

Solutions

1a.

$3 = 0.4(\text{OD})$	M1
$\text{OD} = \frac{3}{0.4}$ $\text{OD} = 7.5\text{cm}$	M1

1b.

$\text{AO} = 12 - 7.5 = 4.5$	M1
$\widehat{\text{AOB}} = \pi - 0.4 = 2.7415\dots$	M1
Area of sector AOB $= \frac{1}{2}(4.5)^2(2.7415)$	M1
$= 27.759\dots$ $= 27.8 \text{ cm}^2$ (to 3 s.f)	M1



Area of sector $ABC = \frac{0.8}{2\pi} \times \pi(16)^2 = 102.7\text{cm}$	M1
Area of $ABD = 1/2 (16)(7) \sin 0.8 = 40.171 \text{ cm}^2$	M1
Area of $BDC = 102.4 - 40.171\dots$	M1
$= 62.228\dots$ $= 62.3 \text{ cm}^2$	M1

1b.

Arc length $BC = \frac{0.8}{2\pi} \times 2\pi(16) = 12.8 \text{ cm}$	M1
ABD Cosine rule: $BD^2 = 16^2 + 7^2 - 2(16)(7) \cos 0.8$ $= 148.937$	M1
$BD = \sqrt{148.937} = 12.204 \dots \text{ cm}$	M1
Perimeter $BDC = 12.8 + 12.204\dots + 9$ $= 34.004\dots$ $= 34.0 \text{ cm (3 s.f)}$	M1

