

LC 2015 (SET B): PAPER 2

QUESTION 4 (25 MARKS)

Question 4 (a)

Call A the centre of circle s_1 .

$$(x-1)^2 + (y+6)^2 = 360$$

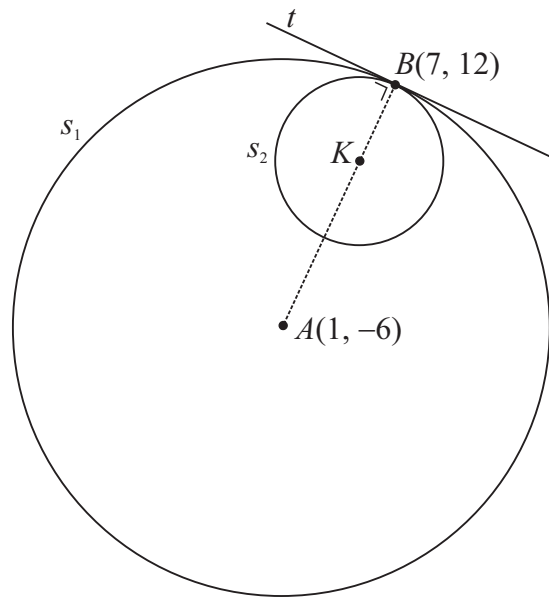
Centre $A(1, -6)$

$$\text{Radius } r_1 = \sqrt{360} = 6\sqrt{10}$$

MARKING SCHEME NOTES

Question 4 (a) [Scale 5B (0, 2, 5)]

2: • Centre or radius

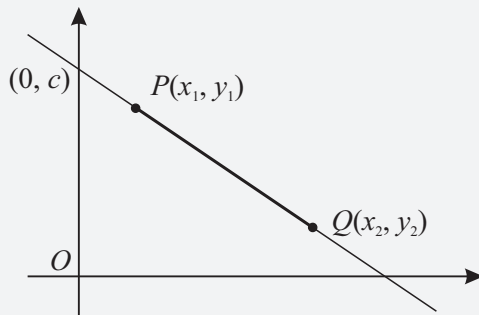


Question 4 (b) (i)

FORMULAE AND TABLES BOOK

Co-ordinate geometry: Line [page 18]

Point dividing $[PQ]$ in the ratio $a:b$



$$\left(\frac{bx_1 + ax_2}{b+a}, \frac{by_1 + ay_2}{b+a} \right)$$

FORMULAE AND TABLES BOOK

Co-ordinate geometry: Circle [page 19]

Given centre (h, k) and radius r

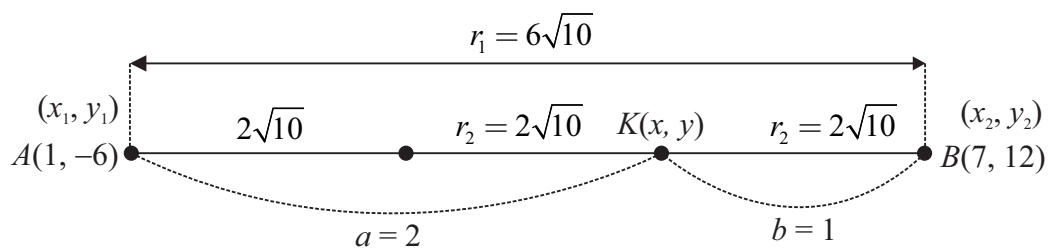
$$(x-h)^2 + (y-k)^2 = r^2$$

Given equation

$$x^2 + y^2 + 2gx + 2fy + c = 0$$

Centre $(-g, -f)$

Radius $\sqrt{g^2 + f^2 - c}$



$$K(x, y) = \left(\frac{1(1) + 2(7)}{1+2}, \frac{1(-6) + 2(12)}{1+2} \right) = K(5, 6)$$

MARKING SCHEME NOTES

Question 4 (b) (i) [Scale 5D (0, 2, 4, 5)]

- 2: • Formula for ratio with some correct substitution
 • Effort at setting up translation
- 4: • Substitution into ratio formula fully correct
 • One ordinate only found
 • Correct answer without supporting work

Question 4 (b) (ii)

Centre $K(5, 6) = (h, k)$, $r_2 = 2\sqrt{10}$

Equation of s_2 : $(x-5)^2 + (y-6)^2 = (2\sqrt{10})^2$

$$(x-5)^2 + (y-6)^2 = 40$$

MARKING SCHEME NOTES

Question 4 (b) (ii) [Scale 10C (0, 4, 8, 10)]

- 4: • Identifies centre
• Identifies radius
- 8: • Equation of circle formed but error in substitution

Question 4 (c)

Call t the equation of the common tangent.

Line AB is perpendicular to t .

Finding the slope from the equation of a line:

$$l: ax + by + c = 0$$

$$m = -\frac{a}{b} \Rightarrow m_{\perp} = \frac{b}{a}$$

$$\text{Slope of } AB: m = \frac{12 - (-6)}{7 - 1} = 3$$

$$\text{Slope of } t: m_{\perp} = -\frac{1}{3}$$

$$\text{Equation of } t: B(7, 12) = (x_1, y_1), m = -\frac{1}{3}$$

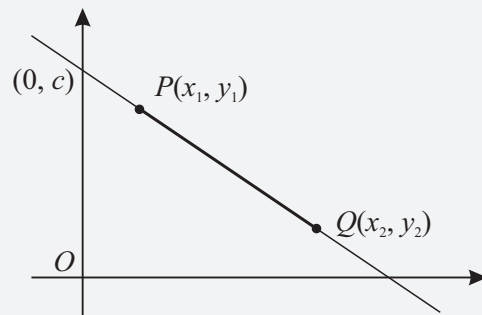
$$y - 12 = -\frac{1}{3}(x - 7)$$

$$3(y - 12) = -1(x - 7)$$

$$3y - 36 = -x + 7$$

$$x + 3y - 43 = 0$$

FORMULAE AND TABLES BOOK
Co-ordinate geometry: Line



Slope of PQ [page 18]

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Equation of PQ [page 18]

$$y - y_1 = m(x - x_1)$$

MARKING SCHEME NOTES

Question 4 (c) [Scale 5C (0, 2, 4, 5)]

- 2: • Slope AB or slope of tangent
• Some correct substitution into relevant formula
- 4: • Equation of line fully substituted