
Case Study 1:

A circular park in a town is surrounded by a walking track. The radius of the park is 35 m. A fountain is constructed at the center, covering a circular region of radius 7 m. The remaining space is covered with grass. The municipality decides to build two benches along the boundary of the fountain, each covering a sector of the circular region. The angle of each sector is 90° . The rest of the grass area is left open for visitors. Students of a nearby school are asked to calculate the areas of different parts for a project.

MCQ Questions:

1. What is the area of the circular park?

- (a) 3850 m^2
- (b) $3850\pi \text{ m}^2$
- (c) 3848 m^2
- (d) 3849 m^2

Answer: (b) $3850\pi \text{ m}^2$

Solution: Area of circle = $\pi r^2 = \pi(35)^2 = 1225\pi = 3850\pi \text{ m}^2$.

2. What is the area covered by the fountain?

- (a) $49\pi \text{ m}^2$
- (b) $154\pi \text{ m}^2$
- (c) 300 m^2
- (d) 150 m^2

Answer: (b) $154\pi \text{ m}^2$

Solution: Area = $\pi(7)^2 = 49\pi \text{ m}^2 = 154\pi \text{ m}^2$.

3. What is the area of the grass-covered region?

- (a) $3696\pi \text{ m}^2$
- (b) $3800\pi \text{ m}^2$
- (c) $3848\pi \text{ m}^2$
- (d) $3700\pi \text{ m}^2$

Answer: (a) $3696\pi \text{ m}^2$

Solution: Grass area = $3850\pi - 154\pi = 3696\pi \text{ m}^2$.

4. Each bench covers a 90° sector of the fountain. What is the total area of the two benches?

- (a) $77\pi \text{ m}^2$
- (b) $98\pi \text{ m}^2$
- (c) $154\pi \text{ m}^2$
- (d) $100\pi \text{ m}^2$

Answer: (b) $98\pi \text{ m}^2$

Solution: Area of one 90° sector = $\frac{90}{360} \times 154\pi = 38.5\pi$.

For two benches = $2 \times 38.5\pi = 77\pi \text{ m}^2$. **Correction:** Correct calculation: $\frac{90}{360} \times 154\pi = 38.5\pi$. For 2 benches = $77\pi \text{ m}^2$. Hence correct option is (a), not (b).

5. What is the remaining grass area after placing the benches?

- (a) $3619\pi \text{ m}^2$
- (b) $3615\pi \text{ m}^2$
- (c) $3620\pi \text{ m}^2$
- (d) $3600\pi \text{ m}^2$

Answer: (a) $3619\pi \text{ m}^2$

Solution: Remaining grass = $3696\pi - 77\pi = 3619\pi \text{ m}^2$.

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