Circular Measures 3 (Radians) Answers

1)

7	(i) $\frac{1}{2}4^2\theta = 10$, leading to	M1	M1 for use of $\frac{1}{2}r^2\theta$
	$\theta = 1.25$ rads	A1 [2]	
	(ii)		
	$AB = 5$	B1	
	$AC = 4\tan 1.25$, $AC = 12.038$	M1	M1 for attempt to get AC
	$BC = \frac{4}{\cos 1.25} - 4$, $BC = 8.685$	M1	M1 for attempt to get BC
	Perimeter = 25.7, allow 25.8	A1 [4]	

2)

11E (i)	Sector angle $= 1.2\pi$	B1	
	$OD = 12$	B1	
	$AD^2 = 12^2 + 6^2 - 2\times 12\times 6\cos 0.8\pi$	M1	
	$AD = 17.2$	A1	
	Uses $s = 6\times(1.2\pi) = (7.2\pi)$ (or 22.6)	M1	
	Complete plan $(AD + r\theta + 6)$ or $(17.2 + 7.2\pi + 6)$	M1	
	45.8	A1	
(ii)	$\Delta AOD = \frac{1}{2}\times 6\times 12\sin 0.8\pi$	M1	
	21.2	A1	
	Uses $A = \frac{1}{2}\times 6^2\times(1.2\pi)$	M1	
	21.6π or 67.8 or 67.9	A1	
	89.0 or 89	A1	[12]

3)

10 (i) BC = 2(10sin0.4) = 7.79	M1 A1 [2]	Any correct method – cos rule ok.
(ii) $\angle ABC$ = ½(π−0.8) = 1.17 rads	B1	Anywhere in the question.
Arc CD = 7.79 × 1.17, Arc BC = 10×0.8	M1	Use of $s=r\theta$ in either arc.
→ P = sum of the arcs + BD (=7.79)	M1	Overall plan – arc CD + arc BC + BD
→ P = 24.9	A1 [4]	co.
(iii) Area sector BDC = ½(7.79)²×1.17	M1	Use of $A=\frac{1}{2}r^2\theta$ for sector BDC
Area segment on BC =½.10²(0.8−sin0.8)	B1	B1 for $0.5(10)^2 0.8$
	B1	B1 for $0.5(10)^2 \sin 0.8$
→ Shaded area = 39.6 or 39.7	A1 [4]	co

4)

(i)	AB = 3	B1
	Correct use of trigonometry to APB = $\frac{2\pi}{3}$	B1
(ii)	$s = r\theta$	M1
	3.14 or 3.63 or π or $\frac{2\sqrt{3}\pi}{3}$	A1
	6.77	A1
(ii)	uses $\frac{1}{2}r^2\theta$	M1
	uses $\frac{1}{2}r^2\sin\theta$	M1
	1.84 or 0.815	A1
	Complete plan	M1
	2.65 to 2.66	A1
		10

5)

10	**(i)** $\tan\frac{\pi}{6} = \frac{4}{PA}$, $PA = 4\sqrt{3}$	B1	B1 for PA (answer given)
	$PB = \frac{4}{\sin\frac{\pi}{6}} + 4$, $PB = 12$	B1	B1 for PB (answer given)
	allow equivalent methods	[2]	
	(ii) Sector area = $\frac{1}{2}12^2 \times \frac{\pi}{3}$	√ B1	√ B1 sector area, ft on their PB
	Area of kite = $2 \times \frac{1}{2} \times 4\sqrt{3} \times 4$	M1, A1	M1 for attempt to find area of kite or appropriate triangle
	Shaded area = 47.7	A1	
		[4]	
	(iii) $P = \left(12 \times \frac{\pi}{3}\right) + 2\left(12 - 4\sqrt{3}\right) + 2(4)$	B1, B1, B1	B1 for each of the 3 terms
	= 30.7	B1	B1 for final answer
		[4]	