

QUESTION 2 (25 MARKS)

Question 2 (a)

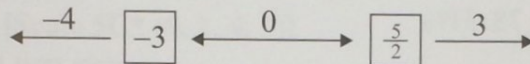
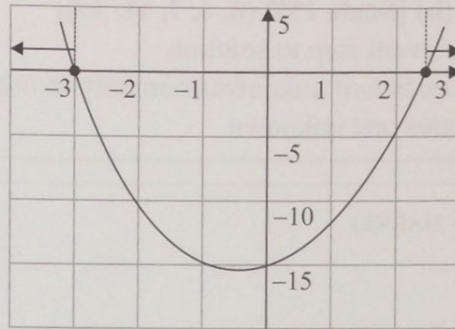
$$2x^2 + x - 15 \geq 0$$

$$2x^2 + x - 15 = 0 \quad [\text{Solve the equality.}]$$

$$(2x - 5)(x + 3) = 0$$

$$\therefore x = -3, \frac{5}{2}$$

Locate the solutions graphically (right) or using the region test (below).



$(2x - 5)(x + 3) \geq 0$	$(2x - 5)(x + 3) \geq 0$	$(2x - 5)(x + 3) \geq 0$
$(2(-4) - 5)(-4 + 3) \geq 0$	$(2(0) - 5)(0 + 3) \geq 0$	$(2(3) - 5)(3 + 3) \geq 0$
$(-13)(-1) \geq 0$	$(-5)(3) \geq 0$	$(1)(6) \geq 0$
$13 \geq 0$	$-15 \geq 0$	$6 \geq 0$

ANSWER: $\therefore x \leq -3, x \geq \frac{5}{2}$

MARKING SCHEME NOTES

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

- 3: • Factorises
• Gets roots
• Some use of quadratic root formula
- 7: • Wrong shape of graph, but otherwise correct
• Incorrect deduction for correct values of x
• Correct shading on x -axis
• Using $x >$ only

Question 2 (b)

Eliminate the fractions:

$$x + y + z = 16 \dots (1)$$

$$\frac{5}{2}x + y + 10z = 40 \dots (2) (\times 2)$$

$$2x + \frac{1}{2}y + 4z = 21 \dots (3) (\times 2)$$

$$x + y + z = 16 \dots (1)$$

$$5x + 2y + 20z = 80 \dots (2)$$

$$4x + y + 8z = 42 \dots (3)$$

Eliminate y from equations (1) and (2):

$$x + y + z = 16 \dots (1) (\times 2)$$

$$5x + 2y + 20z = 80 \dots (2)$$

$$2x + 2y + 2z = 32$$

$$5x + 2y + 20z = 80$$

$$3x + 18z = 48 \dots (4)$$

Eliminate y from equations (1) and (3):

$$x + y + z = 16 \dots (1)$$

$$4x + y + 8z = 42 \dots (3)$$

$$3x + 7z = 26 \dots (5)$$

Eliminate x from equations (4) and (5):

$$3x + 18z = 48 \dots (4)$$

$$3x + 7z = 26 \dots (5)$$

$$11z = 22 \Rightarrow z = 2$$

$$z = 2: 3x + 7(2) = 26 \dots (5)$$

$$3x + 14 = 26$$

$$3x = 12 \Rightarrow x = 4$$

$$4 + y + 2 = 16 \dots (1)$$

$$\therefore y = 10$$

ANSWER: $x = 4, y = 10, z = 2$