Question	Scheme	Marks	AOs
1(i)	$\alpha+\beta+\gamma=\frac{3}{2},\ \alpha\beta+\alpha\gamma+\beta\gamma=2,\ \alpha\beta\gamma=-\frac{7}{2}$	B1	3.1a
	$\frac{3}{\alpha}+\frac{3}{\beta}+\frac{3}{\gamma}=\frac{3(\alpha\beta+\alpha\gamma+\beta\gamma)}{\alpha\beta\gamma}$	M1	1.1b
	$=3(2)\div-\frac{7}{2}=-\frac{12}{7}$	A1ft	1.1b
		(3)	
(ii)	$(\alpha-2)(\beta-2)(\gamma-2)=(\alpha\beta-2\alpha-2\beta+4)(\gamma-2)$	M1	1.1b
	$=\alpha\beta\gamma-2(\alpha\beta+\alpha\gamma+\beta\gamma)+4(\alpha+\beta+\gamma)-8$	A1	1.1b
	$=-\frac{7}{2}-2(2)+4\left(\frac{3}{2}\right)-8=-\frac{19}{2}$	A1	1.1b
		(3)	
	Alternative		
	$2(x+2)^3-3(x+2)^2+4(x+2)+7=0$	M1	1.1b
	$=\ldots+16+\ldots-12+\ldots+8+7=19$	A1	1.1b
	$(\alpha-2)(\beta-2)(\gamma-2)=-\frac{19}{2}$	A1	1.1b
		(3)	
(iii)	$\alpha^2+\beta^2+\gamma^2=(\alpha+\beta+\gamma)^2-2(\alpha\beta+\alpha\gamma+\beta\gamma)$	M1	3.1a
	$=\left(\frac{3}{2}\right)^2-2(2)=-\frac{7}{4}$	A1ft	1.1b
		(2)	
			(8 marks)

Notes

(i) B1: Identifies the correct values for all 3 expressions (can score anywhere)
M1: Uses a correct identity
A1ft: Correct value (follow through their $\frac{3}{2}, 2, -\frac{7}{2}$)

(ii) M1: Attempts to expand
A1: Correct expansion
A1: Correct value
Alternative:
M1: Substitutes $(x + 2)$ for x in the given cubic
A1: Calculates the correct constant term
A1: Completes correctly by changing sign and dividing by 2

(iii) M1: Establishes the correct identity
A1ft: Correct value (follow through their $\frac{3}{2}, 2, -\frac{7}{2}$)