

MENSURATION MC

Form 6

Vol 2

Part B - Circle / Sector

1. Area of the shaded region

$$\begin{aligned} &= \frac{140^\circ}{360^\circ} \pi (9)^2 - \frac{1}{2} (9)^2 \sin 140^\circ \\ &\approx 72.9272704 \\ &= 72.9 \text{ cm}^2 \end{aligned}$$

2. Area of the shaded region

$$\begin{aligned} &= \frac{1}{2} (2)^2 \sin 60^\circ - 3 \times \frac{60^\circ}{360^\circ} \pi (1)^2 \\ &\approx 0.16125448 \\ &= 0.161 \text{ cm}^2 \end{aligned}$$

3. Perimeter of the shaded region

$$\begin{aligned} &= 8 + (\sqrt{8^2 + 8^2} - 8) + \frac{45^\circ}{360^\circ} 2\pi(8) \\ &\approx 17.59689381 \\ &= 17.6 \text{ cm} \end{aligned}$$

Area of the shaded region

$$\begin{aligned} &= \frac{1}{2} (8)^2 - \frac{45^\circ}{360^\circ} \pi (8)^2 \\ &\approx 6.867258771 \\ &= 6.87 \text{ cm}^2 \end{aligned}$$

4. A

Area of the shaded region

$$\begin{aligned} &= \frac{1}{2} (8)^2 \sin 60^\circ - 3 \times \frac{60^\circ}{360^\circ} \pi (4)^2 \\ &\approx 2.580071692 \\ &= 2.58 \text{ cm}^2 \end{aligned}$$

5. (a)
$$\cos \angle AOB = \frac{OA^2 + OB^2 - AB^2}{2(OA)(OB)}$$

$$\angle AOB = 120^\circ$$

(b) Area of the shaded region

$$= \frac{120^\circ}{360^\circ} \pi (6)^2 - \frac{1}{2} (6)^2 \sin 120^\circ$$

$$= (12\pi - 9\sqrt{3}) \text{ cm}^2$$

6. A

Consider sector OAB

Area of minor segment DB

$$= \frac{60^\circ}{360^\circ} \pi (6)^2 - \frac{1}{2} (6)^2 \sin 60^\circ$$

$$= (6\pi - 9\sqrt{3}) \text{ cm}^2$$

Area of the shaded region

$$= 2 \times \text{area of the shaded region } OAD$$

$$= 2 \times \left[\frac{90^\circ}{360^\circ} \pi (6)^2 - \frac{60^\circ}{360^\circ} \pi (6)^2 - (6\pi - 9\sqrt{3}) \right]$$

$$= 2(9\pi - 6\pi - 6\pi + 9\sqrt{3})$$

$$= (18\sqrt{3} - 6\pi) \text{ cm}^2$$

7. Let the radius be r cm.

Note that $XZ : BC = 1 : 2$ (mid-point thm.)

$$2r = \frac{1}{2} \times 12$$

$$r = 3$$

Area of the shaded region

$$= \frac{1}{2} \left(\frac{12}{2}\right)^2 \sin 60^\circ - \frac{120^\circ}{360^\circ} \pi (3)^2$$

$$\approx 6.163679307$$

$$= 6.16 \text{ cm}^2$$

8. D

Denote the centre be O .

$$OA = OC = 6 \text{ cm and } AC = 6 \text{ cm}$$

$\therefore \triangle OAC$ is an equilateral triangle.

Area of the shaded region

$$= \frac{1}{2}(6)^2 \sin 60^\circ + \frac{120^\circ}{360^\circ} \pi(6)^2$$

$$\approx 53.28756911$$

$$= 53.3 \text{ cm}^2$$

9. C

Let $DC = r$ cm

$$2\left(\frac{60^\circ}{360^\circ} 2\pi r + r\right) = 15$$

$$\left(\frac{2}{3}\pi + 2\right)r = 15$$

$$r \approx 3.663544828$$

$$r^2 \approx 13.4215607$$

\therefore Area of the square = 13.4 cm^2