

SAMPLE PAPER 2: PAPER 1

QUESTION 6 (25 MARKS)

Question 6 (a)

$$f(x) = g(x)$$

$$5x - x^2 = x + 3$$

$$0 = x^2 - 4x + 3$$

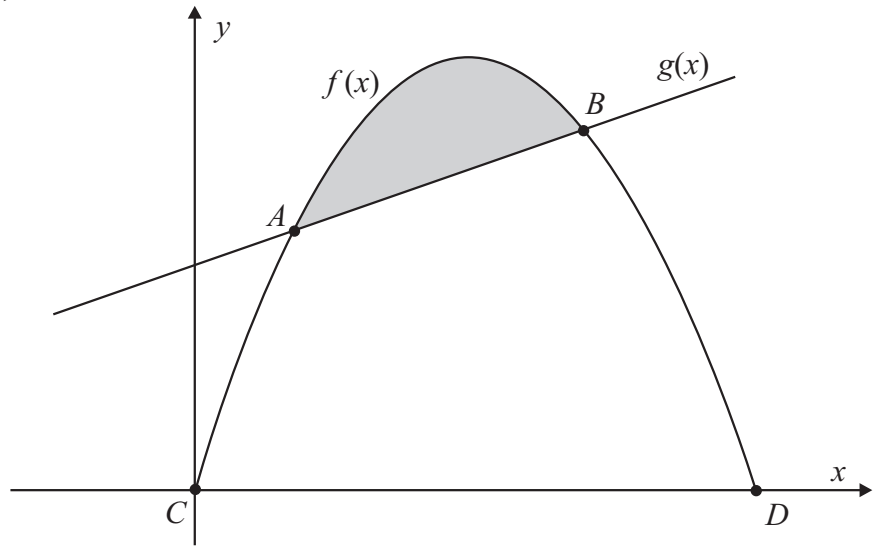
$$0 = (x-1)(x-3)$$

$$\therefore x = 1, 3$$

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

$$g(3) = 3 + 3 = 6$$

$$A(1, 4), B(3, 6)$$



Question 6 (b)

$$|A| = \int_1^3 (f(x) - g(x)) dx$$

$$= \int_1^3 (-x^2 + 4x - 3) dx$$

$$= \left[-\frac{1}{3}x^3 + 2x^2 - 3x \right]_1^3$$

$$= \left\{ -\frac{1}{3}(3)^3 + 2(3)^2 - 3(3) \right\} - \left\{ -\frac{1}{3}(1)^3 + 2(1)^2 - 3(1) \right\}$$

$$= -9 + 18 - 9 + \frac{1}{3} - 2 + 3$$

$$= \frac{4}{3}$$

Question 6 (c)

$$C(0, 0), D(5, 0)$$

$$\text{Average value} = \frac{1}{5-0} \int_0^5 f(x) dx$$

$$= \frac{1}{5} \int_0^5 (5x - x^2) dx$$

$$= \frac{1}{5} \left[\frac{5}{2}x^2 - \frac{1}{3}x^3 \right]_0^5$$

$$= \frac{1}{5} \left\{ \frac{5}{2}(5)^2 - \frac{1}{3}(5)^3 \right\} - \{0\}$$

$$= \frac{1}{5} \left(\frac{125}{2} - \frac{125}{3} \right) = \frac{25}{6}$$