Question Number	Answer	Marks
4	**Penalise only once in the question for non 3 sf answers.**	
(a)	$\frac{1}{2}\times 10^2 \sin\theta = 20$	M1
	$\theta = 0.4115... = 0.412$ (Any complete method M1; Correct answer A1)	A1 (2)
(b)	$r\theta = 10\times 0.412 = 4.12$	M1A1ft (2)
(c)	area of sector = $\frac{1}{2}r^2\theta = \frac{1}{2}\times 100\times 0.4115 = 20.5754$	M1
	shaded area = $20.5754 - 20 = 0.576$ (accept 0.575)	M1A1 (3) [7]

Notes

M1 for using Area of $\Delta = \frac{1}{2}ab\sin C$ with $a = b = 10$ and $A = 20$

A1cao for $\theta = 0.412$ **must be 3 sf and in radians**

There are longer methods. Give M1 if any complete method is used and A1 for correct value.

(b)

M1 for using length arc $= r\theta$ or any other valid method. Some may work in degrees - allow M1 for correct formula (for degrees) used with angle in degree

A1cao for $r\theta = 4.12$ If rounding penalised in (a), award for more figures, see initial notes for info on rounding/truncating penalties

(c)

M1 for using $A = \frac{1}{2}r^2\theta$ with *their* θ and $r = 10$ Some may work in degrees - allow M1 for correct formula (for degrees) used with angle in degrees

M1 for *their* area of the sector - 20. Must be this way round even if it gives a negative answer.

A1cao . For 0.576 or 0.575. Answer must be 3 sf (or more if already penalised)