



IGCSE · Cambridge (CIE) · Further Maths

🕒 41 mins ❓ 6 questions

Exam Questions

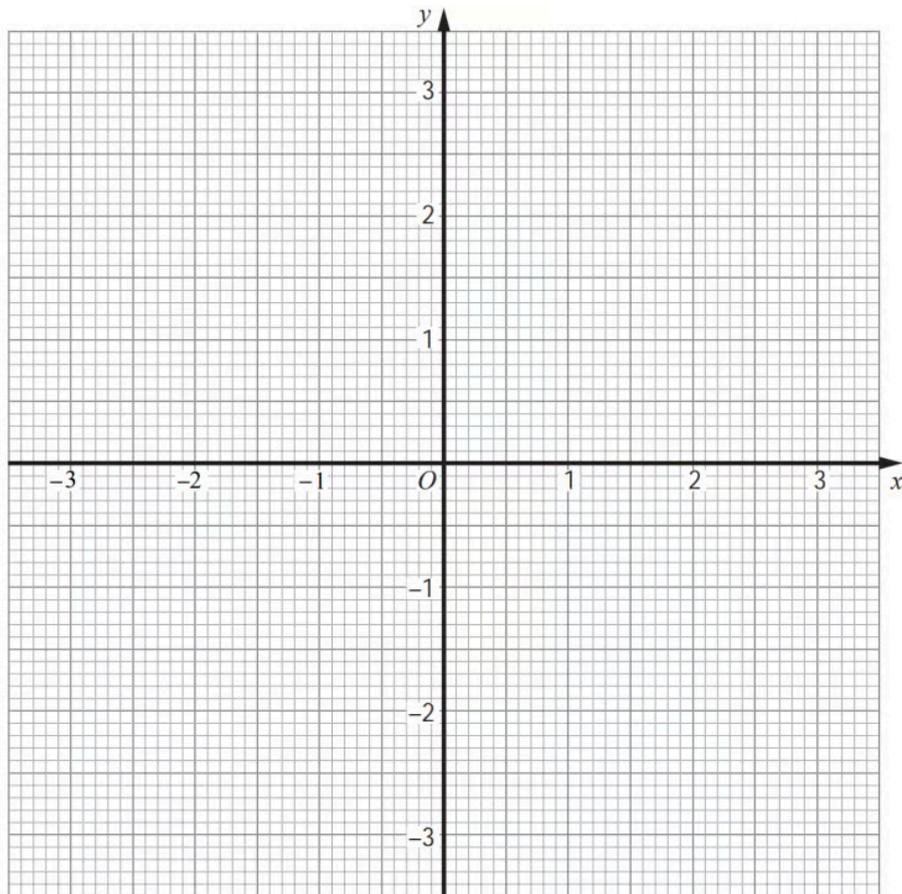
Coordinate Geometry of the Circle

Equation of a Circle / Tangents to Circles / Intersection of Two Circles

Medium (2 questions)	/10
Hard (3 questions)	/23
Very Hard (1 question)	/8
Total Marks	/41

Medium Questions

1 (a) Construct the graph of $x^2 + y^2 = 9$

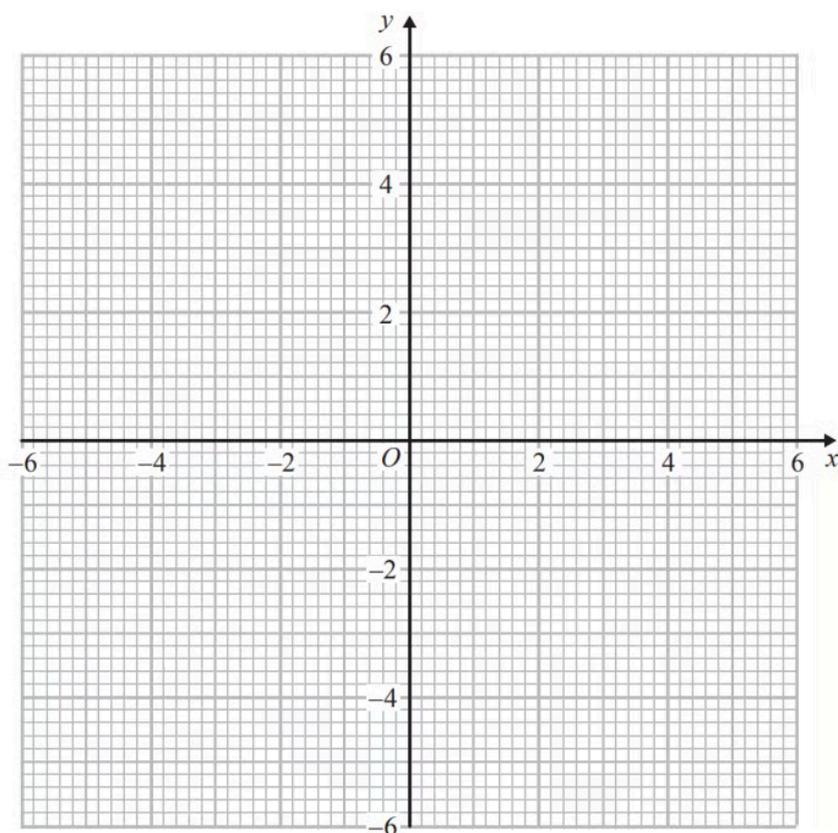


(2 marks)

(b) By drawing the line $x + y = 1$ on the grid, solve the equations $x^2 + y^2 = 9$
 $x + y = 1$

(3 marks)

2 (a) On the grid, construct the graph of $x^2 + y^2 = 16$



(2 marks)

(b) Find estimates for the solutions of the simultaneous equations

$$\begin{aligned}x^2 + y^2 &= 16 \\ y &= 2x + 1\end{aligned}$$

(3 marks)

Hard Questions

1 (a) Solutions to this question by accurate drawing will not be accepted. A circle has equation $x^2 + y^2 - 16x - 10y + 73 = 0$.

(i) Find the coordinates of the centre of the circle and the length of the radius.

(ii) Hence show that the point $(10, 6.5)$ lies inside the circle.

(5 marks)

(b) A different circle has equation $(x - 10)^2 + (y - 6.5)^2 = 2.25$.

Show that the two circles touch. You are not required to find the coordinates of the common point.

(1 mark)

2 (a) The circle C_1 has a centre at $(3, 4)$ and a radius of 3.

Write down the equation of C_1 .

(1 mark)

(b) The circle C_2 has the equation

$$x^2 + y^2 - 12x - 16y + 100 - k^2 = 0$$

where $k > 0$.

Given that C_2 is tangent to C_1 , find the value of k in each of the following cases:

(i) The circles touch each other once and neither circle lies inside the other.

(ii) The circles touch each other once and C_1 lies inside C_2 .

(7 marks)

(c) A different circle, C_3 , intersects C_1 at two distinct points, one of which has the coordinates $(w, 7)$.

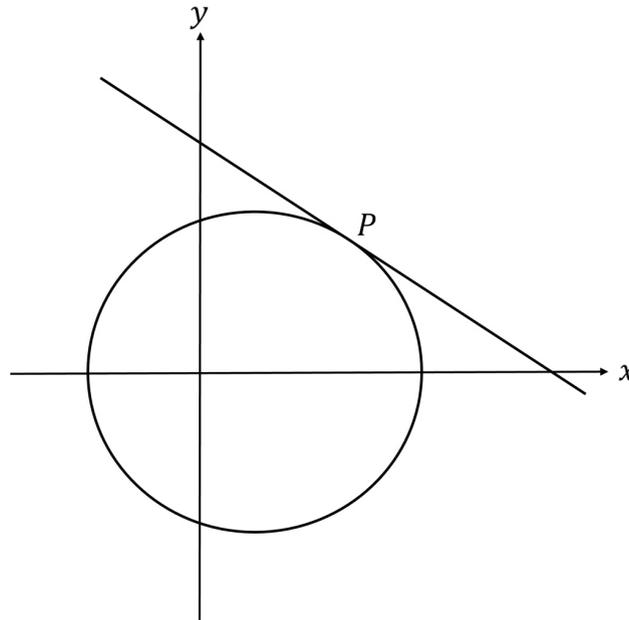
The equation of the common chord to C_1 and C_3 is $x + y = 10$.

Find w .

(1 mark)

3 (a) The point $P(8, 8)$ lies on the circle $(x - 2)^2 + y^2 = 100$ with centre C .

The circle and the tangent to the circle at P are shown below.



Find the equation of the tangent to the circle at P , giving your answer in the form $y = mx + c$.

(4 marks)

(b) The tangent intersects the y -axis at the point Q .

Find the area of triangle PCQ .

(4 marks)

Very Hard Questions

- 1 A circle has a centre $(2, -4)$ and radius 3.

The line $y = 2x - 3$ intersects the circle at points A and B . The perpendicular bisector of line AB intersects the circle at points X and Y .

Find the area of kite $AXBY$.

(8 marks)