Question	Answer	Marks	Guidance
12(a)	$2\left(\cot^2\theta+1\right)-5=5\cot\theta$ soi	**B1**	
	$2\cot^2\theta-5\cot\theta-3=0$	**M1**	For attempt to obtain a 3-term quadratic in terms of $\cot\theta$, equated to zero
	$\left(2\cot\theta+1\right)\left(\cot\theta-3\right)=0$	**M1**	**M1 dep** for attempt to factorise, or use of quadratic formula oe
	$\tan\theta=-2,\ \tan\theta=\frac{1}{3}$	**M1**	**M1 dep** for obtaining in terms of $\tan\theta$, using *their* factors
	$-161.6^o,\ -63.4^o,\ 18.4^o,\ 116.6^o$	**3**	**M1** for a correct solution **A1** for another correct solution **A1** for a further 2 correct solutions and no extras in the range
	Alternative		
	$2\left(\cot^2\theta+1\right)-5=5\cot\theta$ soi	**B1**	
	$2\cot^2\theta-5\cot\theta-3=0$	**M1**	For attempt to obtain a 3-term quadratic in terms of $\cot\theta$, equated to zero
	$3\tan^2\theta+5\tan\theta-2=0$	**M1**	**M1 dep** for attempt to obtain a 3-term quadratic in terms of $\tan\theta$, equated to zero
	$\left(3\tan\theta-1\right)\left(\tan\theta+2\right)=0$ $\tan\theta=-2,\ \tan\theta=\frac{1}{3}$	**M1**	**M1 dep** for attempt to factorise, or use of quadratic formula oe and obtaining $\tan\theta=...$
	$-161.6^o,\ -63.4^o,\ 18.4^o,\ 116.6^o$	**3**	**M1** for a correct solution **A1** for another correct solution **A1** for a further 2 correct solutions and no extras in the range
10(b)	$\sin\left(2\phi+1.5\right)=\frac{2}{3}$ $2\phi+1.5=0.7297...$ soi	**M1**	
	$2\phi+1.5=2.4119$ or 7.0129 or 8.6591	**A1**	
	0.456, 2.76, 3.6[0]	**3**	**M1** for correct order of operations **A1** for one correct solution **A1** for a further 2 correct solutions and no extras in the range.

© Cambridge University Press & Assessment 2024