

SAMPLE PAPER 5: PAPER 2

QUESTION 5 (25 MARKS)

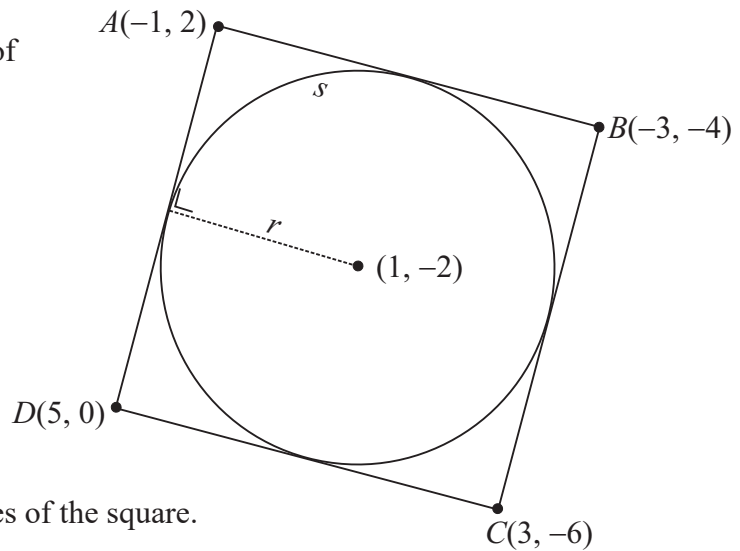
Question 5 (a)

The centre of the circle is the midpoint of the diagonals $[AC]$ or $[BD]$.

$$\text{Midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$A(-1, 2), C(3, -6)$$

$$\text{Midpoint} = \left(\frac{-1+3}{2}, \frac{2-6}{2} \right) = (1, -2)$$



Question 5 (b)

The radius r is half the length of the sides of the square.

$$A(-1, 2), B(-3, -4)$$

$$\begin{aligned} r &= \frac{1}{2}|AB| = \frac{1}{2}\sqrt{(-3-(-1))^2 + (-4-2)^2} \\ &= \frac{1}{2}\sqrt{(-2)^2 + (-6)^2} \\ &= \frac{1}{2}\sqrt{4+36} \\ &= \frac{1}{2}\sqrt{40} = \frac{1}{2}\sqrt{4 \times 10} \\ &= \sqrt{10} \end{aligned}$$

$$|PQ| = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\text{Equation of } s: \text{Centre}(1, -2), r = \sqrt{10}$$

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

$$(x - 1)^2 + (y - (-2))^2 = (\sqrt{10})^2$$

$$(x - 1)^2 + (y + 2)^2 = 10$$

Question 5 (c)

$$(x + 4)^2 + y^2 = 10 \Rightarrow \text{Centre}(-4, 0)$$

$$\therefore (1, -2) \rightarrow (-4, 0) \text{ [Subtract 5, Add 2]}$$

$$(p, q) \rightarrow (6, 5)$$

$$\therefore p - 5 = 6 \Rightarrow p = 11$$

$$\therefore q + 2 = 5 \Rightarrow q = 3$$