Geometry Book Answers

5. Area of a circle

1. Area $= \pi r^2$

$\quad = \pi \times (5)^2$

$\quad = 25\pi \text{ cm}^2$

$\quad \simeq 78.54 \text{ cm}^2$

2. Area $= \pi r^2$

$\quad = \pi \times (3)^2$

$\quad = 9\pi \text{ cm}^2$

3. $\text{Area}_1 = \pi r_1^2$

$\quad = \pi (20)^2$

$\quad = 400\pi \text{ cm}^2$

$\text{Area}_2 = \pi (40)^2$

$\quad = 1600\pi \text{ cm}^2$

$\text{Area}_3 = \pi (60)^2$

$\quad = 3600\pi \text{ cm}^2$

• Total area $= A_1 + A_2 + A_3$

$\quad = 400\pi + 1600\pi + 3600\pi$

$\quad = 5600\pi \text{ cm}^2$

4. a) Area $= \pi r^2 = 64\pi$

$\quad \pi r^2 = 64\pi \qquad \div \pi$

$\quad r^2 = 64 \quad \text{"rooting"}$

$\quad r = \sqrt{64} = 8 \text{ cm}$

b) Area $= \dfrac{\pi D^2}{4} = 144\pi$

$\quad \dfrac{\pi D^2}{4} = 144\pi \qquad \times 4$

$\quad \pi D^2 = 4 \times 144\pi \quad \div \pi$

$\quad D^2 = 576 \quad \text{"square rooting"}$

$\quad D = \sqrt{576} = 24 \text{ cm}$

or

$\quad$ Area $= \pi r^2 = 144\pi$

$\quad \pi r^2 = 144\pi \quad \div \pi$

$\quad r^2 = 144 \quad \text{"square rooting"}$

$\quad r = \sqrt{144} = 12 \text{ cm}$

Diameter $= 2r = 2 \times 12$

$\quad = 24 \text{ cm}$

5. a) Area $= \pi r^2 = 120$

$\quad \pi r^2 = 120 \qquad \div \pi$

$\quad r^2 = \dfrac{120}{\pi} \quad \text{"square rooting"}$

$\quad r = \sqrt{\dfrac{120}{\pi}} \simeq 6.18 \text{ cm}$

b) Diameter $= 2r$

$\quad = 2 \times 6.18$

$\quad = 12.36 \text{ cm}$

(18)

6. a) $Area = \dfrac{\pi r^2}{2} = \dfrac{\pi (4)^2}{2}$

$= \dfrac{16\pi}{2} = 8\pi \ cm^2$

b) $Area = \dfrac{\pi r^2}{4} = \dfrac{\pi (9)^2}{4}$

$= \dfrac{81\pi}{4} = 20\frac{1}{4}\pi \ cm^2$

$= 20.25\pi \ cm^2$

c) $Area = \dfrac{\pi r^2}{2}$

$radius = \dfrac{D}{2} = \dfrac{9}{2} = 4.5 cm$

$Area = \dfrac{\pi (4.5)^2}{2} = \dfrac{20.25\pi}{2}$

$= 10.125\pi \ cm^2$

7. Area of Semicircle $= 50\pi$

Area of circle $= 2 \times 50\pi$

$= 100\pi$

$\therefore \pi r^2 = 100\pi \quad \div \pi$

$r^2 = 100 \quad$ "square rooting"

$r = \sqrt{100} = 10 cm$

$\underset{=}{or}$

Area of Semicircle $= 50\pi$

$\dfrac{\pi r^2}{2} = 50\pi \quad (\times 2)$

$\pi r^2 = 50 \times 2 \pi \quad (\div \pi)$

$r^2 = 100 \rightarrow r = \sqrt{100} = \underset{=}{10}$

8. $Area = \dfrac{\pi r^2}{4} = \dfrac{\pi (8.17)^2}{4}$

$\simeq 52.42 \ mm^2$

9. $Area = \dfrac{\pi D^2}{4} = \dfrac{\pi (12)^2}{4}$

$= 36\pi \ m$

$\simeq 113.1 \ m^2$

Number of bags $= \dfrac{113.1}{15} = 7.54$

$\simeq 8$ bags

10. Area of photo $= \pi r^2$

$= \pi (12)^2$

$= 144\pi \ cm^2$

· Radius of frame $= 12 + 4 = 16 cm$

· Area of frame $= \pi (16)^2$

$= 256\pi \ cm^2$

· Area of shaded part $= 256\pi - 144\pi$

$= 112\pi \ cm^2$

$\simeq 351.86 \ cm^2$

(19)

192

11. Area $= \pi r^2 = 200$

$\pi r^2 = 200 \quad \div \pi$

$r^2 = \dfrac{200}{\pi}$ "square rooting"

$r = \sqrt{\dfrac{200}{\pi}} \simeq 7.98$ cm
$\simeq 8$ cm

12. $C = 2\pi r = 40$

$2\pi r = 40 \quad \div (2\pi)$

$r = \dfrac{40}{2\pi} \simeq 6.37$ cm

Area $= \pi r^2 = \pi \times (6.37)^2$
$= 127.32$ cm²

13. Area $= \pi r^2$
$= \pi \times (8)^2$
$= 64\pi$ not 8π

14. Area of semicircle $= \dfrac{\pi r^2}{2}$
$= \dfrac{\pi(10)^2}{2}$
$= 50\pi$ cm²

Area of trapezium $= \left(\dfrac{12+20}{2}\right) \times 10$
$= 16 \times 10$
$= 160$ cm²

.Total Area $= 160 + 50\pi$
$\simeq 317.08$ cm²

15. a) $C = \pi D$
$= \pi(62)$
$\simeq 194.78$ cm

Distance $= 100 \times$ circumference
$= 100 \times 194.78$
$= 19478$ cm $\quad \div 100$
$= 194.78$ metres

b) $C = 2\pi r$
$= 2\pi(7.5) = 15\pi$ cm
$\simeq 47.124$ cm

revolutions $= \dfrac{50 \times 100}{47.124} = 106.1$
$\simeq 106$ revolutions

16. Area of window $= \dfrac{\pi r^2}{2}$
$= \dfrac{\pi(2.5)^2}{2} \simeq 9.817$ m²

Area of rectangle $= 5 \times 12$
$= 60$ m²

.Area painted $= 60 - 9.817$
$= 50.183$ m²

.Number of tins $= \dfrac{50.183}{5} \simeq 10$

.Cost $= 10 \times 1.99 = 19.9$ £

(20)

193