

LC 2016 (SET A): PAPER 1

QUESTION 2 (25 MARKS)

Question 2 (a)

Step 1: $|x-4| \geq 2$...Test box

Step 2: $|x-4| = 2$
 $x-4 = \pm 2 \Rightarrow x = 2, 6$

Step 3: Region test

\leftarrow 2	\leftrightarrow 6	\rightarrow
$ x-4 \geq 2$	$ x-4 \geq 2$	$ x-4 \geq 2$
$0: 0-4 \geq 2$	$4: 4-4 \geq 2$	$8: 8-4 \geq 2$
$4 \geq 2$ [True]	$0 \geq 2$ [False]	$4 \geq 2$ [True]
\downarrow		\downarrow
$x \leq 2$		$x \geq 6$

Step 4: $x \leq 2, x \geq 6, x \in \mathbb{R}$

MARKING SCHEME NOTES

Question 2 (a) [Scale 10C (0, 3, 7, 10)]

- 3:** • either side squared
 • one correct linear inequality written
 • stating range of natural numbers only

7: • correct solutions to quadratic

10: • correct answer without work

NOTE: use of natural numbers in range merits High Partial Credit at most

Question 2 (b)

$$2x + 3y = -1 \Rightarrow x = \frac{-1-3y}{2} \dots(1)$$

$$x^2 + xy + 2y^2 = 4 \dots(2)$$

$$\left(\frac{-1-3y}{2}\right)^2 + \left(\frac{-1-3y}{2}\right)y + 2y^2 = 4$$

$$\frac{1+6y+9y^2}{4} + \frac{-y-3y^2}{2} + 2y^2 = 4 \text{ [}\times 4\text{]}$$

$$1+6y+9y^2-2y-6y^2+8y^2=16$$

$$11y^2 + 4y - 15 = 0$$

$$(11y+15)(y-1) = 0$$

$$\therefore y = -\frac{15}{11}, 1$$

$$y = 1: x = \frac{-1-3(1)}{2} = \frac{-4}{2} = -2$$

$$y = -\frac{15}{11}: x = \frac{-1-3(-\frac{15}{11})}{2} = \frac{17}{11}$$

Answer: $(-2, 1), (\frac{17}{11}, -\frac{15}{11})$

MARKING SCHEME NOTES

Question 2 (b) [Scale 15C (0, 5, 10,15)]

5: • effort to isolate x (or y)

10: • fully correct substitution into quadratic