

CIE AS PURE MATHEMATICS(P1) TOPIC WISE QUESTIONS PAPERS
COORDINATE GEOMETRY

1. The equation of a circle is $x^2 + y^2 - 4x + 6y - 77 = 0$.
- (a) Find the x -coordinates of the points A and B where the circle intersects the x -axis. [2]
- (b) Find the point of intersection of the tangents to the circle at A and B . [6]

June2021/V1/Q10

2. Points A and B have coordinates $(8, 3)$ and (p, q) respectively. The equation of the perpendicular bisector of AB is $y = -2x + 4$.
- Find the values of p and q . [4]

June2021/V2/Q6

3. The point A has coordinates $(1, 5)$ and the line l has gradient $-\frac{2}{3}$ and passes through A . A circle has centre $(5, 11)$ and radius $\sqrt{52}$.
- (a) Show that l is the tangent to the circle at A . [2]
- (b) Find the equation of the other circle of radius $\sqrt{52}$ for which l is also the tangent at A . [3]

June2021/V2/Q7

4. Points $A(-2, 3)$, $B(3, 0)$ and $C(6, 5)$ lie on the circumference of a circle with centre D .
- (a) Show that angle $ABC = 90^\circ$. [2]
- (b) Hence state the coordinates of D . [1]
- (c) Find an equation of the circle. [2]

June2021/V3/Q10

5. The equation of a circle is $x^2 + y^2 + 6x - 2y - 26 = 0$.
- (a) Find the coordinates of the centre of the circle and the radius. Hence find the coordinates of the lowest point on the circle. [4]
- (b) Find the set of values of the constant k for which the line with equation $y = kx - 5$ intersects the circle at two distinct points. [6]

June2022/V1/Q9

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6. The line with equation $y = kx - k$, where k is a positive constant, is a tangent to the curve with equation $y = -\frac{1}{2x}$.

Find, in either order, the value of k and the coordinates of the point where the tangent meets the curve.
[5]

June2023/V1/Q5

7. A circle has equation $(x - 1)^2 + (y + 4)^2 = 40$. A line with equation $y = x - 9$ intersects the circle at points A and B .

(a) Find the coordinates of the two points of intersection. [4]

(b) Find an equation of the circle with diameter AB . [3]

June2023/V3/Q5

8. The equation of a circle is $(x - 3)^2 + y^2 = 18$. The line with equation $y = mx + c$ passes through the point $(0, -9)$ and is a tangent to the circle.

Find the two possible values of m and, for each value of m , find the coordinates of the point at which the tangent touches the circle. [8]

June2024/V1/Q10

9. The equation of a circle is $(x - 6)^2 + (y + a)^2 = 18$. The line with equation $y = 2a - x$ is a tangent to the circle.

(a) Find the two possible values of the constant a . [5]

(b) For the greater value of a , find the equation of the diameter which is perpendicular to the given tangent. [3]

June2024/V2/Q7

10. A circle with equation $x^2 + y^2 - 6x + 2y - 15 = 0$ meets the y -axis at the points A and B . The tangents to the circle at A and B meet at the point P .

Find the coordinates of P . [8]

June2024/V3/Q8