Fully-worked Solutions
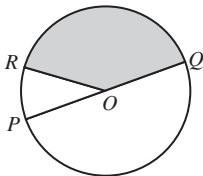
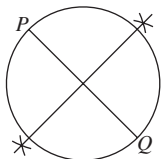**Formative Practice**

1

The shaded region *OQR* is a sector of circle.
Answer: **D**

2

3 (a)

Chord	Part of a circumference.

(b)

Arc	Perimeter of a circle.

(c)

Circumference	Region bounded by an arc and a chord.

(d)

Segment	Straight line joining two points on the circle.
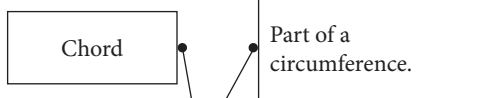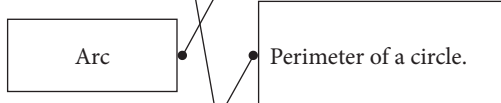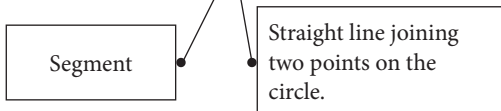
4

5

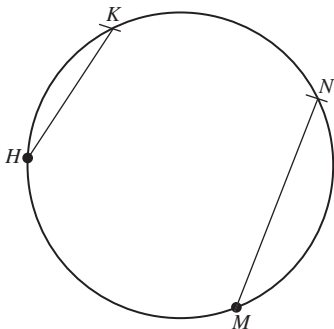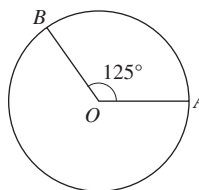**6** Radius of circle is not perpendicular to chord.
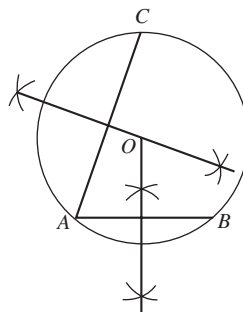Answer: **C**

7 (a) ✓   (b) ✓
   (c) ✗

8 1.4 cm

9 (a) $OH^2 = 51^2 - 45^2$
           $= 576$
     $OH = \sqrt{576}$
           $= 24$ cm
   (b) Height of oil
       $= 51$ cm $+ 24$ cm
       $= 75$ cm

10 Area of the shaded region
   $= \pi(6)^2 - \pi(3)^2$
   $= 36\pi - 9\pi$
   $= 27\pi$ cm^2
   Answer: **C**

11 (a)

Circumference (cm)	Diameter (cm)	Circumference / Diameter
7.855	2.5	3.142
11.311	3.6	3.142
13.195	4.2	3.142
17.91	5.7	3.142
21.365	6.8	3.142

(b) $\dfrac{\text{Circumference}}{\text{Diameter}} = \boxed{\textbf{3.142}}$

Circumference

$= \boxed{\textbf{3.142}} \times \text{Diameter}$

12 (a) Circumference

$= 2 \times \dfrac{22}{7} \times 7$

$= 44$ cm

Area $= \dfrac{22}{7} \times 7^2$

$= 154$ cm^2

(b) $220 = 2 \times \dfrac{22}{7} \times r$

$1\,540 = 44 \times r$

$r = 35$ mm

Area $= \dfrac{22}{7} \times 35^2$

$= 3\,850$ mm^2

(c) $13.86 = \dfrac{22}{7} \times r^2$

$97.02 = 22r^2$

$r^2 = 4.41$

$r = 2.1$ m

Circumference $= 2 \times \dfrac{22}{7} \times 2.1$

$= 13.2$ m

13 (a) Circumference of object

$= 2 \times 3.142 \times 1.4$

$= 8.8$ cm

(b) Circumference of object

$= 2 \times 3.142 \times 2.1$

$= 13.2$ cm

(c) Circumference of object

$= 2 \times 3.142 \times 1.5$

$= 9.43$ cm

(d) Circumference of object

$= 2 \times 3.142 \times 20$

$= 125.68$ cm

14 Number of shaded sectors = 12

Number of unshaded sectors = 12

$x = \dfrac{1}{2} \times \text{circumference}$

$= \dfrac{1}{2} \times 2\pi \times r$

$= \pi \times r$

$y = r$

Area of circle

$= x \times y$

$= \pi \times r \times r$

$= \pi \times r^2$

15 (a) Length of arc

$= \dfrac{30°}{360°} \times 2\pi \times 12$

$= 2\pi$ cm

(b) Length of arc

$= \dfrac{160°}{360°} \times 2\pi \times 9$

$= 8\pi$ cm

(c) Length of arc

$= \dfrac{210°}{360°} \times 2\pi \times 6$

$= 7\pi$ cm

16 (a) $S = \dfrac{45°}{360°} \times 2 \times \dfrac{22}{7} \times 14$

$= 11$ cm

(b) $4\pi = \dfrac{80°}{360°} \times 2\pi \times r$

$2 = \dfrac{2}{9}r$

$r = 9$ cm

(c) $10\pi = \dfrac{\theta}{360°} \times 2\pi \times 15$

$\dfrac{1}{3} = \dfrac{\theta}{360°}$

$\theta = \dfrac{1}{3} \times 360°$

$= 120°$

17 $\dfrac{200°}{360°} \times 2 \times \dfrac{22}{7} \times r = 440$

$r = 126$

18 (a) Area of sector

$= \dfrac{70°}{360°} \times \dfrac{22}{7} \times 6^2$

$= 22$ cm^2

(b) Area of sector

$= \dfrac{210°}{360°} \times \dfrac{22}{7} \times 18^2$

$= 594$ cm^2

19 (a) $36.96 = \dfrac{x}{360°} \times \dfrac{22}{7} \times 8.4^2$

$x = \dfrac{36.96}{8.4^2} \times \dfrac{7}{22} \times 360°$

$= 60°$

(b) $99 = \dfrac{140°}{360°} \times \dfrac{22}{7} \times r^2$

$r^2 = 99 \times \dfrac{360°}{140°} \times \dfrac{7}{22}$

$= 81$

$r = 9$ cm

20 (a) $PR^2 = 25^2 - 20^2$

$= 625 - 400$

$= 225$

$PR = 15$ cm

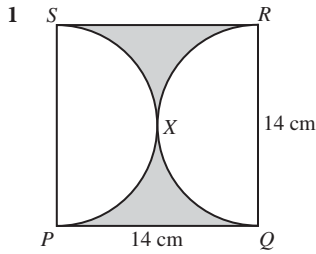(b) Circumference of circle

$= 2 \times 3.142 \times 5$

$= 31.42$ cm

(c) Perimeter of the shaded region

$= 20 + 25 + 15 + 31.42$
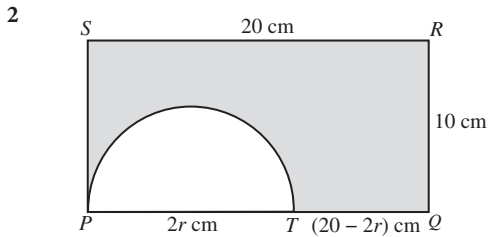
$= 91.42$ cm

1

Area of the shaded region

$= 14 \times 14 - \dfrac{22}{7} \times 7^2$

$= 196 - 154$

$= 42 \text{ cm}^2$
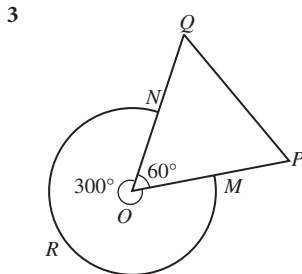
Answer: **C**

2

$\pi r + (20 - 2r) + 10 + 20 + 10 = 68$

$\dfrac{22}{7}r - 2r + 60 = 68$

$\dfrac{8}{7}r = 8$

$r = 7$

Answer: **C**

3

Reflex angle POQ

$= 360° - 60°$

$= 300°$

Length of arc MRN

$= \dfrac{300°}{360°} \times 2\pi \times 15$

$= 25\pi \text{ cm}$

Answer: **C**

4 $\dfrac{20°}{360°} \times \pi \times x^2 = \dfrac{80°}{360°} \times \pi \times 5^2$
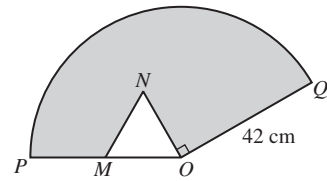
$x^2 = 100$

$x = 10$

Answer: **B**

5 Area of the diagram

$= \dfrac{30°}{360°} \times \pi \times 12^2 + \dfrac{1}{2} \times \pi \times 3^2$

$= 12\pi + 4.5\pi$

$= 16.5\pi \text{ cm}^2$

Answer: **B**

6

Length of arc PQ

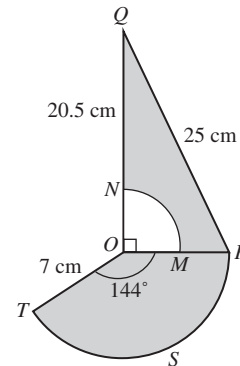$= \dfrac{150°}{360°} \times 2 \times \dfrac{22}{7} \times 42$

$= 110 \text{ cm}$

Perimeter of the shaded region

$= 110 + 21 + 21 + 21 + 42$

$= 215 \text{ cm}$

7

$OQ^2 = 25^2 - 7^2$

$= 576$

$OQ = 24 \text{ cm}$

$NQ = 24 - 3.5$

$= 20.5 \text{ cm}$

Area of the shaded region

$= \dfrac{144°}{360°} \times \dfrac{22}{7} \times 7^2 + \dfrac{1}{2} \times 7 \times 24 - \dfrac{1}{4} \times \dfrac{22}{7} \times 3.5^2$

$= 61.6 + 84 - 9.625$

$= 135.975$

$\approx 135.98 \text{ cm}^2$