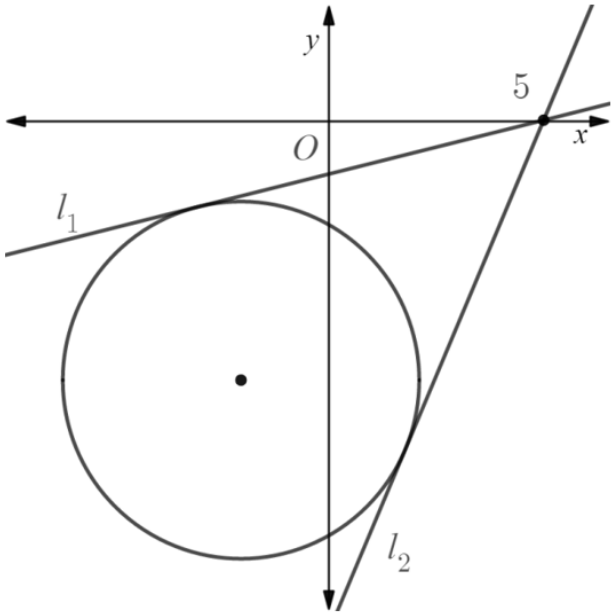
Find the equation of the circle

**[7 marks]**

**Question 7**

A circle has equation $x^2 + y^2 + 4x + 12y = -23$.

The lines $l_1$ and $l_2$ are both tangents to the circle, and they intersect at the point $(5, 0)$.

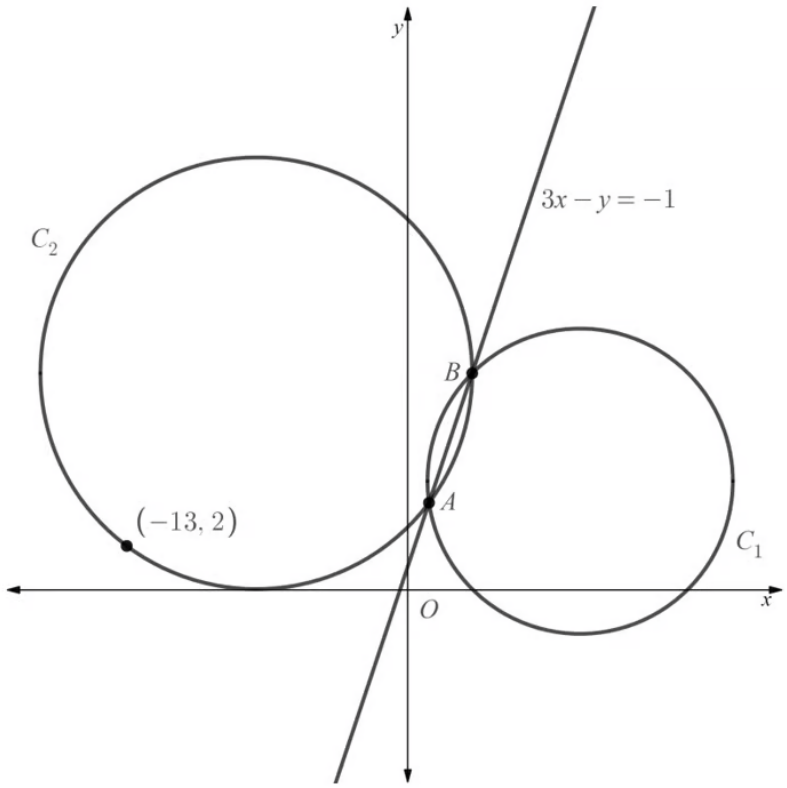



Find the equations of $l_1$ and $l_2$, giving your answers in the form $y = mx + c$.

**[8 marks]**

## Question 8

The diagram below shows circles $C_1$ and $C_2$ which intersect at the two points $A$ and $B$. Circle $C_1$ has equation $x^2 + y^2 - 16x - 10y + 39 = 0$, and points $A$ and $B$ lie along the line with equation $3x - y = -1$. Circle $C_2$ also passes through the point $(-13, 2)$.




Find an equation of circle $C_2$.

[11 marks]