Question Number	Scheme	Marks
5.(a)	$2x^3+3x^2-35x=0 \Rightarrow x\left(2x^2+3x-35\right)=0$	M1
	$(2x-7)(x+5)=0 \Rightarrow x=...$	dM1
	$x=-5,\ 0,\ \frac{7}{2}$	A1
		(3)
(b)	$2(y-5)^6+3(y-5)^4-35(y-5)^2=0$	
	States that $y=5$ is a solution	B1
	$(y-5)^2="\frac{7}{2}" \Rightarrow y=...$	M1
	$y=5+\sqrt{\frac{7}{2}}$ or $y=5-\sqrt{\frac{7}{2}}$ or exact equiavlent	A1ft
	Both $y=5+\sqrt{\frac{7}{2}}$ and $y=5-\sqrt{\frac{7}{2}}$ or exact equivalent.	A1
		(4)
		(7 marks)

(a)

M1 Takes out a common factor of *x*. Score if each term is divided by *x*.

dM1 Attempts to solve the resulting quadratic **via algebra** (usual rules). Allow factorisation, formula or completion of square. They cannot just write down answers from their calculator for this mark.

A1 $x=-5,\ 0,\ \frac{7}{2}$

Note 1: Some candidates will just write down their answers from a calculator. This scores 0,0,0

Note 2: Some students will attempt to solve the cubic by the quadratic formula Eg.

$2x^3+3x^2-35x=0 \Rightarrow a=2, b=3, c=-35$ and use $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a} \Rightarrow x=-5,\ \frac{7}{2}$

This scores 0,0,0 as the method used is incorrect

(b)

B1 States that 5 is a solution of the given equation in (b)

M1 Realises that $x=(y-5)^2$ and proceeds to find a value for *y* using $(y-5)^2="\frac{7}{2}" \Rightarrow y=...$ Follow through on any positive value from (a). Allow decimal answers here. Don't be overly concerned by the mechanics of their solution.

A1ft A solution of $5+\sqrt{\frac{7}{2}}$ or $5-\sqrt{\frac{7}{2}}$ You should follow through on their positive root.

Allow decimals for this mark only. So accept awrt 6.87 or awrt 3.13

A1 Both $5+\sqrt{\frac{7}{2}}$ and $5-\sqrt{\frac{7}{2}}$ with no other solutions for part (b) apart from 5. Do not allow decimal equivalents. Don't allow complex solutions.

Question Number	Scheme	Marks
6.(a)	Sets $4x+c=x(x-3)$ and attempts to write as a 3TQ	M1
	Uses $b^2=4ac$ for their $x^2-7x-c=0$	dM1
	Correct equation $49=-4c$ or $49+4c=0$	A1
	$c=-12.25$ oe	A1
		(4)
(b)	Attempt to solve $x^2-7x-c=0$ with their c	M1
	Attempt to find the y coordinate for their x coordinate	dM1
	$\left(\frac{7}{2},\frac{7}{4}\right)$ oe	A1
		(3)
		(7 marks)

(a)

M1 Sets $4x+c=x(x-3)$ and attempts to write as a 3TQ. All terms don't need to be on the same side of the equation and you should condone slips

dM1 Attempts to use $b^2=4ac$ or $b^2-4ac=0$ for their 3TQ. This may be implied by later work.
For a correct 3TQ, errors on "c" will be common, so condone $\pm 49\pm 4c=0$ oe

A1 Correct equation formed in 'c'

A1 Correct solution $c=-12.25$ oe

(b)

M1 Attempts to solve their $x^2-7x-c=0$ with their c $\left(c\neq 0\right)$
Allow usual methods. If a calculator is used then the answer(s) must be correct for their 3TQ
Incorrect values of c may produce two values of x

dM1 Attempt to find the y coordinate from their x coordinate. It is dependent upon the previous M
If there are two coordinates they only need to find the y value for one of their x values to score this mark.

A1 Correct coordinate given $\left(\frac{7}{2},\frac{7}{4}\right)$ or exact equivalent. Allow written separately $x=3.5, y=1.75$

If c is correct allow the answer to score all 3 marks as long as no incorrect working is seen.

.....

Alternative to (a) by using gradients

M1 Attempts to set $\frac{\mathrm{d}}{\mathrm{d}x}\left(x^2-3x\right)=4\Rightarrow 2x-3=4\Rightarrow x=\ldots.$

dM1 Attempts to find the y coordinate by substituting this answer in $y=x(x-3)$

A1 Correct equation in c Eg $\frac{7}{4}=4\times\frac{7}{2}+c$

A1 Correct solution $c=-12.25$ oe

Note: Using this method the answer to (b) is found before (a). Some candidates will not realise this however. For the marks in (b) to be awarded there must be a statement somewhere in the solution to the effect that they know that they have solved part (b). This could be simply

(b) $\left(3.5,1.75\right)$ or coordinates of point of intersection is $\left(\frac{7}{2},\frac{7}{4}\right)$