

Q	Marking instructions	AO	Marks	Typical solution
18(a)	Obtains $x^4 - y^4$	1.1b	B1	$x^4 - y^4$
	Subtotal		1	

Q	Marking instructions	AO	Marks	Typical solution
18(b)	Begins argument from LHS or RHS applying one useful manipulation from the following: Uses $(x^2 + y^2)(x^2 - y^2) = x^4 - y^4$ Or Converts between cos/sin and cosec/cot Or Uses $\cot^2 \theta - \operatorname{cosec}^2 \theta = -1$ Or Uses $1 - \cos^2 \theta = \sin^2 \theta$	3.1a	M1	$\begin{aligned} &\cot^4 \theta - \operatorname{cosec}^4 \theta \\ &\equiv (\cot^2 \theta + \operatorname{cosec}^2 \theta)(\cot^2 \theta - \operatorname{cosec}^2 \theta) \\ &\equiv -(\cot^2 \theta + \operatorname{cosec}^2 \theta) \\ &\equiv -\frac{\cos^2 \theta + 1}{\sin^2 \theta} \\ &\equiv -\frac{\cos^2 \theta + 1}{1 - \cos^2 \theta} \\ &\equiv \frac{\cos^2 \theta + 1}{\cos^2 \theta - 1} \end{aligned}$
	Makes progress with their argument applying a second technique listed above.	3.1a	M1	
	Makes further progress with their rigorous argument applying $(x^2 + y^2)(x^2 - y^2) = x^4 - y^4$ AND Converts between cos/sin and cosec/cot AND at least one of Uses $\cot^2 \theta - \operatorname{cosec}^2 \theta = -1$ Or Uses $1 - \cos^2 \theta = \sin^2 \theta$ If working from LHS to RHS correctly obtaining a single fraction in terms of $\cos^2 \theta$ scores M1M1M1	3.1a	M1	
	Completes rigorous argument to prove the given result condone starting the argument with “LHS” or “RHS”	2.1	R1	
	Subtotal		4	

Q	Marking instructions	AO	Marks	Typical solution
18(c)	Begins an argument starting from $\frac{\cos^2 \theta + 1}{\cos^2 \theta - 1}$ For example Explains that $\cos^2 \theta + 1 > 0$ Condone inclusive inequality or Explains that $\cos^2 \theta - 1 < 0$ Condone inclusive inequality	2.4	M1	$\cos^2 \theta + 1 > 0$ $\cos^2 \theta - 1 < 0$ $\cot^4 \theta - \operatorname{cosec}^4 \theta = \frac{\text{positive}}{\text{negative}} < 0$
	Completes reasoned argument For example Explains that $\cos^2 \theta + 1 > 0$ AND Explains that $\cos^2 \theta - 1 < 0$ Completes reasoned argument stating that $\cot^4 \theta - \operatorname{cosec}^4 \theta = \frac{\text{positive}}{\text{negative}} < 0$	2.1	R1	
	Subtotal		2	

	Question 18 Total		7	
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