1			$5.9^2 + 8.5^2 - 2 \times 5.9 \times 8.5 \times \cos 72$	M1		
			107 – 31 or better	M1	76.(….) or 204.(…) (radians)	or 64.(…..) (grad) NB 6.76cos72 or 2.08(8954882..) scores M1M0
			8.7(2…)	A1		if M0M0, B3 for 8.72 or better if unsupported or 8.7(2…) if obtained from other valid method
				[3]		

Question			Answer	Marks	Guidance	
2	(i)	(*A*)	$AC^2 = 12.8^2 + 7.5^2$ oe	**M1**	allow correct application of cosine rule or from finding relevant angle and using trig	
			$AC = 14.83543056..$	**A1**	rot to 3 or more sf , or 15	**B2** for 14.8 or better unsupported
			$\tan C = {}^{12\,8}/_{7\,5}$	**M1**	or $\sin C = {}^{12\,8}/_{\text{their}14\,8}$	or $\frac{\sin C}{12.8} = \frac{\sin 90}{\textit{their}14.8}$
			or $C = 90 - \tan^{-1}({}^{7\,5}/_{12\,8})$ oe		or $\cos C = {}^{7\,5}/_{\text{their}14\,8}$	or $\cos C = \frac{\textit{their}14.8^2 + 7.5^2 - 12.8^2}{2 \times 7.5 \times \textit{their}14.8}$
			59.6 to 59.64	**A1**		
			$\frac{AD}{\sin(155 - \textit{their}59.6)} = \frac{\textit{their}14.8}{\sin 35}$ oe	**M1**		
			25.69 to 25.8	**A1**	allow **B2** for $25.69 \leq AD < 25.8$ unsupported…..but **B0** for 25.8 unsupported	**M0A0** for ${}^{14\,8}/_{\cos 55} = 25.803...$
				[6]		

Question			Answer	Marks	Guidance	
2	(i)	(*B*)	area of *ABC* = 48 soi	**B1**	may be implied by correct final answer in range or by sight of ½ × 12.8 × 7.5 oe	condone 48.0…
			½×their 14.8…×their 25.7…×sin(their 59.6 – 10)	**M1**	may be implied by 144.8 to 146	
			192.8 to 194[m^2]	**A1**		**B3** for correct answer in range if unsupported
				[3]		
2	(ii)		angle *HMG* = $\frac{\pi - 1.1}{2}$ or *MHG* = 0.55 (31.5126°)	**B1**	or angle *EMF* or angle *MEF*	allow 1.02 to 1.021 *or* 58.487° to 58.5°
			HM = 1.7176 to 1.7225	**B1**		may be implied by final answer
			½ × 1.1 × *their HM*^{2} or $\frac{\theta}{360} \times \pi \times theirHM^2$	**M1**	1.63(0661924…) θ =63(.025357…)	check arithmetic if necessary their *HM* ≠ 0.9 or 1.8
			area of triangle *EMF* = 0.652 to 0.662	**B1**	or *MGH*	may be implied by final answer or in double this (1.304 to 1.324)
			2.95 to 2.952 [m^2] cao	**A1**		full marks may be awarded for final answer in correct range ie allow recovery of accuracy
				[5]		

3	**(i)**		$9.8^2 + 6.4^2 - 2 \times 9.8 \times 6.4 \times \cos 53.4$ $9.8^2 + 6.4^2 - 74.79...$ [= 62.2...] 7.887… or 7.89 or 7.9	M1 M1 A1 **[3]**	 for evidence of correct order of operations used; may be implied by correct answer if M0, B3 for 7.89 or more precise www	 6.89 implies M0 262.4368 implies M1 (calc in radian mode), (NB $\sqrt{262.436..}$=16.199…) NB 9.8sin53.4 = 7.87
3	**(ii)**		½ × 9.8 × 7.3 × sin (180 – 53.4) oe seen 28.716…or 28.72 or 28.7 or 29 isw	M1 A1 **[2]**	or sin 53.4 used; may be embedded if M0, B2 for 28.7 or more precise www	may be split into height = 9.8 × sin 53.4 then Area = ½ × 7.3 × height

4	**i** (*A*)	$5.2^2 + 6.3^2 - 2 \times 5.2 \times 6.3 \times \cos$ "57" ST = 5.6 or 5.57 cao	M2 A1	M1 for recognisable attempt at cos rule. or greater accuracy	3	
	i (*B*)	sin T/5.2 = sin(their 57)/their ST T=51 to 52 or S = 71 to 72 bearing 285 + their T or 408 – their S	M1 A1 B1	Or sin S/6.3 = … or cosine rule If outside 0 to 360, must be adjusted	3	
	ii	5.2θ, $24 \times 26/60$ θ = 1.98 to 2.02 θ = their $2 \times 180/\pi$ or 114.6°... Bearing = 293 to 294 cao	B1B1 B1 M1 A1	 Lost for all working in degrees Implied by 57.3	5	11

5			$\cos A = \frac{105^2 + 92^2 - 75^2}{2 \times 105 \times 92}$ oe 0.717598…soi A = 44.14345…° soi [0.770448553…] ½ × 92 × 105 × sin (*their* A) 3360 or 3361 to 3365	M1 A1 A1 M1 A1 **[5]**	or $\cos B = \frac{75^2 + 92^2 - 105^2}{2 \times 75 \times 92}$ oe 0.2220289…soi B = 77.1717719……° soi [1.346901422] or ½ × 75 × 92 × sin (*their* B)	or $\cos C = \frac{105^2 + 75^2 - 92^2}{2 \times 105 \times 75}$ oe 0.519746…soi C = 58.6847827…° soi [1.024242678…] ignore minor errors due to premature rounding for second **A1** condone *A*, *B* or *C* wrongly attributed or ½ × 75 × 105 × sin (*their* C) **or** **M3** for $\sqrt{136(136-75)(136-105)(136-92)}$ **A2** for correct answer 3360 or 3363 - 3364

6	**(i)**	$\frac{\sin A}{5.6} = \frac{\sin 79}{8.4}$ [A =] 40.87 to 41	M1 A1		
	(ii)	[BC^2 =] $5.6^2 + 7.8^2 - 2 \times 5.6 \times 7.8 \times$ cos ("180-79") = 108.8 to 108.9 [BC =] 10.4(…)	M1 A1 A1		5