

CLASS 10 — MATHEMATICS

Chapter: Areas Related to Circles

Practice Worksheet | CBSE Pattern

Maximum Marks: 40

Time Allowed: 1 hour 30 minutes

Name: _____

Class/Section: _____ Date: _____

General Instructions:

1. All questions are compulsory.
2. Read each question carefully before answering.
3. Show complete working for questions requiring calculations or proofs.
4. Select only one option for each MCQ.
5. Marks for each question are indicated alongside the question.
6. Write mathematical steps clearly and use appropriate notation.

This paper has 21 questions in five sections: A (Q1–Q10, 1 mark each), B (Q11–Q15, 2 marks each), C (Q16–Q19, 3 marks each), D (Q20, 4 marks) and E (Q21, case study, 4 marks). Use $\pi = \frac{22}{7}$ unless stated otherwise. Figures are not drawn to scale.

SECTION A

Multiple Choice Questions — Q1 to Q10 carry 1 mark each.

- Q1.** The area of a sector of a circle of radius 7 cm with central angle 90° is **[1 mark]**
(A) 38.5 cm^2 (B) 77 cm^2
(C) 154 cm^2 (D) 11 cm^2
- Q2.** The length of an arc of a circle of radius 21 cm, subtending an angle of 60° at the centre, is **[1 mark]**
(A) 44 cm (B) 22 cm
(C) 11 cm (D) 66 cm
- Q3.** The area of a quadrant of a circle whose circumference is 88 cm is **[1 mark]**
(A) 616 cm^2 (B) 308 cm^2
(C) 154 cm^2 (D) 77 cm^2
- Q4.** The angle of a sector whose area is one-sixth of the area of the circle is **[1 mark]**
(A) 30° (B) 45°
(C) 60° (D) 90°

- Q5.** The area swept by the minute hand of a clock, 6 cm long, in 20 minutes is **[1 mark]**
 (A) $12\pi \text{ cm}^2$ (B) $6\pi \text{ cm}^2$
 (C) $36\pi \text{ cm}^2$ (D) $4\pi \text{ cm}^2$
- Q6.** If the radius of a sector is doubled and its central angle is unchanged, its area becomes **[1 mark]**
 (A) 2 times (B) 4 times
 (C) half (D) 8 times
- Q7.** A chord of a circle of radius 14 cm subtends a right angle at the centre. The area of the minor segment is **[1 mark]**
 (A) 154 cm^2 (B) 98 cm^2
 (C) 252 cm^2 (D) 56 cm^2
- Q8.** The perimeter of a sector of a circle of radius 7 cm is 25 cm. The area of the sector is **[1 mark]**
 (A) 77 cm^2 (B) 25 cm^2
 (C) 11 cm^2 (D) 38.5 cm^2

In Q9 and Q10, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

- Q9. Assertion (A):** The area of a sector of angle θ (in degrees) of a circle of radius r is $\frac{\theta}{360} \times \pi r^2$. **[1 mark]**
Reason (R): The area of a sector is proportional to its central angle, and the whole circle corresponds to an angle of 360° .
 (A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
 (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
 (C) Assertion (A) is true, but Reason (R) is false.
 (D) Assertion (A) is false, but Reason (R) is true.
- Q10. Assertion (A):** The minute hand of a clock, 7 cm long, sweeps an area of 154 cm^2 in 30 minutes. **[1 mark]**
Reason (R): In 60 minutes, the minute hand sweeps the area of the full circle.
 (A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
 (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
 (C) Assertion (A) is true, but Reason (R) is false.
 (D) Assertion (A) is false, but Reason (R) is true.

SECTION B

Very Short Answer Questions — Q11 to Q15 carry 2 marks each.

Q11. Find the area of the minor sector and the major sector of a circle of radius 21 cm, if the angle of the minor sector is 120° . **[2 marks]**

Q12. Find the length of the arc of a circle of radius 28 cm that subtends an angle of 45° at the centre. Also find the perimeter of the sector. **[2 marks]**

Q13. The bob of a pendulum swings through an angle of 72° and describes an arc of length 22 cm. Find the length of the pendulum. **[2 marks]**

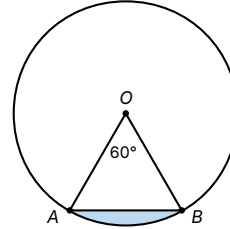
Q14. The area of a sector of a circle of radius 10.5 cm is 69.3 cm^2 . Find the central angle of the sector. **[2 marks]**

Q15. The area of a circle is 616 cm^2 . Find the area of a sector of this circle whose central angle is 45° . **[2 marks]**

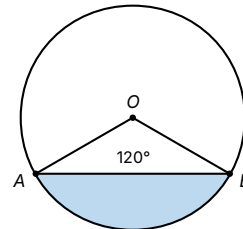
SECTION C

Short Answer Questions — Q16 to Q19 carry 3 marks each.

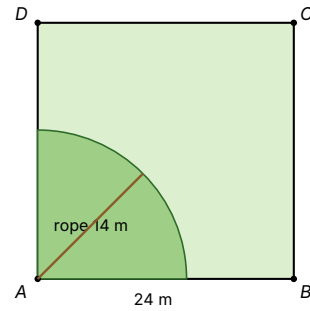
- Q16.** A chord AB of a circle of radius 21 cm subtends an angle of 60° at the centre O. Find the areas of the minor segment and the major segment. (Use $\pi = \frac{22}{7}$, $\sqrt{3} = 1.73$) **[3 marks]**



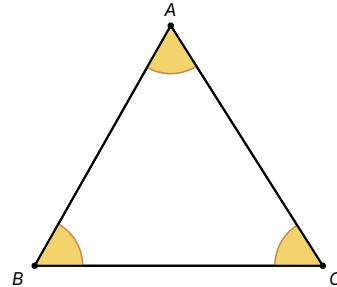
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- Q17.** A chord of a circle of radius 6 cm subtends an angle of 120° at the centre. Find the area of the corresponding minor segment. (Use $\pi = 3.14$, $\sqrt{3} = 1.73$) **[3 marks]**



- Q18.** A cow is tied with a 14 m long rope to the corner A of a square field [3 marks]
of side 24 m. Find the area of the field the cow can graze, and the
area it cannot graze. If the rope were 21 m long, how much more
area could it graze?



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- Q19.** A, B and C are the centres of three circles, each of radius 7 cm, and [3 marks]
they form the vertices of $\triangle ABC$. Find the total area of the three
sectors of the circles that lie inside the triangle (shaded).



SECTION D

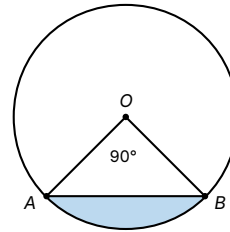
Long Answer Question — Q20 carries 4 marks.

Q20. A chord AB of a circle of radius 21 cm subtends a right angle at the centre O. Find: **[4 marks]**

(i) the area of the minor segment,

(ii) the area of the major segment,

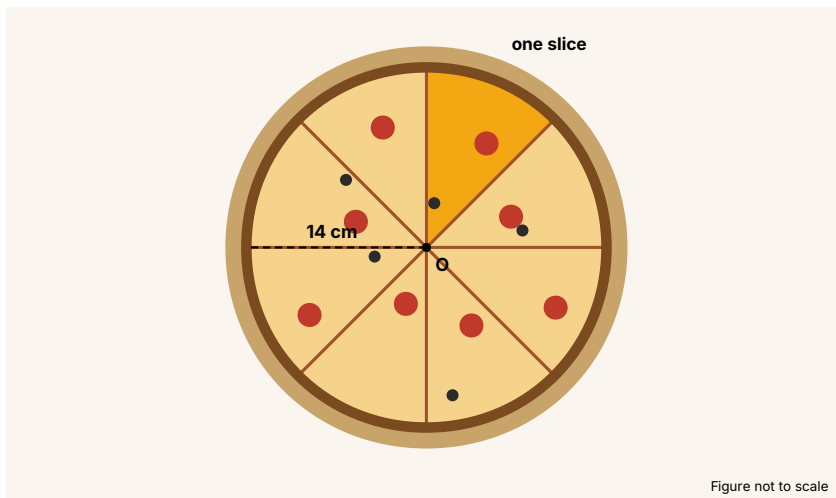
(iii) the perimeter of the minor segment. (Use $\pi = \frac{22}{7}$, $\sqrt{2} = 1.414$)



SECTION E

Case Study Based Question — Q21 carries 4 marks.

- Q21.** A pizza of diameter 28 cm is cut into 8 equal slices by cuts through its centre O, as shown. Each slice is a sector of the circle. **[4 marks]**



Based on the above information, answer the following questions:

- (i) What is the central angle of each slice? **[1 mark]**
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- (ii) Find the area of the top of one slice. **[1 mark]**
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- (iii) Find the length of the crust (arc) on one slice and the perimeter of one slice. If 3 slices are eaten, what area of the pizza is left? **[2 marks]**
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— End of Question Paper —