Core 2 Trigonometry Answers

4(a)	Area of triangle $=\frac{1}{2}(12)(8)\sin\theta$	M1		Use of $\frac{1}{2}ab\sin C$ or full equivalent
	$\sin\theta=\frac{20}{48}$ [=0.41(666…)]	A1		OE (giving 0.412 to 0.42)
	$\Rightarrow\theta=0.4297(7…)=0.430$ to 3sf	A1	3	AG(need to see >3sf value)
(b)	$\{AB^2=\}8^2+12^2-2\times8\times12\times\cos\theta$	M1		
	$=64+144-174.5….$	m1		Accept 33 to 34 inclusive if three values not separate
	$\Rightarrow AB=5.78…=5.8$ cm to 2sf	A1	3	If not 2sf condone 5.78 to 5.79 inclusive. Condone $\pm$
(c)(i)	Arc $AD=8\theta$;	M1;		
	$=3.44..=3.4$ cm to 2sf	A1	2	If not 2sf condone 3.438 to 3.44 inclusive
(ii)	Area of sector $=\frac{1}{2}r^2\theta$	M1		Stated or used [or 13.7(6..) seen]
	Shaded area = Area of triangle – sector area	M1		Difference of areas
	Shaded area $=20-0.5\times8^2\times\theta$			
	$=6.2$ cm^2 to 2sf	A1	3	Condone 6.24 to 6.2472
	Total		**11**	

1(a)	Area of sector $=\frac{1}{2}r^2\theta=\frac{1}{2}\times5^2\times\theta$	M1		$\frac{1}{2}r^2\theta$ seen or used
	$12.5\theta=8.1\Rightarrow\theta=0.648$	A1	2	AG Condone $\theta=0.648$ used to show that area = 8.1
(b)	Arc $=5\theta$;	M1		5θ
	$….. =3.24$ cm	A1		PI by a correct perimeter
	$\Rightarrow$ Perimeter $=10+$ arc $=13.24$ cm	A1√	3	CSO Condone missing/wrong units; condone 3sf i.e. 13.2 if no obvious error NMS 3/3
	Total		**5**	

2(a)	$\frac{\sin B}{4.8}=\frac{\sin100}{12}$	M1		Use of the sine rule
	$\sin B=\frac{4.8\sin100}{12}$ [= 0.39(392…)]	m1		Rearrangement
	(angle ABC) $=23.19(8…)$ {= 23.2°.}	A1	3	AG Need >1dp eg 23.19 or 23.20
(b)	Angle $C=80°-23.2°=56.8°$	M1		Valid method to find a relevant angle eg C (PI eg by correct $\sin C$) or 23.2°+10°
	Area of triangle $=0.5\times12\times4.8\times\sin C$	M1		OE eg $0.5\times4.8\times12\times\cos(B+10)$
	$…..=24.09….=24.1$ cm^2. (to 3sf)	A1	3	Condone missing/wrong units
	Total		**6**	

1(a)	{Area of sector =} $\frac{1}{2}r^2\theta$	M1		Condone missing/wrong units throughout the paper
	$=0.5\times36\times1.2=21.6$ cm^2	A1	2	
(b)	Arc $=r\theta$	M1		
	$=6\times1.2=7.2$	A1		
	Perimeter $=12+7.2=19.2$ cm	A1ft	3	Ft on incorrect evaluation of 6×1.2
	Total		5	

4(a)	$6^2=4^2+5^2-2(4)(5)\cos\theta$	M1		Use of the cosine rule
	$\cos\theta=\dfrac{4^2+5^2-6^2}{2(4)(5)}$	m1		Rearrangement
	$\cos\theta=\dfrac{5}{40}=\dfrac{1}{8}$	A1	3	CSO AG (be convinced)
(b)	$\cos^2\theta+\sin^2\theta=1$	M1		Stated or used (PI)
	$\sin^2\theta=\dfrac{63}{64}$	A1		Or better
	$\sin\theta=\dfrac{\sqrt{63}}{8}=\dfrac{\sqrt{9\times7}}{8}=\dfrac{3\sqrt{7}}{8}$	A1	3	AG (be convinced)
(c)	Area of triangle $=0.5\times4\times5\times\sin\theta$.	M1		
	$.....=\dfrac{30\sqrt{7}}{8}$ cm^2.	A1	2	OE (Condone 9.92)
	Total		8	

3(a)	Arc $=r\theta$	M1		For $r\theta$ or 20θ or PI by 20×1.4
	$28=20\theta\Rightarrow\theta=1.4$	A1	2	AG
(b)	Area of sector $=\dfrac{1}{2}r^2\theta$	M1		$\dfrac{1}{2}r^2\theta$ OE seen
	$=\dfrac{1}{2}20^2(1.4)=280$ (cm^2.)	A1	2	Condone absent cm^2.
(c)(i)	Area triangle $=\dfrac{1}{2}\times15\times20\times\sin1.4$	M1		Use of $\dfrac{1}{2}ab\sin C$ OE
	$(=147.8....)$			
	Shaded area $=$			
	Area of sector $-$ area of triangle	M1		
	$=280-147.8=132$ (cm^2.) (3sf)	A1ft	3	Ft on [ans (b) $-147.8...$] to 3sf provided [....] >0
(ii)	{$BD^2=$}$15^2+20^2-2\times15\times20\cos1.4$	M1		RHS of cosine rule used
	$=225+400-101.98...$	m1		Correct order of evaluation
	$\Rightarrow BD=\sqrt{523.019...}=22.86..$	A1	3	Condone absent cm
	$=22.9$ (cm) to 3 sf			
	Total		10	