MATHS WITHOUT GUESSWORK · BOARD BOOSTER

Areas Related to Circles

LOCK THE SURE MARKS.
STRETCH FOR THE TOP.
PRACTISE THE BOARD WAY.

A board-exam practice companion for **CBSE Class 10 Mathematics**
Syllabus session 2026–27 · Standard (041)

🛡️ Secure Track | 🚀 Stretch Track | ~88 questions + 3 mini-mocks

Built around one idea — a slice of the circle

Sector	Arc	Segment
area = (θ/360) πr²	length = (θ/360) 2πr	sector − triangle

Original questions and solutions. Answers kept separate. Not a substitute for the NCERT textbook or your teacher.

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Areas Related to Circles in the board paper

Know exactly how many marks are really at stake here — so you spend your effort where the paper pays.

◆ UNDERSTAND THE OFFICIAL NUMBER This chapter sits inside **Unit VI — Mensuration, worth 10 marks**, shared with Surface Areas & Volumes. Areas Related to Circles is a **reliable 5–7 marks** — nearly always a **3-mark sector/segment** question and often a **5-mark combination-of-figures** or a case study (a clock, a wheel, a grazing animal). CBSE publishes weightage per unit, not per chapter.

Where those marks usually fall (PYQ trend — based on past papers, not official)

Form it takes	Typical marks	What it tests
1–2 MCQ / Assertion-Reason	1–2	Area/circumference, the θ/360 fraction, a quadrant
A VSA or SA	2–3	Sector area, arc length, or a minor segment
A 5-mark LA	5	Combination of a circle with a triangle/square; a shaded region
A case study	4	A clock hand, a wheel's revolutions, a grazing animal, a wiper

★ SPOT THE CLUE WHAT'S IN THE 2026–27 SCOPE The whole chapter is in scope — **area & circumference**, **area of a sector and length of an arc**, **area of a segment** (central angles restricted to **60°, 90°, 120°**), and **combinations of plane figures** (circle with triangle or quadrilateral). There are no topic deletions.

Q6 A quadrant of a circle is a sector of angle: A. 45° B. 60° C. 90° D. 120°

1 GUIDED ★

Q7 The area of a quadrant of a circle of radius r is: A. $\pi r^2/2$ B. $\pi r^2/4$ C. $\pi r^2/6$ D. πr^2

1 GUIDED ★

Q8 A segment of a circle lies between: A. two radii B. a chord and an arc C. two chords D. two arcs

1 GUIDED ★

Q9 Area of segment = A. sector + triangle B. sector − triangle C. triangle − sector D. 2 × sector

1 GUIDED ★

Q10 The area of a circle of radius 7 cm ($\pi = 22/7$) is: A. 44 cm^2 B. 154 cm^2 C. 22 cm^2 D. 49 cm^2

1 PART-GUIDED ★

Q11 The circumference of a circle of radius 7 cm ($\pi = 22/7$) is: A. 44 cm B. 154 cm C. 22 cm D. 14 cm

1 PART-GUIDED ★

Q12 The area of a sector of radius 7 cm and angle 90° ($\pi = 22/7$) is: A. 38.5 cm^2 B. 11 cm^2 C. 77 cm^2 D. 154 cm^2

1 PART-GUIDED ★

Q13 The length of an arc of radius 7 cm and angle 90° ($\pi = 22/7$) is: A. 11 cm B. 22 cm C. 38.5 cm D. 14 cm

1 PART-GUIDED

Q14 In a segment with central angle 60°, the triangle is: A. right-angled B. equilateral C. isosceles right D. scalene

1 PART-GUIDED ★

Q15 In a segment with central angle 90°, the triangle area is: A. r^2 B. $\frac{1}{2} r^2$ C. $(\sqrt{3}/4)\, r^2$ D. $\pi r^2/4$

1 PART-GUIDED ★

Q16 The perimeter of a sector of radius r and arc length ℓ is: A. 2ℓ B. $\ell + 2r$ C. $\ell + r$ D. $2\pi r$

1 PART-GUIDED ★

Q17 If the radius doubles, the area of the circle becomes: A. 2× B. 3× C. 4× D. the same

1 PART-GUIDED ★

Q18 The area between two concentric circles of radii R and r is: A. $\pi(R - r)$ B. $\pi(R^2 - r^2)$ C. $\pi(R + r)$ D. $\pi R^2 r^2$

1 PART-GUIDED ★

Q19 A sector's area is 1/6 of the circle. Its angle is: A. 30° B. 60° C. 90° D. 120°

1 PART-GUIDED ★

Q20 A circle of diameter 14 cm has area ($\pi = 22/7$): A. 154 cm^2 B. 616 cm^2 C. 44 cm^2 D. 22 cm^2

1 PART-GUIDED

Q21 The minute hand of a clock sweeps, in 15 minutes, an angle of: A. 60° B. 90° C. 180° D. 120°

1 INDEPENDENT ★

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1 2 3 4 5 6 Secure

Very Short Answer (2-mark) set

16 two-mark questions. Write the formula, put the θ/360 fraction, substitute. Take π = 22/7 unless stated. Worked solutions in the Answer Key.

Q1 Find the area of a circle of radius 14 cm.

2 GUIDED ★

Q2 Find the circumference of a circle of radius 21 cm.

2 GUIDED

Q3 Find the area of a sector of radius 7 cm and angle 90°.

2 PART-GUIDED ★

Q4 Find the length of an arc of radius 21 cm and angle 60°.

2 PART-GUIDED ★

Q5 Find the area of a sector of angle 60° in a circle of radius 6 cm (take π = 3.14).

2 PART-GUIDED

Q6 Find the area of a quadrant of a circle of radius 14 cm.

2 PART-GUIDED ★

Q7 A sector's area is 1/4 of the circle. Find its central angle.

2 GUIDED

Q8 Find the area between two concentric circles of radii 14 cm and 7 cm.

2 PART-GUIDED ★

Case studies (4-mark)

8 source-based cases, each 1 + 1 + 2 marks. Find the angle, then the sector. Solutions in the Answer Key. Take π = 22/7 unless stated.

Case 1 — The clock on the wall

4 marks

A wall clock has a minute hand 14 cm long.

(i) Through what angle does the minute hand turn in 15 minutes?

1

(ii) Which formula gives the area swept?

1

(iii) Find the area the hand sweeps in 15 minutes.

2

Case 2 — A cartwheel

4 marks

A cartwheel has diameter 70 cm.

(i) Find the circumference of the wheel.

1

(ii) What distance does it cover in one revolution?

1

(iii) How many revolutions to cover 110 m?

2

Answer Key

Kept at the back on purpose — so a parent needn't teach. The recurring methods are worked in full once; the drills get the key step, the answer and the likely slip. Take π = 22/7 unless stated, √3 = 1.73.

Worked methods (learn these once)

Sector area and arc (the θ/360 method). For radius r and angle θ: sector area = (θ/360)·πr², arc length = (θ/360)·2πr. *Example (VSA Q3):* r = 7, θ = 90°, π = 22/7: sector = (90/360)·(22/7)·49 = ¼·154 = 38.5 cm²; arc = (90/360)·(2·22/7·7) = ¼·44 = 11 cm.

Minor segment = sector − triangle (SA Q1). r = 10, θ = 90°, π = 3.14. Sector = (90/360)·3.14·100 = 78.5. Triangle (right-isosceles) = ½·r² = ½·100 = 50. Segment = 78.5 − 50 = 28.5 cm². For 60° use triangle (√3/4)r²; for 120° use ½r²sin120° = (√3/4)r².

Combination of figures (SA Q7). A circle of radius 7 inscribed in a square of side 14. Region between = square − circle = 14² − (22/7)·7² = 196 − 154 = 42 cm². Always: shaded = whole − unshaded, piece by piece.

The ½·r·arc shortcut (HOTS Q3, Q8). Sector area = ½ × r × (arc length). So if the perimeter (arc + 2r) is known, find the arc, then the area — no need for θ. E.g. perimeter 25, r 7 ⇒ arc = 25 − 14 = 11 ⇒ area = ½·7·11 = 38.5 cm².

Section 6 — MCQ & Assertion-Reason

Q	Ans	Why
Q1	**B**	Area = πr².

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- **Case studies.** 8 four-mark source-based cases
- **HOTS and trickiest variations.** 10 questions
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