Question	Scheme	Marks
3(a)	$\frac{1}{2}\times 3^2\times\alpha = 7.2 \Rightarrow \alpha = ...$ or $\frac{1}{2}\times 3^2\times 1.6 = 7.2 \Rightarrow \alpha = 1.6$	M1
	$\alpha = 1.6$*	A1*
		(2)
(b)(i)	Angle $COA = \frac{1}{2}(2\pi - 1.6)(= 2.34...)$ $(\approx 134°)$	M1
	Area $COA = \frac{1}{2}\times 5\times 3\sin("2.34")$ $(= 5.38...)$	M1
	Total Area $= 2\times\frac{1}{2}\times 5\times 3\sin("2.34") + 7.2$	dM1
	= 18 (cm^2) Awrt 18 (cm^2) (Ans = 17.96)	A1
(ii)	Arc $AB = 3\times 1.6(= 4.8)$	B1
	$(AC^2 =)\ 5^2 + 3^2 - 2\times 5\times 3\cos("2.34")$	M1
	Total perimeter $= 2\times\sqrt{5^2 + 3^2 - 2\times 5\times 3\cos("2.34")} + 3\times 1.6$	dM1
	= Awrt 19.6 (cm)	A1
		(8)
Alt (b)(i)	$AB = 2\times 3\sin 0.8$	M1
	$ON = 3\cos 0.8$	M1
	Total Area $= \frac{1}{2}(5 + ON)\times AB + 7.2 - \frac{1}{2}\times 3\cos 0.8\times 2\times 3\sin 0.8$	dM1
	= 18 (cm^2) Awrt 18 (cm^2) (Ans = 17.96)	A1
		(10 marks)

Notes

(a)

M1 Uses a correct sector area formula and 7.2 to find the value for α. They should show the values embedded in the equation and proceed to find a value for α.
Alternatively, substitutes in $\alpha = 1.6$ into the area of a sector formula and achieves 7.2.

A1* Correct proof starting with $\frac{1}{2}\times 3^2\times\alpha = 7.2$ and at least one intermediate line of working and no errors. Eg $\frac{1}{2}\times 3^2\times\alpha = 7.2 \Rightarrow \alpha = \frac{7.2}{4.5} = 1.6$ scores M1A1
Alternatively, they must conclude that $\alpha = 1.6$ or if there is a preamble then there should be some form of completion which could be a tick, QED etc.
If they use a different variable such as θ they must state/link somewhere that $\alpha = 1.6$

(b)(i) **Mark both (i) and (ii) together. If no angle calculation is seen then use what they think is their angle *COA* in bi and bii. Beware of values on the diagram that may imply a method.**

M1 $\frac{1}{2}(2\pi - 1.6)$ Correct method for angle *COA*. Sight of awrt 2.34 is sufficient to score this mark and may be on the diagram. (May also be implied by 134°)

M1 Uses a correct method for the area of triangle *COA* or *COB*. It is sufficient to see the values embedded in the expression such as $\frac{1}{2}\times 5\times 3\sin("2.34")$ (= awrt 5.38 / 5.39). Angle may be in degrees. If they state $\frac{1}{2}ab\sin C$ oe but embed values as $\frac{1}{2}abC$ condone as a slip for M1.

dM1 Fully correct strategy for the area. It is dependent on the previous method mark so allow if their angle *COA* is incorrect. Look for $2\times$ area of triangle $COA + 7.2$. Embedded values are sufficient.

A1 awrt 18 (cm^2) **Must come from a correct method**

……

Alt b(i)

M1 Find the length $AB = 2\times 3\sin 0.8$ (awrt 4.30)

M1 Finds the length *ON* where *N* is the midpoint of *AB* (awrt 2.09)

dM1 Fully correct strategy for the area. Look for $7.2 +$ area of triangle *ABC* – area of triangle *AOB*

A1 awrt 18 (cm^2) **Must come from a correct method**

……

(ii)

B1 Correct expression or value for the arc length (4.8)

M1 Uses a correct method for AC^2, *AC*, CB^2 or *CB*. Embedded values in the associated formula is sufficient or sight of awrt 54.9 or awrt 7.41 would imply this mark. (Angle in degrees $\approx 134°$) For this mark condone candidates confusing AC^2/CB^2 and *AC*/*CB*.

dM1 Total perimeter $= 2\times\sqrt{5^2+3^2-2\times 5\times 3\cos("2.34")} + 3\times 1.6$. It is dependent on the B and the M marks and they must have remembered to square root AC^2 or CB^2.

A1 awrt 19.6 (cm) (Ans = 19.619) **Must come from a correct method**