Question Number	Scheme	Marks
8(a)	$25 = a + -(5\times -2+b)\ (\Rightarrow 25 = a+10-b) \Rightarrow a = 15+b$ *	M1A1*
		(2)
(b)	$9 = a+10+b \Rightarrow a = \ldots$ or $b = \ldots.$ $a = 7,\ b = -8$	M1 A1A1
		(3)
(c)	$\left(\frac{8}{5}, 7\right)$	B1ftB1
		(2)
(d)	$15-5x = -2x^3+5x^2+4x-3 \Rightarrow 2x^3-5x^2-9x+18=0$ $2x^3-5x^2-9x+18 = (x+2)(2x^2-9x+9)$ $2x^2-9x+9=0 \Rightarrow x = \frac{3}{2}$ (ignore $x=3$) $\left(\frac{3}{2}, \frac{15}{2}\right)$	M1 dM1A1 ddM1 M1A1
		(6)
		(13 marks)

(a)

M1: Substitutes $(-2,\ 25)$ into $y = a-(5x+b)$. You must **either** see a correct unsimplified equation without the modulus before the answer **or** indication of correct branch with attempt to substitute.
Note they may use the cubic and substitute $x = -2$ to achieve the 25.
For methods via squaring send to review if you are unsure if the marks are deserved.

A1*: Achieves the given answer with no errors seen following a correct unsimplified equation.
If they attempt both equations, they must clearly indicate the choice of solution.

(b)

M1: Substitutes $(2,\ 9)$ into $y = a+(5x+b)$ and solves simultaneously with the equation from (a) to find a value for *a* or a value for *b*. May be implied by a correct value for *a* or *b*.

A1: One of $a = 7,\ b = -8$

A1: Both $a = 7,\ b = -8$ only

Note if there are attempts at squaring they must reach only the correct values. If unsure, use review.

(c)

B1ft: One of the coordinates of $\left(\frac{8}{5}, 7\right)$. Follow through their *a* and *b* for this mark ie one of $\left(-\frac{b}{5}, a\right)$

B1: $\left(\frac{8}{5}, 7\right)$ Aceept as *x* = …, *y* = …

(d)

M1: Sets their $y = 15 - 5x$ equal to $-2x^3 + 5x^2 + 4x - 3$ and collects terms to achieve a cubic. Condone a miscopy of the cubic if the intention is clear.

dM1: Attempts to find a quadratic factor (by division or equating coefficients). It is dependent on the previous method mark. For factorisation expect to see $(x \pm 2)(2x^2 + ...\pm 9)$ or via division $(x \pm 2)(2x^2 + ...x + ...)$ Valid non-calculator method must be seen, solutions which go direct to a "factorised" form with no intermediate quadratic factor seen score dM0. Note they may use another linear factor to divide through by, the scheme applies the same way, but must be one of the correct factors.

A1: $2x^2 - 9x + 9$ (or correct factor for their linear term).

ddM1: Attempts to solve their quadratic via a non-calculator method, leading to a value for *x*. It is dependent on the previous two method marks. Valid non-calculator method must be seen to award this mark.

M1: Proceeds to find both coordinates of Q, accepting answers where the *x* value was found via a calculator. It is not dependent on the previous Ms but must attempted an initial equation using the cubic and either branch, set up to show what has been solved on the calculator. Correct answer with no working at all seen will score no marks.

A1: $\left(\frac{3}{2}, \frac{15}{2}\right)$ (oee) only. A0 if a second set of coordinates is given. Allow for solutions where the cubic or quadratic was solved via calculator.
Allow listed as *x* =…, *y* = … and isw but must clear clearly seen as the correct coordinates.

Attempts at squaring, use review if you are unsure how to score unsuccessful attempts.

NB If no quadratic factor or suitable method is seen to solve the cubic then maximum of three mark is available, M1dM0A0ddM0M1A1.
If the quadratic factor is reached but the quadratic is solved via calculator a maximum of 5 marks may be scored, M1dM1A1ddM0M1A1.
M0dM0A0ddM0M1A1 is also possible if they give the initial equation and proceed to give the solutions without first gathering terms.
A non-calculator approach must be shown for full marks.

Question Number	Scheme	Marks
9(a)	$4\sin\theta\cos\theta = 2\sin 2\theta$	B1
	e.g. $\Rightarrow 6\sin^2\theta\cot 2\theta + 2\sin 2\theta = (3-3\cos 2\theta)\dfrac{\cos 2\theta}{\sin 2\theta} + 2\sin 2\theta$	M1A1
		(3)
(b)	$3\cot 2\theta - 14 = 6\sin^2\theta\cot 2\theta + 4\sin\theta\cos\theta$	
	e.g. $\Rightarrow 3\cot 2\theta\sin 2\theta - 14\sin 2\theta = (3-3\cos 2\theta)\cos 2\theta + 2\sin^2 2\theta$	M1
	$\Rightarrow -14\sin 2\theta = -3(1-\sin^2 2\theta) + 2\sin^2 2\theta$	M1
	$5\sin^2 2\theta + 14\sin 2\theta - 3 = 0$ *	A1*
		(3)
(c)	$(\sin 2x =)\dfrac{1}{5} \Rightarrow x = \ldots$	M1
	$x = \text{awrt } 5.8°,\ \text{awrt } 84.2°$	A1A1
		(3)
		(9 marks)

(a)

B1: $4\sin\theta\cos\theta = 2\sin 2\theta$ (seen or implied)

M1: Attempts to use $\cos 2\theta = \pm 1 \pm 2\sin^2\theta$ and $\cot 2\theta = \dfrac{\cos 2\theta}{\sin 2\theta}$ or alternative versions of these formulae to get to an expression in just $\sin 2\theta$ and $\cos 2\theta$. Other routes are possible, but any trig identities must be correct up to sign error to reach an expression in just $\sin 2\theta$ and $\cos 2\theta$.

A1: $(3-3\cos 2\theta)\dfrac{\cos 2\theta}{\sin 2\theta} + 2\sin 2\theta$ or equivalent. isw once a correct expression is seen. Alternatives are possible here.

(b)

M1: Uses their expression from part (a) in the given equation and attempts to multiply both sides by $\sin 2\theta$. Alternatively they may rework part (a) again in this part but must reach an expression in terms of $\sin 2\theta$ and $\cos 2\theta$ only on one line.

M1: Cancels $3\cos 2\theta$ from both sides, attempts to use $\pm\sin^2 2\theta \pm \cos^2 2\theta = \pm 1$ and proceeds to a 3TQ in $\sin 2\theta$ only (terms do not need to be collected on the same side)

A1*: Achieves the given answer with no errors seen (including invisible brackets).

(c)