Question	Scheme	Marks	AOs
2	$w=3x-2 \Rightarrow x=\dfrac{w+2}{3}$	B1	3.1a
	$9\left(\dfrac{w+2}{3}\right)^3-5\left(\dfrac{w+2}{3}\right)^2+4\left(\dfrac{w+2}{3}\right)+7=0$	M1	3.1a
	$\dfrac{1}{3}\left(w^3+6w^2+12w+8\right)-\dfrac{5}{9}\left(w^2+4w+4\right)+\dfrac{4}{3}\left(w+2\right)+7=0$		
	$3w^3+13w^2+28w+91=0$	dM1 A1 A1	1.1b 1.1b 1.1b
		(5)	
	Alternative:		
	$\alpha+\beta+\gamma=\dfrac{5}{9}, \alpha\beta+\beta\gamma+\alpha\gamma=\dfrac{4}{9}, \alpha\beta\gamma=-\dfrac{7}{9}$	B1	3.1a
	New sum = $3\left(\alpha+\beta+\gamma\right)-6=-\dfrac{13}{3}$	M1	3.1a
	New pair sum = $9\left(\alpha\beta+\beta\gamma+\gamma\alpha\right)-12\left(\alpha+\beta+\gamma\right)+12=\dfrac{28}{3}$		
	New product = $27\alpha\beta\gamma-18\left(\alpha\beta+\beta\gamma+\gamma\alpha\right)+12\left(\alpha+\beta+\gamma\right)-8=-\dfrac{91}{3}$		
	$w^3-\left(-\dfrac{13}{3}\right)w^2+\dfrac{28}{3}w-\left(-\dfrac{91}{3}\right)=0$	dM1	1.1b
	$3w^3+13w^2+28w+91=0$	A1 A1	1.1b 1.1b
		(5)	
		(5 marks)	

Notes

B1: Selects the method of making a connection between x and w by writing $x=\dfrac{w+2}{3}$

Condone the use of a different letter than w

M1: Applies the process of substituting $x=\dfrac{w+2}{3}$ into $9x^3-5x^2+4x+7=0$

dM1: Depends on the previous M mark. Manipulates their equation into the form $aw^3+bw^2+cw+d\,(=0)$. Condone the use of a different letter then w consistent with B1 mark.

A1: At least two of a, b, c, d correct

A1: Fully correct equation, must be in terms of w

Alternative:

B1: Selects the method of giving three correct equations containing α, β and γ

M1: Applies the process of finding the new sum, new pair sum, new product

dM1: Depends on the previous M mark. Applies $w^3-(\text{new sum})w^2+(\text{new pair sum})w-(\text{new product})(=0)$ condone the use of any letter here.

A1: At least two of a, b, c, d correct

A1: Fully correct equation in term of w