

Short Answer Type Questions – I

[2 marks]

Que 1. If a square is inscribed in a circle, what is the ratio of the areas of the circle and the square?

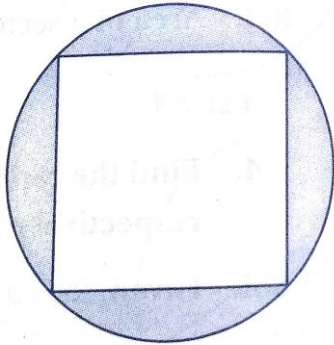


Fig. 12.6

Sol. Let radius of the circle be r units.

Then, diagonal of the square = $2r$

$$\Rightarrow \text{Side of the square} = \frac{2r}{\sqrt{2}} = \sqrt{2}r$$

$$\therefore \frac{\text{Area of the circle}}{\text{Area of the square}} = \frac{\pi r^2}{(\sqrt{2}r)^2} = \frac{\pi r^2}{2r^2} = \pi : 2$$

Que 2. What is the area of the largest triangle that is inscribed in a semi-circle of radius r unit?

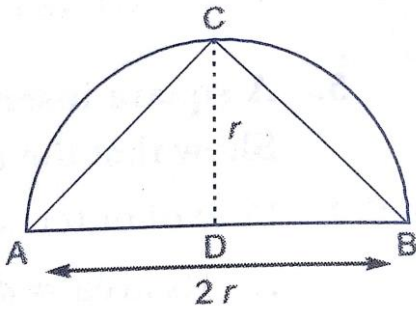


Fig. 12.7

Sol. Area of largest $\triangle ABC = \frac{1}{2} \times AB \times CD$

$$= \frac{1}{2} \times 2r \times r = r^2 \text{ sq. units}$$

Que 3. What is the angle subtended at the centre of a circle of radius 10 cm by an arc of length 5π cm?

Sol. Arc length of a circle of radius $r = \frac{\theta}{360^\circ} \times 2\pi r$

$$\Rightarrow 5\pi = \frac{\theta}{360^\circ} \times 2\pi \times 10 \quad \text{or} \quad \frac{\theta}{360^\circ} = \frac{5\pi}{20\pi} = \frac{1}{4} \Rightarrow \theta = \frac{360^\circ}{4} = 90^\circ$$

Que 4. What is the area of the largest circle that can be drawn inside a rectangle of length a cm and breadth b cm ($a > b$)?

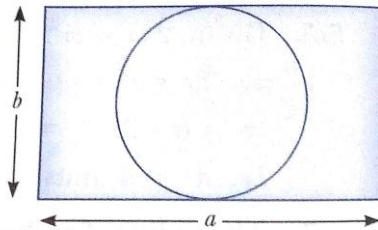


Fig. 12.8

Sol. Diameter of the largest circle that can be inscribed in the given rectangle = b cm

$$\therefore \text{Radius} = \frac{b}{2} \text{ cm}$$

$$\Rightarrow \text{Area of the required circle} = \pi \left(\frac{b}{2}\right)^2 = \frac{\pi b^2}{4} \text{ cm}^2$$

Que 5. Different between the circumference and radius of a circle is 37 cm. Find the area of circle.

Sol. Given $2\pi r - r = 37$

$$\text{or } r(2\pi - 1) = 37$$

$$r = \frac{37}{2\pi - 1} = \frac{37}{2 \times \frac{22}{7} - 1} = \frac{37 \times 7}{37} = 7$$

So area of circle = πr^2

$$= \frac{22}{7} \times 7 \times 7 = 154 \text{ cm}^2$$

Que 6. The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.

Sol. Let r be the radius of required circle. Then, we have

$$\pi r^2 = \pi(8)^2 + \pi(6)^2$$

$$\Rightarrow \pi r^2 = 64\pi + 36\pi \Rightarrow \pi r^2 = 100\pi$$

$$\therefore r^2 = \frac{100\pi}{\pi} = 100 \Rightarrow r = 10 \text{ cm}$$

Hence, radius of required circle is 10 cm.

Que 7. The radii of two circles are 19 cm and 9 cm respectively. Find the radius of the circle which has circumference equal to the sum of the circumferences of the two circles.

Sol. Let R be the radius of required circle. Then, we have

$$2\pi R = 2\pi(19) + 2\pi(9)$$

$$\Rightarrow 2\pi R = 2\pi(19 + 9) \Rightarrow R = \frac{2\pi \times 28}{2\pi} = 28 \Rightarrow R = 28 \text{ cm}$$

Hence, the radius of required circle is 28 cm.

Que 8. Find the area of a circle whose circumference is 22 cm.

Sol. Let r be the radius of the circle. Then,

$$\text{Circumference} = 22 \text{ cm}$$

$$\Rightarrow 2\pi r = 22 \Rightarrow r = \frac{22}{2\pi} = \frac{22 \times 7}{2 \times 22} = \frac{7}{2} \text{ cm}$$

$$\therefore \text{Area of the circle} = \pi r^2 = \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \text{ cm}^2 = 38.5 \text{ cm}^2$$

Que 9. The area of a circular playground is 22176 m². Find the cost of fencing this ground at the rate of ₹50 per m.

Sol. Area of circular playground = 22176 m²

$$\pi r^2 = 22176$$

$$\Rightarrow \frac{22}{7} r^2 = 22176 \Rightarrow r^2 = \frac{22176 \times 7}{22}$$

$$\Rightarrow r = 84 \text{ m}$$

$$\therefore \text{Circumference of a circle} = 2\pi r = 2 \times \frac{22}{7} \times 84 = 44 \times 12 = 528 \text{ m}$$

$$\therefore \text{Cost of fencing this ground} = 528 \times 50 = ₹ 26400.$$

Que 10. Find the area of a sector of a circle with radius 6 cm if angle of the sector is 60°.

Sol. We know that

$$\text{Area of a sector} = \frac{\theta}{360} \times \pi r^2$$

$$\text{Here, } \theta = 60^\circ \text{ and } r = 6 \text{ cm}$$

$$\therefore \text{Area of the sector} = \frac{60}{360} \times \pi(6)^2$$

$$= 6\pi = \frac{6 \times 22}{7} = \frac{132}{7} \text{ cm}^2 = 18\frac{6}{7} \text{ cm}^2$$