

1	i	AB = 7.8(0), 7.798 to 7.799 seen area = 52.2 to 52.3	2 2	M1 for correct use of sine rule For long methods M1A1 for art 7.8 M1 for [2×][0.5 ×] their AB × 11.4 × sin 36°	4
	ii	tan 0.91 = ST/12.6 ST = 12.6 × tan 0.91 and completion (16.208...) area OSTR = [2×][0.5 ×]12.6 × their(16.2) nb 204. area of sector = 0.5 × 12.6 ² × 1.82 = 144.47... Logo = 59.6 to 60.0 arc = 12.6 × 1.82 [=22.9...] perimeter = 55.3 to 55.4	M1 E1 M1 M1 A1 A1 M1 A1	Accept 16.2 if ST is explicit but for long methods with pa check that their explicit expression = 16.2 oe using degrees soi by correct ans Accept 144, 144.5 oe using degrees	

Question		Answer	Marks	Guidance
2	(i)	$1.2r = 4.2$ 3.5 cao	M1 A1 [2]	$\text{or } \frac{68.7549...}{360} \times 2\pi r = 4.2$ with θ to 3 sf or better B2 if correct answer unsupported
2	(ii)	$\cos 0.6 = \frac{d}{\text{their}3.5}$ 2.888.. to 2.9	M1 A1 [2]	$\text{or } \cos 34.377.. = \frac{d}{\text{their}3.5}$ with θ to 3 sf or better or correct use of Sine Rule with 0.9708 (55.623°) or area = 5.709 = $0.5 \times h \times 3.952$, or $3.5^2 - 1.976^2 = d^2$

Question		Answer	Marks	Guidance	
3	(i)	$\sin(\frac{1}{2} \text{ COD}) = 3.5/5$ $\frac{1}{2} \text{ COD} = 0.7753(97496\dots)$ so $\text{COD} = 1.55$ area of sector = $\frac{1}{2} \times 11^2 \times 1.55(07\dots)$ [= 93.8m ² to 3 sf] area of triangle = $\frac{1}{2} \times 5^2 \times \sin 1.55(07\dots)$ or $\frac{1}{2} \times 7 \times 3.57\dots$ their 93.8 – their 12.497 soi 81 to 81.4 m ²	M1 M1 M1* M1* M1dep* A1 [6]	$\cos(\text{COD}) = \frac{5^2 + 5^2 - 7^2}{2 \times 5 \times 5}$ $\text{COD} = \cos^{-1}(1/50)$ (or = 1.550....) or equivalent in degrees or $\frac{1}{2} \times 7 \times 5 \times \cos(\frac{1}{2} \text{ COD})$ oe 12.497... implies M1	must see $88.85 \times \frac{\pi}{180}$ if working in degrees (88.85 or better) M0 for area of triangle = $\frac{1}{2} \times 5^2$
3	(ii) (A)	sector angle = $2\pi - 1.55$ soi $7.4 \times$ their 4.73(...) soi their arc $\div 0.8$ 43 cao	M1* M1dep* M1 A1 [4]	may be embedded in circumference – removed arc may be implied by answer 43.78... = 4.73 to 3sf ≈ 35 m arc length must be dimensionally correct, and must be an arc, not a radius.	
3	(ii) (B)	$11 \times 4.73(\dots) \div 0.8$ 22 cao	M1 A1 [2]	or $\frac{11}{7.4} \times 43.7\dots$ or $\frac{2\pi \times 11 - 1.55 \times 11}{0.8} = \frac{69.16 - 17.05}{0.8}$	

4	<p>area sector = $\frac{1}{2} \times r^2 \times \frac{\pi}{6} \left[= \frac{\pi r^2}{12} \right]$</p> <p>area triangle = $\frac{1}{2} \times a^2 \times \sin \frac{\pi}{6} \left[= \frac{a^2}{4} \right]$</p> <p>$\frac{1}{2}a^2 \times \frac{1}{2} = \frac{1}{2} \times r^2 \times \frac{\pi}{6} \times \frac{1}{2}$</p> <p>$\frac{a^2}{4} = \frac{\pi r^2}{24}$ o.e. and completion to given answer</p>	<p>M1</p> <p>M1</p> <p>M1</p> <p>A1</p>	<p>soi</p> <p>soi</p> <p>soi</p>	<p>allow sin30</p> <p>no follow through marks available</p> <p>at least one correct intermediate step required, and no wrong working to obtain given answer</p>
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5		radius = 6.5 [cm]	3	M1 for $\frac{1}{2} \times r^2 \times 0.4$ [= 8.45] o.e. and M1 for $r^2 = \frac{169}{4}$ o.e. [= 42.25]	3
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6	i(A)	150 (cm) or 1.5 m	2	M1 for 2.5×60 or 2.5×0.6 or for 1.5 with no units	2
	i(B)	$\frac{1}{2} \times 60^2 \times 2.5$ or 4500 $\frac{1}{2} \times 140^2 \times 2.5$ or 24 500 subtraction of these 20 000 (cm ²) isw	M1 M1 DM1 A1	or equivalents in m ² or 2 m ²	4
	ii(A)	attempt at use of cosine rule $\cos \text{EFP} = \frac{3.5^2 + 2.8^2 - 1.6^2}{2 \times 2.8 \times 3.5}$ o.e. 26.5 to 26.65 or 27	M1 M1 A1	condone 1 error in substitution	3
	ii(B)	2.8 sin (their EFP) o.e. 1.2 to 1.3 [m]	M1 A1		2