Circular Measures 1 (Radians) Answers

1)

(iii) $2z - 0.6 = 0.9273, 2.2143$ $z = 0.764, 1.407$ (allow 1.41)	M1 M1 A1, A1 [4]	M1 for correct order of operations M1 for a valid attempt at a second solution A1 for each

2)

(iii) $\cos\frac{z}{3} = \frac{1}{4}$ $\frac{z}{3} = 1.3181$ leading to $z = 3.95$ Allow $3.96, 1.25\pi, 1.26\pi$	B1 M1 A1 [3]	B1 for $\cos\frac{z}{3} = \frac{1}{4}$ or equivalent in terms of cos M1 for a correct order of operations (allow π)

3)

(b)	cot = 1/tan used
	tan 2y = 4
	
	2y = 1.326 → y = 0.66
	or 2y = π + 1.326 or 2π + 1.326
	
	→ y = 2.23
	→ y = 3.80 or 3.81
		M1
		
		A1
		
		A1√
		A1√
		[4]
			Use of cot = 1/tan even if "2" removed incorrectly. Not for tan and 2y split.
			Co (must be radians) – not for 0.67.
			
			For (i) + ½π
			For (i) + π or (ii) + ½π
			[S–1 for extra values in the range]
			[sc All answers in degrees B1.]

4)

(b) $\sin(2y+1) = -\frac{5}{6}$ Base angle in radians = 0.985 2y+1 = π + 0.985 y = 1.56 or 2y+1 = 2π – 0.985 y = 2.15 Extra values in range, loses last A1 Extra values outside range – no penalty.	M1 M1 A1 M1 A1 [5]	Making sin(2y+1) subject Realising 2y+1 = π + Realising that 2y+1 = 2π –

5)

8. (a) $1+5\cos 3x=0$ $\cos 3x=-0.2 \quad 3x=\cos^{-1}(-0.2)$ $\rightarrow \quad x=0.59$ or 1.50	M1 A1 A1 [3]	Looks up cos before ÷ 3 co.co.

6)

(iii) $\cos\left(z+\frac{\pi}{2}\right)=-\frac{1}{2}$ $z+\frac{\pi}{2}=\frac{2\pi}{3},\frac{4\pi}{3}$ $z=\frac{\pi}{6},\frac{5\pi}{6}$, allow 0.52, 2.62 rads	M1 A1,A1 [3]	M1 for dealing with sec and order of operations A1 for each

7)

(ii) $2\cot^2 y+3\operatorname{cosec} y=0$ $2\left(\operatorname{cosec}^2 y-1\right)+3\operatorname{cosec} y=0$ $2\operatorname{cosec}^2 y+3\operatorname{cosec} y-2=0$ $\left(2\operatorname{cosec} y-1\right)\left(\operatorname{cosec} y+2\right)=0$ leading to $\sin y=-\frac{1}{2},\ y=\frac{7\pi}{6},\frac{11\pi}{6}$	[4] M1 M1 M1 A1,A1 [5]	M1 for use of correct identity M1 for attempt to solve quadratic M1 for dealing with cosec

8)

11 **(i)** $\tan x=\frac{4}{3}, x=53.1°, 233.1°$	M1 A1, √A1 [3]	M1 for an equation in tan Follow through on their first answer +180°
(ii) $11\sin y+1=4(1-\sin^2 y)$ $(4\sin y-1)(\sin y+3)=0$ $\sin y=\frac{1}{4}, y=14.5°, 165.5°$	M1 M1 A1,√A1 [4]	M1 for use of correct identity M1 for dealing with quadratic Follow through on their 14.5
(iii) $\cos\left(2z+\frac{\pi}{3}\right)=-\frac{1}{2}$ $2z+\frac{\pi}{3}=\frac{2\pi}{3},\frac{4\pi}{3}$ so $z=\frac{\pi}{6},\frac{\pi}{2}$	B1 M1 A1, A1 [4]	 M1 for correct order of operations