Topic 24 Inequalities and graphs (Post-TT) [36] MARKSCHEME

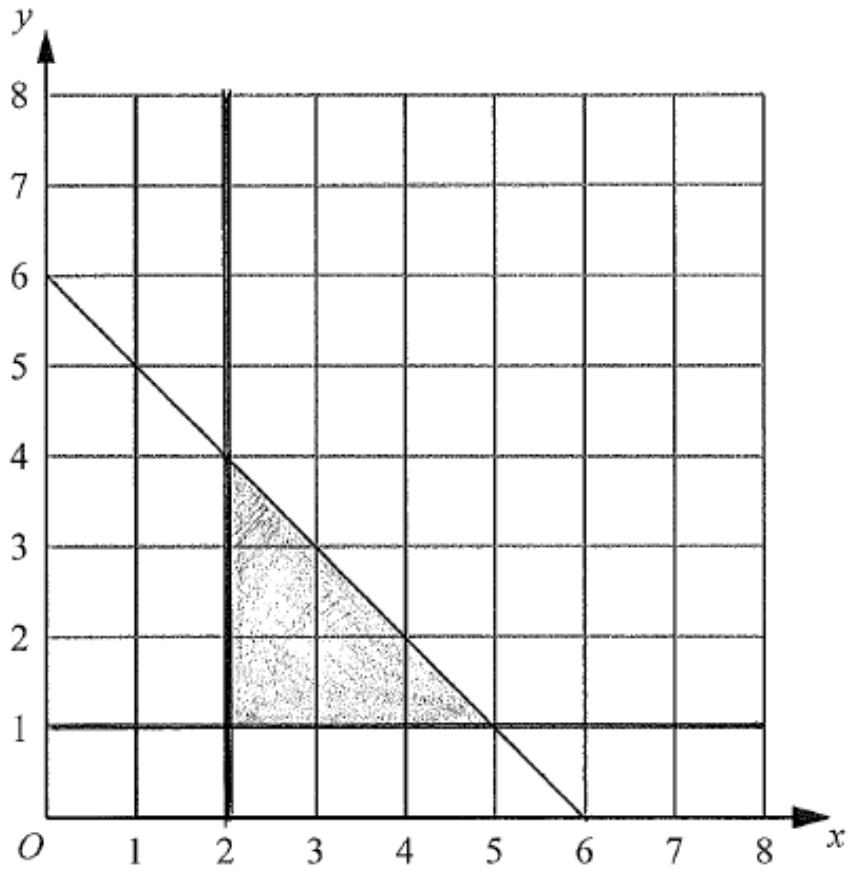
1.

(a)	(i)	–2 and 3	B1
	(ii)	$-1.6 \leq x \leq -1.5$	B1
		$2.5 \leq x \leq 2.6$	B1
		If non-graphical method used B0	
(b)		$x^2 - x - 6 = x + 3$ *(= y)* or attempt to subtract the given equations *oe*	M1
		$x^2 - 2x - 9 = 0$	A1
(c)		$x^2 - x - 6 - x + 2$ (= 0) or attempt to subtract the equations	
		(y =) $x^2 - x - 6$ and (0 =) $x^2 - 2x - 4$	M1
		$x^2 - 2x - 4 + x - 2$	
		$y = x - 2$	A1
		Must have y = (may be seen on the graph)	
		SC1 y = x + 2 or y = –x – 2 or y = 2 – x	

[7]

2. Attempt to factorise: $(x + 4)(x - 5) < 0$ [M1]
Sketch of concave-up curve (since $+x^2$)… [B1]
…with roots at $x = -4$ and $x = 5$ [M1]
< 0 means below the $x -$ axis
$-4 < x < 5$ [A1]

3.
[B1] for each correct line and [A1] for the correct region shaded



4.

(a) $y = (x+3)^2$ B1

(b) $y = x^2 - 2$ B1

5.

(a) 3.2, –1.2 B1

(Accept 3.3, – 1.3)

(b) $(x^2 - 2x - 4) - (x^2 - 3x - 2)$ M1

$= x - 2$

Draw $y = x - 2$ B1ft

$x = -0.55, 3.55$ A1

Accept –0.5 to –0.6; 3.5 to 3.6

SC1 correct answers by any method

[4]

6.

Sketch of concave-down curve (since $-x^2$)… [B1]

…with roots at $x = -2$ and $x = 1$ [B1]

< 0 means below the x – axis

$x < -2$ or $x > 1$ [A1]

7.

(a) attempt at translation of graph B1

$\begin{pmatrix} 9 \\ 0 \end{pmatrix}$

accurate ie, through correct points B1

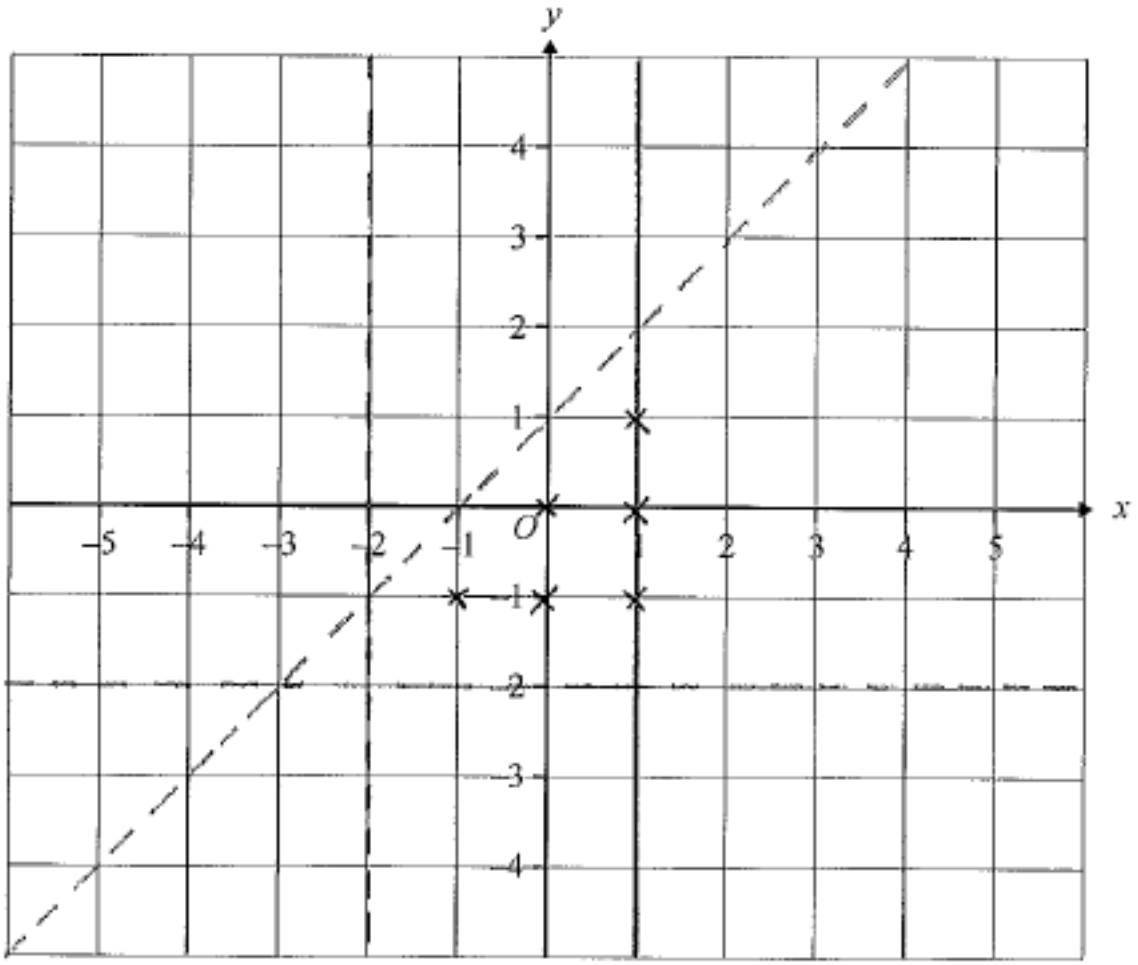
Must be 0° to 360°

(b) (y =) – sin × or – cos $(x - 90)$ B1

or cos (x + 90)

[3]

8.



(Total 3 marks)

9.

Use of quadratic formula:	[M1]
Roots of $x = 2.38$ and $x = 4.62$	[A1]
Sketch of concave-up curve (since $+x^2$)…	[B1]
< 0 means below the $x-$ axis	
$2.38 < x < 4.62$	
Integer values are 3 and 4	[A1, A1]