

Extend Tasks — Answers



Solve these problems involving area. Justify your reasoning.

- 1.** Circle: radius r ; find area in terms of π and r

Solution

$$\text{Area} = \pi r^2$$

- 2.** If a circle has area $49\pi \text{ cm}^2$, find its radius.

Solution

$$\begin{aligned}\pi r^2 &= 49\pi \Rightarrow r^2 = 49 \\ r &= 7 \text{ cm (positive root)}\end{aligned}$$

- 4.** Parallelogram has base b and height h ; triangle has same base b and same height h ; explain ratio of areas.

Solution

$$\begin{aligned}\text{Parallelogram} &= bh; \text{triangle} = \frac{1}{2}bh \\ \text{Ratio} &= 2 : 1 \text{ (parallelogram is twice)}\end{aligned}$$

- 5.** Trapezium with parallel sides 5 m and 15 m, and area 100 m^2 ; find height.

Solution

$$\begin{aligned}\frac{1}{2}(5 + 15)h &= 100 \Rightarrow 10h = 100 \\ h &= 10 \text{ m}\end{aligned}$$

- 7.** Derive why trapezium area $= \frac{1}{2}(a + b)h$ by using two triangles.

Solution

$$\begin{aligned}\text{Two triangles: } &\frac{1}{2}ah + \frac{1}{2}bh \\ &= \frac{1}{2}(a + b)h\end{aligned}$$

- 8.** Irregular hexagon composed of rectangle ($12 \text{ cm} \times 8 \text{ cm}$) and two triangles (each base 12 cm, height 3 cm); find total area.

Solution

$$\begin{aligned}&= (12)(8) + 2 \cdot \frac{1}{2}(12)(3) \\ &= 96 + 36 = 132 \text{ cm}^2\end{aligned}$$

- 3.** Composite: quarter circle (radius 8 cm) inside a square (side 8 cm); find shaded area (use $\pi = 3.14$)

Solution

$$\begin{aligned}\text{Shaded} &= 8^2 - \frac{1}{4}(3.14)(8^2) \\ &= 64 - 50.24 = 13.76 \text{ cm}^2\end{aligned}$$

- 6.** Complex composite: rectangle $20 \text{ cm} \times 15 \text{ cm}$ with semicircles removed from each end (diameter 15 cm); use $\pi = 3.14$.

Solution

$$\begin{aligned}&= (20)(15) - 3.14(7.5^2) \\ &= 300 - 176.625 = 123.375 \text{ cm}^2\end{aligned}$$

- 9.** Circle with diameter 10 m; find area leaving answer in exact form as π expression.

Solution

$$\begin{aligned}r &= 5 \text{ m: Area} = \pi \times 5^2 \\ &= 25\pi \text{ m}^2\end{aligned}$$