UNIQUE STUDY POINT

BY SUMEET SAHU

Amitesh Nagar, Indore (M.P.)

Class: **X**	Subject: **Mathematics**	Session: **2025-26**
Chapter: **Ch 11: Areas Related to Circles (PYQ)**		

PREVIOUS YEAR QUESTIONS (PYQ)

Chapter 11: Areas Related to Circles

CBSE Board Exam 2019–2025 | With Direct Answers

www.uniquestudyonline.com | Download Our App from Google Play Store

This document contains chapter-wise Previous Year Questions from CBSE Class X Board Examinations (2019–2025) for **Chapter 11: Areas Related to Circles**. Each question includes the year of examination, marks allotted, and direct answer for quick revision.

⚠ **NOTE: As per CBSE 2025–26 Syllabus. Topics: Circumference & Area of a Circle, Area of Sector & Segment, Areas of combinations of plane figures & circle. All topics included — No deletions.**

SECTION A: Multiple Choice Questions (1 Mark Each)

[CBSE 2024 | 1 Mark]

Q1. The perimeter of a sector of a circle whose central angle is 90° and radius 7 cm is:

(a) 35 cm
(b) 11 cm
(c) 22 cm
(d) 25 cm

Ans: (d) 25 cm. Arc = (θ/360)×2πr = (90/360)×2×(22/7)×7 = 11 cm. Perimeter = 2r + arc = 14 + 11 = 25 cm.

[CBSE 2023 | 1 Mark]

Q2. If the area of a circle is 154 cm², then its circumference is:

(a) 44 cm
(b) 22 cm
(c) 28 cm
(d) 56 cm

Ans: (a) 44 cm. πr² = 154 ⇒ r² = 154×7/22 = 49 ⇒ r = 7. C = 2πr = 2×(22/7)×7 = 44 cm.

[CBSE 2022 | 1 Mark]

Q3. If the perimeter of a circle is equal to that of a square, then the ratio of their areas is:

(a) 14:11
(b) 11:14
(c) 22:7
(d) 7:22

Ans: (a) 14:11. 2πr = 4a ⇒ a = πr/2. Area circle/Area square = πr²/(πr/2)² = πr²/(π²r²/4) = 4/π = 4×7/22 = 14/11.

[CBSE 2022 | 1 Mark]

Q4. The area of the sector of a circle of radius 12 cm and angle 120° is:

(a) 48π cm²
(b) 36π cm²
(c) 144π cm²
(d) 24π cm²

Ans: (a) 48π cm². Area = (θ/360)πr² = (120/360)π(144) = 48π cm².

[CBSE 2021 | 1 Mark]

Q5. The number of revolutions made by a circular wheel of radius 0.7 m in rolling a distance of 176 m is:

(a) 20
(b) 40
(c) 30
(d) 50

Ans: (b) 40. Circumference = 2πr = 2×(22/7)×0.7 = 4.4 m. Revolutions = 176/4.4 = 40.

[CBSE 2021 | 1 Mark]

Q6. The area of the largest circle that can be drawn inside a rectangle of length 18 cm and breadth 14 cm is:

(a) 49 cm²
(b) 154 cm²
(c) 378 cm²
(d) 1078 cm²

Ans: (b) 154 cm². Diameter = breadth = 14 cm, r = 7. Area = (22/7)×49 = 154 cm².

[CBSE 2020 | 1 Mark]

Q7. If the circumference of a circle and the perimeter of a square are equal, then:

(a) Area of circle = Area of square
(b) Area of circle > Area of square
(c) Area of circle < Area of square
(d) Nothing can be said

Ans: (b) Area of circle > Area of square. For equal perimeters, circle always encloses the larger area.

[CBSE 2019 | 1 Mark]

Q8. The area of a quadrant of a circle whose circumference is 22 cm is:

(a) 77/8 cm²
(b) 77/2 cm²
(c) 77/4 cm²
(d) 77 cm²

Ans: (a) 77/8 cm². 2πr = 22 ⇒ r = 7/2 cm. Quadrant = (1/4)πr² = (1/4)(22/7)(49/4) = 77/8 cm².

[CBSE 2023 | 1 Mark]

Q9. Three sectors of a circle of radius 7 cm make angles of 60°, 80° and 40° at the centre. The area of the shaded region (sum of three sectors) is:

(a) 77 cm²
(b) 154 cm²
(c) 44 cm²
(d) 22 cm²

Ans: (a) 77 cm². Total angle = 60+80+40 = 180°. Area = (180/360)×(22/7)×49 = 77 cm².

[CBSE 2020 | 1 Mark]

Q10. The length of the minute hand of a clock is 14 cm. The area swept by the minute hand in 5 minutes is:

(a) 308/3 cm²
(b) 154/3 cm²
(c) 154 cm²
(d) 308 cm²

Ans: (b) 154/3 cm². In 5 min, θ = 5×6° = 30°. Area = (30/360)×(22/7)×196 = 154/3 cm².

SECTION B: Assertion-Reason Questions (1 Mark Each)

[CBSE 2024 | 1 Mark]

Q11. Assertion (A): A bicycle wheel makes 5000 revolutions in covering 11 km. The diameter of the wheel is 70 cm.
Reason (R): Circumference of a circle = 2πr.

(a) Both true, R explains A
(b) Both true, R does not explain A
(c) A true, R false
(d) A false, R true

Ans: (a) Both true and R explains A. C = 11000/5000 = 2.2 m = 220 cm. 2πr = 220 ⇒ r = 35 cm ⇒ d = 70 cm ✓

[CBSE 2023 | 1 Mark]

Q12. Assertion (A): If the circumference of a circle is 176 cm, then its radius is 28 cm.
Reason (R): Circumference = 2πr.

(a) Both true, R explains A
(b) Both true, R does not explain A
(c) A true, R false
(d) A false, R true

Ans: (a) Both true and R explains A. 2πr = 176 ⇒ r = 176×7/44 = 28 cm ✓

SECTION C: Short Answer Questions (2 Marks Each)

[CBSE 2024 | 2 Marks]

Q13. The minute hand of a clock is 12 cm long. Find the area of the face of the clock described by the minute hand in 35 minutes.

Ans: In 35 min, θ = 35×6° = 210°. Area = (210/360)×(22/7)×144 = (7/12)×(22/7)×144 = 264 cm².

[CBSE 2020 | 2 Marks]

Q14. A piece of wire 22 cm long is bent into the form of an arc of a circle subtending an angle of 60° at its centre. Find the radius of the circle. [Use π = 22/7]

Ans: Arc length = (θ/360)×2πr. 22 = (60/360)×2×(22/7)×r = (1/6)×(44/7)×r = 44r/42. r = 22×42/44 = 21 cm.

[CBSE 2020 | 2 Marks]

Q15. A circular park is surrounded by a road 21 m wide. If the radius of the park is 105 m, find the area of the road.

Ans: R = 105+21 = 126 m. Area of road = πR² − πr² = π(126²−105²) = (22/7)(15876−11025) = (22/7)(4851) = 15246 m².

[CBSE 2019 | 2 Marks]

Q16. Find the area of a sector of a circle with radius 4 cm and of angle 30°. Also, find the area of the corresponding major sector. (Use π = 3.14)

Ans: Area of sector = (30/360)×3.14×16 = (1/12)×50.24 = 4.19 cm². Major sector = 50.24 − 4.19 = 46.05 cm².

SECTION D: Short Answer Questions (3 Marks Each)

[CBSE 2023 | 3 Marks]

Q17. A car has two wipers which do not overlap. Each wiper has a blade of length 21 cm sweeping through an angle of 120°. Find the total area cleaned at each sweep of the blades. (Use π = 22/7)

Ans: Area of one wiper = (θ/360)×πr² = (120/360)×(22/7)×441 = (1/3)×(22/7)×441 = 462 cm². Total = 2×462 = 924 cm².

[CBSE 2022 | 3 Marks]

Q18. A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the minor segment. (Use π = 3.14)

Ans: Area of sector = (90/360)×3.14×100 = 78.5 cm². Area of △OAB = (1/2)×10×10 = 50 cm². Area of minor segment = 78.5 − 50 = 28.5 cm².

[CBSE 2021 | 3 Marks]

Q19. Find the area of the segment of a circle of radius 21 cm, if the arc of the segment has a length of 44 cm. [Use π = 22/7]

Ans: Arc = (θ/360)×2πr. 44 = (θ/360)×2×(22/7)×21 = (θ/360)×132. θ = 120°. Area of sector = (120/360)×(22/7)×441 = 462 cm². Area of △ = (1/2)r²sinθ = (1/2)(441)(sin120°) = (1/2)(441)(√3/2) = 220.5√3 = 190.96 cm². Segment = 462 − 190.96 = 271.04 cm².

[CBSE 2019 | 3 Marks]

Q20. A chord of a circle of radius 14 cm makes a right angle at the centre. Find the areas of the minor and major segments.

Ans: Area of sector = (90/360)×(22/7)×196 = 154 cm². Area of △ = (1/2)×14×14 = 98 cm². Minor segment = 154 − 98 = 56 cm². Area of circle = (22/7)×196 = 616 cm². Major segment = 616 − 56 = 560 cm².

SECTION E: Long Answer Questions (4–5 Marks Each)

[CBSE 2024 | 5 Marks]

Q21. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find: (i) the length of the arc, (ii) area of the sector, (iii) area of the minor segment. [Use π = 22/7, √3 = 1.73]

Ans: (i) Arc = (60/360)×2×(22/7)×21 = 22 cm. (ii) Sector = (60/360)×(22/7)×441 = 231 cm². (iii) △OAB is equilateral (r=r, θ=60°). Area = (√3/4)×21² = (√3/4)×441 = 190.96 cm². Minor segment = 231 − 190.96 = 40.04 cm².

[CBSE 2022 | 5 Marks]

Q22. In the given figure, ABCD is a square of side 10 cm and semicircles are drawn with each side of the square as diameter. Find the area of the shaded region. (Use π = 3.14)

Ans: Area of square = 100 cm². Each semicircle area = (1/2)π(5)² = 39.25 cm². 4 semicircles = 157 cm². Shaded region = 4 semicircles − square (overlapping parts) = 2(πr² − 2r²) = 2(78.5−50) = 57 cm².

[CBSE 2021 | 5 Marks]

Q23. A chord of a circle of radius 15 cm subtends an angle of 60° at the centre. Find the areas of the corresponding minor and major segments. (Use π = 3.14 and √3 = 1.73)

Ans: Area of sector = (60/360)×3.14×225 = 117.75 cm². △OAB is equilateral. Area = (√3/4)×225 = 97.3125 cm². Minor segment = 117.75 − 97.31 = 20.44 cm². Major segment = πr² − 20.44 = 706.5 − 20.44 = 686.06 cm².

[CBSE 2019 | 5 Marks]

Q24. A round table cover has six equal designs as shown in the figure. If the radius of the cover is 28 cm, find the cost of making the designs at the rate of Rs 0.35 per cm². [Use √3 = 1.7]

Ans: 6 equal designs ⇒ each sector angle = 60°. Area of each segment = Area of sector − Area of equilateral △. Sector = (60/360)×(22/7)×784 = 410.67 cm². △ = (√3/4)×784 = 333.2 cm². Each segment = 77.47 cm². Total 6 designs = 464.8 cm². Cost = 464.8×0.35 = Rs 162.68.

SECTION F: Case Study Based Questions (4 Marks Each)

[CBSE 2024 | 4 Marks]

Q25. Case Study: A stable owner has four horses. He ties them with 7 m long ropes at each corner of a square-shaped grass field of side 20 m.
(i) Find the area of the square-shaped grass field.
(ii) Find the total area in which the horses can graze.
(iii) If the rope length is increased to 10 m, find the area grazed by one horse. (Use π = 22/7)
(iv) Find the ungrazed area when rope = 7 m.

Ans: (i) Area = 20×20 = 400 m². (ii) Each horse grazes a quadrant: 4×(1/4)π(7)² = (22/7)×49 = 154 m². (iii) One horse = (1/4)π(10)² = (1/4)(3.14)(100) = 78.5 m². (iv) Ungrazed = 400 − 154 = 246 m².

[CBSE 2025 | 4 Marks]

Q26. Case Study: In a clock, the minute hand is 14 cm long.
(i) Find the area swept by the minute hand in 1 hour.
(ii) Find the area swept by the minute hand in 10 minutes.
(iii) Find the distance covered by the tip of the minute hand in 30 minutes.
(iv) Find the angle swept in 20 minutes.

Ans: (i) 1 hour = 360°. Area = πr² = (22/7)×196 = 616 cm². (ii) 10 min = 60°. Area = (60/360)×616 = 102.67 cm². (iii) 30 min = 180°. Distance = half circumference = πr = (22/7)×14 = 44 cm. (iv) 20 min = 20×6° = 120°.

★ PYQ SUMMARY & ANALYSIS

Topic	Years Asked	Frequency	Marks
Area of Sector	2019–2025	Every Year	1–5
Area of Segment (sector − triangle)	2019–2025	Every Year	3–5
Circumference / Arc length	2019–2025	Every Year	1–2
Perimeter of sector	2019–2024	5 times	1–2
Shaded region (combination figures)	2019–2024	5 times	3–5
Clock (minute hand) problems	2019–2025	4 times	1–4
Circle vs Square perimeter/area	2019–2022	3 times	1
Case Study (grazing field/clock)	2024–2025	2 times	4

Key Observations for Students:

- ✔ Area of sector = (θ/360)×πr² — MOST important formula, used in almost every question.
- ✔ Arc length = (θ/360)×2πr. Perimeter of sector = 2r + arc length.
- ✔ Area of segment = Area of sector − Area of triangle — frequently asked 3–5 marks.
- ✔ For θ = 60°, triangle is equilateral: Area = (√3/4)r².
- ✔ For θ = 90°, triangle is right isosceles: Area = (1/2)r².
- ✔ Clock: minute hand covers 6° per minute, hour hand covers 0.5° per minute.
- ✔ Shaded region = larger area − smaller area (combination of figures).
- ✔ Expected marks: 5–8 marks in Board Exam.

"Practice makes perfect. Solve PYQs to master your Board Exam!"

Best Wishes for Your Board Exam!

Prepared by: Sumeet Sahu | UNIQUE STUDY POINT, Indore

Visit: www.uniquestudyonline.com

Download Our App: Search "Unique Study Point" on Google Play Store