

4. (a) $l = r\theta$ or $ACB = 2 \times OA$ (M1)
 $= 30 \text{ cm}$ (A1) (C2)
- (b) $\widehat{AOB}(\text{obtuse}) = 2\pi - 2$ (A1)
 $\text{Area} = \frac{1}{2}\theta r^2 = \frac{1}{2}(2\pi - 2)(15)^2$ (M1)(A1)
 $= 482 \text{ cm}^2$ (3 s.f.) (A1) (C4)
[6 marks]

20. $h = r$ so $2r^2 = 100 \Rightarrow r^2 = 50$ (M1)
- $l = 10\theta = 2\pi r$ (M1)
- $\Rightarrow \theta = \frac{2\pi\sqrt{50}}{10}$ (A1)
- $= \frac{2\pi5\sqrt{2}}{10}$
- $\theta = \pi\sqrt{2} = 4.44$ (3 s.f.) (A1)
- Note:** Accept either answer.
- Answer:** $\theta = \pi\sqrt{2} = 4.44$ (3 s.f.) (C4)

QUESTION 14

- (a) area of sector $ABDC = \frac{1}{4}\pi(2)^2 = \pi$ (A1)
 area of segment $BDCP = \pi - \text{area of } \triangle ABC$ (M1)
 $= \pi - 2$ (A1) (C3)
- (b) $BP = \sqrt{2}$ (A1)
 area of semicircle of radius $BP = \frac{1}{2}\pi(\sqrt{2})^2 = \pi$ (A1)
 area of shaded region $= \pi - (\pi - 2) = 2$ (A1) (C3)

QUESTION 2

$$\text{Area of large sector} = \frac{1}{2}r^2\theta = \frac{1}{2}16^2 \times 1.5 \quad (M1)$$

$$= 192 \quad (A1)$$

$$\text{Area of small sector} = \frac{1}{2}r^2\theta = \frac{1}{2} \times 10^2 \times 1.5 \quad (M1)$$

$$= 75 \quad (A1)$$

$$\text{Shaded area} = \text{large area} - \text{small area} = 192 - 75 \quad (M1)$$

$$= 117 \quad (A1) \quad (C6)$$

QUESTION 14**METHOD 1**

$$\text{Area sector OAB} = \frac{1}{2}(5)^2(0.8) \quad (M1)$$

$$= 10 \quad (A1)$$

$$\text{ON} = 5 \cos 0.8 \quad (= 3.483\dots) \quad (A1)$$

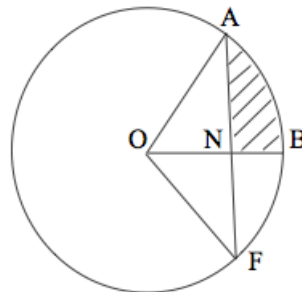
$$\text{AN} = 5 \sin 0.8 \quad (= 3.586\dots) \quad (A1)$$

$$\text{Area of } \triangle \text{AON} = \frac{1}{2}\text{ON} \times \text{AN}$$

$$= 6.249\dots \text{ (cm}^2\text{)} \quad (A1)$$

$$\text{Shaded area} = 10 - 6.249\dots$$

$$= 3.75 \text{ (cm}^2\text{)} \quad (A1) \quad (C6)$$

METHOD 2

$$\text{Area sector ABF} = \frac{1}{2}(5)^2(1.6) \quad (M1)$$

$$= 20 \quad (A1)$$

$$\text{Area } \triangle \text{OAF} = \frac{1}{2}(5)^2 \sin 1.6 \quad (M1)$$

$$= 12.5 \quad (A1)$$

$$\text{Twice the shaded area} = 20 - 12.5 \quad (= 7.5) \quad (M1)$$

$$\text{Shaded area} = \frac{1}{2}(7.5)$$

$$= 3.75 \text{ (cm}^2\text{)} \quad (A1) \quad (C6)$$

QUESTION 4

(a) $A = \frac{1}{2}r^2\theta$

$$27 = \frac{1}{2}(1.5)r^2$$

$$r^2 = 36$$

$$r = 6 \text{ cm}$$

(M1)(A1)

(A1)

(A1)

(C4)

(b) Arc length = $r\theta = 1.5 \times 6$

Arc length = 9 cm

(M1)

(A1)

(C2)

Note: Penalize a total of *(1 mark)* for missing units.