

## LC 2012 (SET E): PAPER 1

### QUESTION 5 (25 MARKS)

#### Question 5 (a)

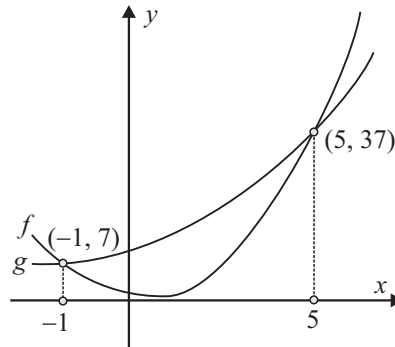
$$f(x) = g(x)$$

$$2x^2 - 3x + 2 = x^2 + x + 7$$

$$x^2 - 4x - 5 = 0$$

$$(x+1)(x-5) = 0$$

$$\therefore x = -1, 5$$



$$g(-1) = (-1)^2 + (-1) + 7 = 1 - 1 + 7 = 7 \Rightarrow (-1, 7)$$

$$g(5) = (5)^2 + (5) + 7 = 25 + 5 + 7 = 37 \Rightarrow (5, 37)$$

#### MARKING SCHEME NOTES

##### Question 5 (a) [Scale 10C (0, 5, 8, 10)]

- 5: • Constructs a table of values but fails to finish  
• Any reasonable first step
- 8: • Correct x-values but no y-values (or incorrect y-values)  
• Solution with one minor error

#### Question 5 (b)

##### FORMULAE AND TABLES BOOK Calculus: Integrals [page 26]

$$\int x^n dx = \frac{x^{n+1}}{n+1} + c, n \neq -1$$

$$A = \int_{-1}^5 [f(x) - g(x)] dx$$

$$= \int_{-1}^5 [x^2 + x + 7 - 2x^2 + 3x - 2] dx$$

$$= \int_{-1}^5 [-x^2 + 4x + 5] dx$$

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

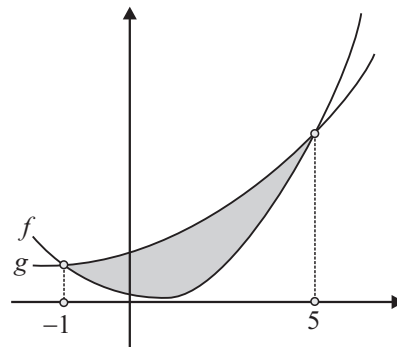
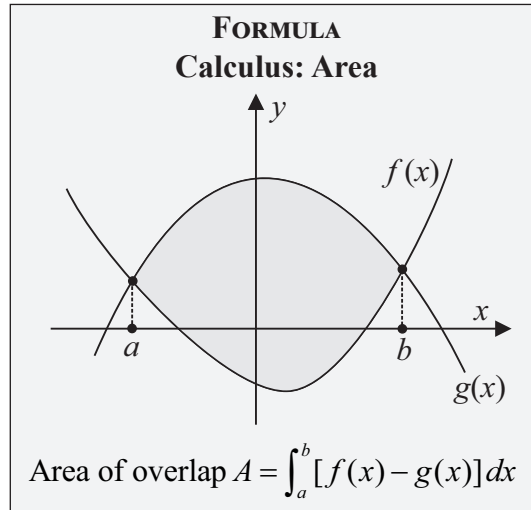
$$= \left\{ -\frac{(5)^3}{3} + 2(5)^2 + 5(5) \right\} - \left\{ -\frac{(-1)^3}{3} + 2(-1)^2 + 5(-1) \right\}$$

$$= \left\{ -\frac{125}{3} + 50 + 25 \right\} - \left\{ \frac{1}{3} + 2 - 5 \right\}$$

$$= -\frac{125}{3} + 50 + 25 - \frac{1}{3} - 2 + 5$$

$$= -\frac{126}{3} + 78$$

$$= -42 + 78 = 36$$



**MARKING SCHEME NOTES**

**Question 5 (b) [Scale 15D (0, 5, 10, 14, 15)]**

- 5:**
- Area enclosed = Area under  $g$  – Area under  $f$
  - Shade the enclosed area
  - Indicate the limits on the graph
  - Any reasonable first step
- 10:**
- Correct integration of  $f(x)$  or  $g(x)$
- 14:**
- Correct integration of  $(f(x)$  or  $g(x))$  or  $(f(x)$  or  $g(x))$ , or both  $f(x)$  and  $g(x)$
  - Correct solution with minor arithmetic errors, and/or mishandles negative integral
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