Question Number	Scheme	Marks
2.(a)	Attempts to substitute $y = x+4$ into $2x^2 - xy = 8 \Rightarrow 2x^2 - x(x+4) = 8$	M1
	$\Rightarrow 2x^2 - x^2 - 4x = 8 \Rightarrow x^2 - 4x - 8 = 0$ *	A1*
		(2)
(b)	$x^2 - 4x - 8 = 0 \Rightarrow (x-2)^2 = 12$	M1
	$\Rightarrow x = 2 \pm 2\sqrt{3}$	A1
	Attempts y for either value $\Rightarrow y = 2 + 2\sqrt{3} + 4 = ...$	M1
	$\Rightarrow x = 2+2\sqrt{3}, y = 6+2\sqrt{3}$ AND $x = 2-2\sqrt{3}, y = 6-2\sqrt{3}$	A1
		(4)
		(6 marks)

(a)

M1: Awarded for an attempt to substitute $y = \pm x \pm 4$ into $2x^2 - xy = 8 \Rightarrow 2x^2 - x(\pm x \pm 4) = 8$

This may be seen with or without the bracket so look for either $2x^2 - x(\pm x \pm 4) = 8$ or $2x^2 \pm x^2 \pm 4x = 8$

A1*: Proceeds to the given answer showing all necessary steps and no errors.

For example, look for intermediate working showing ALL of the following

- $y - x = 4$ being adapted to $y = x + 4$
- A line of $2x^2 - x(x+4) = 8$ or equivalent such as $2x^2 - x^2 - 4x - 8 = 0$
- The given answer $x^2 - 4x - 8 = 0$

(b)

M1: Shows a non-calculator method of solving the given $x^2 - 4x - 8 = 0$, not any incorrect version.

Do not accept factorisation.

For completing the square look for $x^2 - 4x - 8 = 0 \Rightarrow (x-2)^2 = k, k > 0 \Rightarrow x = ...$

For use of formula look, for example, for $x^2 - 4x - 8 = 0 \Rightarrow x = \dfrac{4 \pm \sqrt{16 - (-32)}}{2}$ or $x = \dfrac{4 \pm \sqrt{48}}{2}$

You cannot accept the correct simplified solutions following a quoted formula (with no additional working shown, i.e embedded values).

A correct quoted formula followed by an unsimplified solution with a slip E.g. $x = \dfrac{-4 \pm \sqrt{(-4)^2 - (-32)}}{2}$ or $x = \dfrac{-4 \pm \sqrt{48}}{2}$ would score M1, A0 even if followed by the correct solutions and then potentially M1, A0

A1: Correctly finds both x values in an allowable form. Look for $2 + 2\sqrt{3}$ and $2 - 2\sqrt{3}$. Condone values written in the partially simplified form of $x = 2 \pm \sqrt{12}$ but not $x = \dfrac{4 \pm \sqrt{48}}{2}$. Award this mark even if one value is subsequently rejected. **This can only be scored following the award of M1**

M1: Find a y value by adding 4 to an x value.

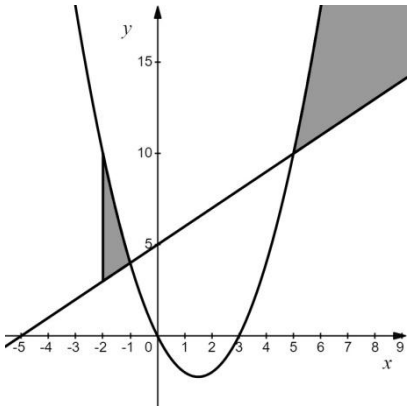
It is not dependent so 0,0,1,0 is possible for candidates who write down solutions for the equation in x. So $x^2 - 4x - 8 = 0 \Rightarrow x = 2 \pm 2\sqrt{3}$ without working followed by $y = 6 \pm 2\sqrt{3}$ scores 0, 0, 1, 0

A1: Both pairs correctly matched up, and in the form requested by the question, i.e $p + q\sqrt{3}$

Allow $x = 2 \pm 2\sqrt{3}, y = 6 \pm 2\sqrt{3}$ Must follow M1, A1, M1

Note that a pair is matched up when you see $x = 2 + 2\sqrt{3}, y = 4 + 2 + 2\sqrt{3} = 6 + 2\sqrt{3}$

SC: Some candidates may ignore part (a) and produce a quadratic in y. They will score no marks in part (a) but we will allow all marks for a correct solution for part (b). FYI $y^2 - 12y + 24 = 0 \Rightarrow y = 6 \pm 2\sqrt{3}$. The first M1 is scored for a valid non-calculator method followed by A1 for both y values.

Question Number	Scheme	Marks
3 (i)	$z < 0$ or $z > \frac{1}{2}$	M1, A1 **(2)**
(ii)		
	Correctly draws $x = -2$	B1
	Correct left or right-hand region shaded	B1
	Correct left and right-hand region shaded	B1 **(3)**
		(5 marks)

(i)

M1: For an attempt, graphical, algebraic or otherwise that reaches either inequality.

Score for one of $z < 0, z > \frac{1}{2}$ Allow non-strict inequalities here. **No working is necessary**

Award even in cases where the solution(s) seem contradictory. E.g. $z > \frac{1}{2},\ z < \frac{1}{2}$

Condone an un-simplified version for this mark. E.g. $\frac{4}{z} < 8 \Rightarrow z > \frac{4}{8}$

Alternatively score for an attempt that proceeds to **both** critical values

A1: Correct answer which must be in simplest form.

Condone the appearance of a comma or the word "and" between the two inequalities

If set notation is used accept versions such as $\{z \in \mathbb{R} : z < 0\} \cup \left\{z \in \mathbb{R} : z > \frac{1}{2}\right\}$ but not with $\cap$

If they write $0 > z > \frac{1}{2}$ would score M1, A0

(ii)

Advice for examiners:

You may see the representation of the inequalities on Figure 1 and/or Diagram 1.

- If only Figure 1 is used mark Figure 1
- If both Figure 1 and Diagram 1 are used Diagram 1 takes precedence.

B1: Correctly draws the line with equation $x = -2$ (at least drawn between the line and curve)

Allow this line to be dotted.

Alternatively has $x = -2$ as the boundary of a shaded region (at least drawn between the line and curve)

Be tolerant of slips of the pen here or gaps in the boundary of the shaded region

B1: Shading implies a correct and distinct left-hand **OR** right-hand region shaded.

For the left-hand region, it is acceptable for the boundary line $x = -2$ to be 'dotted' or implied (by shading)

B1: Shading implies a correct and distinct left-hand and a correct and distinct right-hand region ONLY.

There must be an attempt to shade/include the whole of the left and right-hand region.

The line or the shading at the boundary at $x = -2$ must now be solid