

LC 2015 (SET B): PAPER 1

QUESTION 5 (25 MARKS)

Question 5 (a)

$$A(1, k) \in g(x) = x + 3$$

$$\therefore g(1) = k$$

$$g(1) = (1) + 3 = 4 = k$$

$$\therefore A(1, k) = A(1, 4)$$

$$f(x) = 5x - x^2 \quad \leftarrow \text{Put } f(x) = g(x).$$

$$g(x) = x + 3$$

$$f(x) = g(x) \Rightarrow 5x - x^2 = x + 3 \quad \leftarrow \text{Bring all terms to the left-hand side.}$$

$$-x^2 + 4x - 3 = 0 \quad \leftarrow \text{Multiply each term by } -1.$$

$$x^2 - 4x + 3 = 0 \quad \leftarrow \text{Factorise the quadratic.}$$

$$(x-1)(x-3) = 0 \quad \leftarrow \text{Put each bracket equal to zero and solve for } x.$$

$$\therefore x = 1, 3$$

$$g(1) = 1 + 3 = 4 \Rightarrow A(1, 4)$$

$$g(3) = 3 + 3 = 6 \Rightarrow B(3, 6)$$

MARKING SCHEME NOTES

Question 5 (a) [Scale 15C (0, 3, 10, 15)]

- 3: • $g(x) = f(x)$
 • Any work towards a graphical solution
 • Finds A and stops
 • Finds A and B without work

- 10: • Solve for x values
 • Show points on the graph
 • Not more than one error working out points algebraically

Question 5 (b) (i)

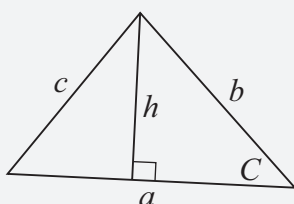
Plot the points $O(0, 0)$, $A(1, 4)$, $B(3, 6)$ and $C(5, 0)$.

Join these 4 points with straight lines to form a **quadrilateral**.

Question 5 (b) (ii)

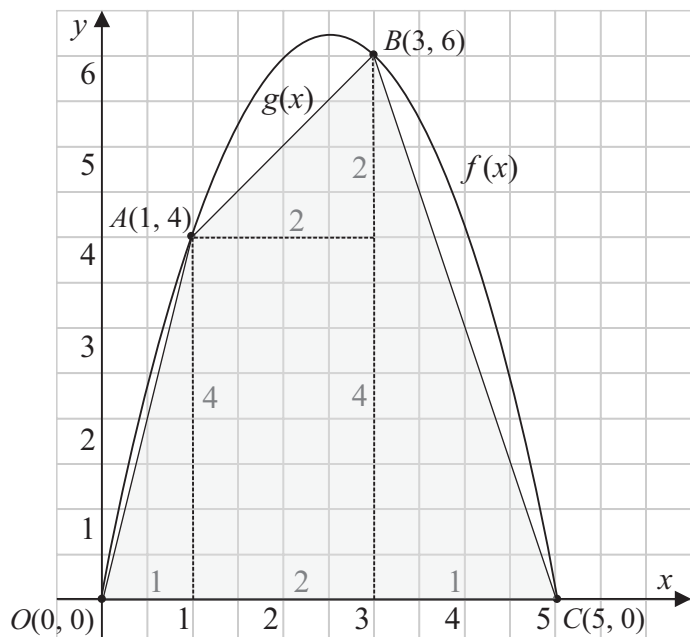
FORMULAE AND TABLES BOOK: Length and area (page 8)

TRIANGLE



$$A = \frac{1}{2} ah$$

$$A = \frac{1}{2} ab \sin C$$



Break up the quadrilateral into triangles and rectangles and add up their areas.

$$\begin{aligned} A &= \frac{1}{2}(1)(4) + (2)(4) + \frac{1}{2}(2)(2) + \frac{1}{2}(2)(6) \\ &= 2 + 8 + 2 + 6 \\ &= 18 \end{aligned}$$

MARKING SCHEME NOTES**Question 5 (b) (i) (ii) [Scale 10D (0, 2, 5, 9, 10)]**

- 2:**
- One or more points plotted correctly
 - Any incorrect quadrilateral drawn
 - Any relevant formula written
- 5:**
- Correct quadrilateral drawn
 - Correct area of any section, without a quadrilateral established (e.g. OAC)
- 9:**
- Correct area of any section, provided quadrilateral established
 - Area formula established, with correct substitutions, for total area
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