

Q	Marking instructions	AO	Marks	Typical solution
12(a)	Demonstrates given result starting with $\cos \theta = \frac{12}{AC}$ OE (in terms of adj/hyp)	2.1	R1	$\cos \theta = \frac{12}{AC}$ $AC = \frac{12}{\cos \theta}$
	Subtotal		1	

Q	Marking instructions	AO	Marks	Typical solution
12(b)	States $12\cos \theta$ CAO	1.1b	B1	$AD = 12\cos \theta$
	Subtotal		1	

Q	Marking instructions	AO	Marks	Typical solution
12(c)	Expresses CD as the difference between AC and their AD Or Expresses BD as $12\sin \theta$ and uses $\tan \theta$ in triangle BCD	3.1a	M1	$CD = \frac{12}{\cos \theta} - 12\cos \theta$ $= \frac{12}{\cos \theta} - \frac{12\cos^2 \theta}{\cos \theta}$ $= \frac{12 - 12\cos^2 \theta}{\cos \theta}$
	Completes reasoned argument to obtain given result Must see two separate fractions with a common denominator Or $CD = \frac{12\sin^2 \theta}{\cos \theta}$ Or $CD\cos \theta = 12 - 12\cos^2 \theta$ before final answer AG	2.1	R1	
	Subtotal		2	

Q	Marking instructions	AO	Marks	Typical solution
12(d)	States $8\sqrt{3} = \frac{12 - 12\cos^2\theta}{\cos\theta}$	1.1b	B1	$8\sqrt{3} = \frac{12 - 12\cos^2\theta}{\cos\theta}$ $8\sqrt{3}\cos\theta = 12 - 12\cos^2\theta$ $12\cos^2\theta + 8\sqrt{3}\cos\theta - 12 = 0$ $\cos\theta = \frac{\sqrt{3}}{3} \text{ or } -\sqrt{3}$ $\cos\theta = -\sqrt{3} \text{ not valid}$ $\therefore \cos\theta = \frac{\sqrt{3}}{3}$ $\theta = 55^\circ$
	Rearranges to give a three-term quadratic equation in $\cos\theta$ (must be = 0)	3.1a	M1	
	Solves their quadratic to obtain at least one real value for $\cos\theta$	1.1a	M1	
	Obtains $\cos\theta = \frac{\sqrt{3}}{3}$ and explains that $-\sqrt{3}$ is not valid OE	2.4	A1	
	Obtains AWRT 55 ISWCSO	1.1b	A1	
	Subtotal		5	

	Question 12 Total		9	
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