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	$\cot^4\theta - \operatorname{cosec}^4\theta$ $\equiv (\cot^2\theta + \operatorname{cosec}^2\theta)(\cot^2\theta - \operatorname{cosec}^2\theta)$ $\equiv -(\cot^2\theta + \operatorname{cosec}^2\theta)$ $\equiv -\dfrac{\cos^2\theta + 1}{\sin^2\theta}$ $\equiv -\dfrac{\cos^2\theta + 1}{1 - \cos^2\theta}$ $\equiv \dfrac{\cos^2\theta + 1}{\cos^2\theta - 1}$
	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**	