

LC 2014 (SET C): PAPER 1

QUESTION 4 (25 MARKS)

Question 4 (a)

$x^2 - x - 6 = 0$ ← Factorise the quadratic.

$(x + 2)(x - 3) = 0$ ← Put each bracket equal to zero and solve for x .

$x + 2 = 0 \Rightarrow x = -2$

$x - 3 = 0 \Rightarrow x = 3$

Solutions : $x = -2, 3$

MARKING SCHEME NOTES

Question 4 (a) [Scale 15C (0, 5, 10, 15)]

- 5:**
- Some correct effort at factorising
 - Correct quadratic formula written
 - Trial and Error with no correct solution

- 10:**
- Correct factors found
 - Solutions found from incorrect, but plausible, factors
 - Correct substitution into quadratic formula
 - Solutions found from substantially correct use of formula
 - Trial and Error leading to one correct solution (verified)

Question 4 (b)

$f : x \mapsto +x^2 - x - 6 = (x + 2)(x - 3)$ This function is a quadratic curve with one bend.
As the coefficient of x^2 is positive, the graph is U-shaped.
This function crosses the x -axis at $x = -2$ and $x = 3$.

ANSWER: Graph D

Question 4 (c) (i)

From the graph write down the co-ordinates of $(x, g(x))$: $(-2, 8)$, $(-1, 5)$, $(0, 0)$, $(1, -1)$, $(2, 0)$, $(3, 3)$ and $(4, 8)$.

To write the co-ordinates of $h(x)$ just add 2 to the second number of the co-ordinates of $g(x)$: $(-2, 10)$, $(-1, 7)$, $(0, 2)$, $(1, 1)$, $(2, 2)$, $(3, 5)$ and $(4, 10)$.

The effect graphically of this transformation is to shift the graph vertically up by 2 units.

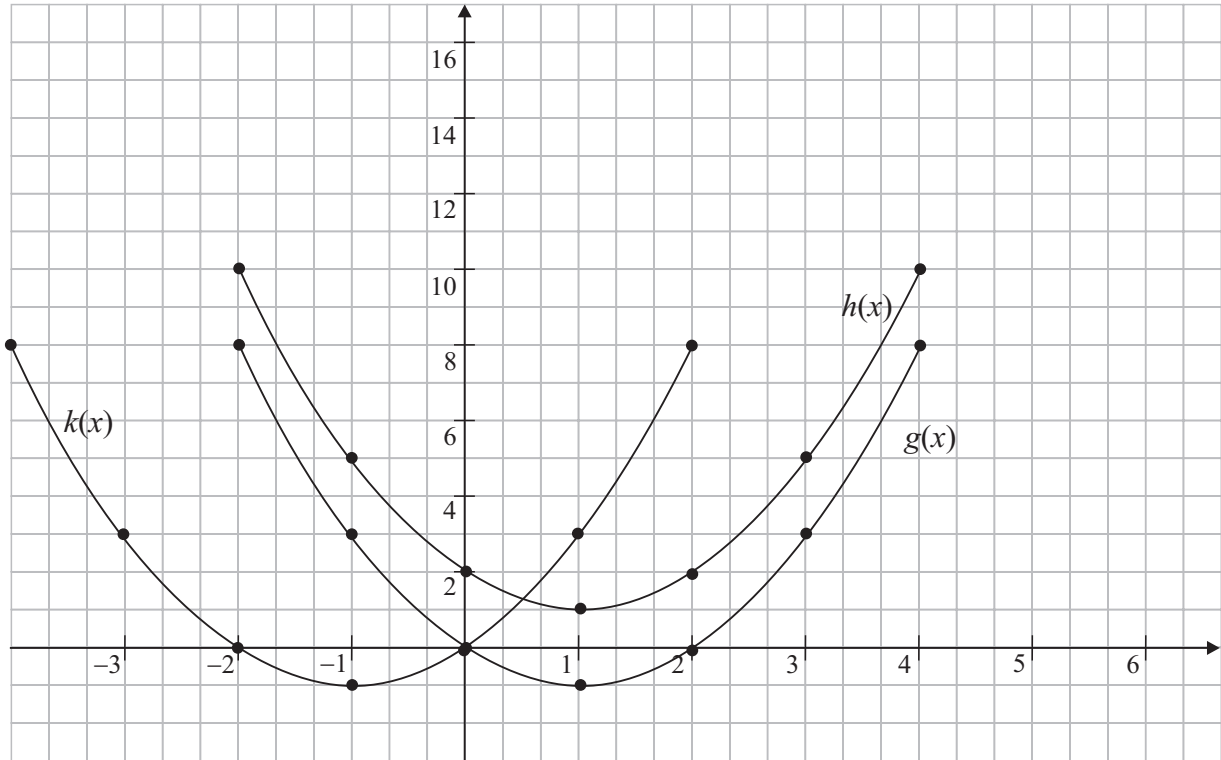
x	$g(x)$	$h(x) = g(x) + 2$
-2	8	10
-1	3	5
0	0	2
1	-1	1
2	0	2
3	3	5
4	8	10

Question 4 (c) (ii)

x	$x + 2$	$g(x)$	$k(x) = g(x + 2)$
-2	0	8	0
-1	1	3	-1
0	2	0	0
1	3	-1	3
2	4	0	8
3	5	3	
4	6	8	

For example $k(1) = g(1 + 2) = g(3) = 3$

The effect graphically of this transformation is to shift the graph horizontally left by 2 units.



MARKING SCHEME NOTES

Question 4 (b) [Scale 5A (0, 5)]

Question 4 (c) [Scale 5C (0, 2, 3, 5)]

- 2:**
- 1 or 2 graphs of correct shape drawn
 - Effort at evaluating $h(x)$ and/or $k(x)$
- 3:**
- Both drawn correctly but not labelled or incorrectly labelled
 - $h(x) = g(x) - 2$ and/or $k(x) = g(x - 2)$ drawn and labelled
 - 1 graph drawn correctly and labelled