CLASS IX – MATHEMATICS

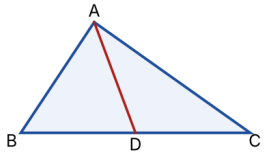
Chapter Test: Measuring Space: Perimeter and Area

(Ganita Manjari, Grade 9, Part I – Chapter 6)

Time: 1½ Hours **M. M.: 40**

General Instructions:

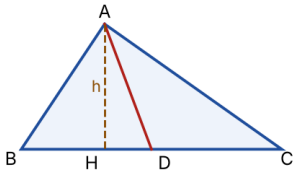
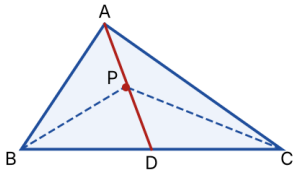
1. This paper contains 21 questions. All questions are compulsory.
2. This paper is divided into 5 sections: **A, B, C, D** and **E**.
3. In **Section A**, Questions no. **1** to **10** are MCQs and questions no. **11** and **12** are Assertion-Reason based questions of 1 mark each.
4. In **Section B**, Questions no. **13** to **16** are Very Short Answer type questions carrying 2 marks each.
5. In **Section C**, Questions no. **17** and **18** are Short Answer type questions carrying 3 marks each.
6. In **Section D**, Questions no. **19** and **20** are Long Answer type questions carrying 5 marks each.
7. In **Section E**, Question no. **21** is a case based question carrying 4 marks. Internal choice is provided in the 2 marks part of the case study.
8. There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section D and 1 part of Section E.
9. Figures are not drawn to scale. Give reasons for your steps wherever required. Take π = 22/7 unless stated otherwise.
10. Use of calculator is **not** allowed.

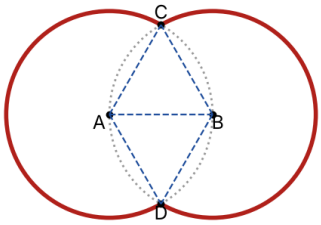
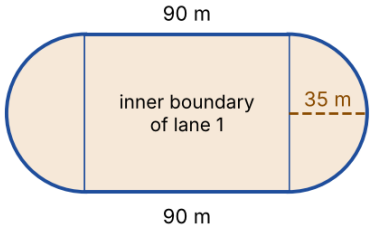
Q. No.	Section – A	Marks
1.	The circumference of a circle is 88 cm. Its radius is (take π = 22/7) (A) 7 cm (B) 14 cm (C) 28 cm (D) 44 cm	**[1]**
2.	The length of an arc that subtends an angle of 45° at the centre of a circle of radius 14 cm is (take π = 22/7) (A) 22 cm (B) 44 cm (C) 11 cm (D) 5.5 cm	**[1]**
3.	The area of a circle of diameter 14 cm is (take π = 22/7) (A) 44 cm^2 (B) 308 cm^2 (C) 616 cm^2 (D) 154 cm^2	**[1]**
4.	The area of a triangle with sides 5 cm, 12 cm and 13 cm is (A) 15 cm^2 (B) 30 cm^2 (C) 60 cm^2 (D) 65 cm^2	**[1]**
5.	The area of a sector of angle 60° in a circle of radius 21 cm is (take π = 22/7) (A) 462 cm^2 (B) 693 cm^2 (C) 231 cm^2 (D) 1386 cm^2	**[1]**
6.	The area of a parallelogram with base 12 cm and corresponding height 7.5 cm is (A) 90 cm^2 (B) 45 cm^2 (C) 19.5 cm^2 (D) 180 cm^2	**[1]**
7.	A wheel has diameter 70 cm. The distance it covers in 100 complete revolutions is (take π = 22/7) (A) 22 m (B) 2200 m (C) 110 m (D) 220 m	**[1]**
8.	In the figure, AD is a median of ΔABC and area (ΔABC) = 48 cm^2. The area of ΔABD is  (A) 12 cm^2 (B) 24 cm^2 (C) 48 cm^2 (D) 96 cm^2	**[1]**
9.	The perimeters of two circles are in the ratio 5 : 4. The ratio of their areas is (A) 5 : 4 (B) 4 : 5 (C) 25 : 16 (D) 16 : 25	**[1]**

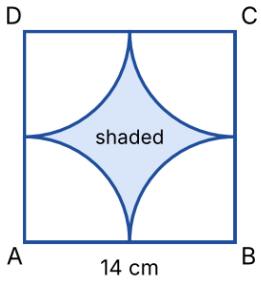
Q. No.	Section – A	Marks
10.	Which of the following statements about π is correct? (A) π is exactly equal to 22/7 (B) π is exactly equal to 3.14 (C) π is a rational number (D) π is an irrational number	**[1]**
	Questions number 11 and 12 are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer from the options (A), (B), (C) and (D) as given below. (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 and 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.	
11.	**Assertion (A):** If the radius of a circle is doubled, its circumference is also doubled. **Reason (R):** The circumference of a circle of radius r is $2\pi r$, which is proportional to r.	**[1]**
12.	**Assertion (A):** Two rectangles having the same perimeter always have the same area. **Reason (R):** The area of a rectangle of length l and breadth b is $l \times b$.	**[1]**

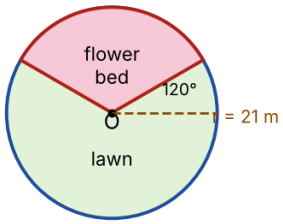
Q. No.	Section – B	Marks
13.	Find the circumference and the area of a circle of radius 14 cm. (Take π = 22/7.)	**[2]**
14.	(A) The radius of a bicycle wheel is 35 cm. Find the distance covered in one complete turn, and the number of turns it makes to cover 2.2 km. (Take π = 22/7.) **OR** (B) Find the perimeter of a sector of a circle of radius 21 cm and sector angle 60°. (Take π = 22/7.)	**[2]**
15.	Two sides of a triangle are 7 cm and 24 cm and its perimeter is 56 cm. Find the third side and the area of the triangle.	**[2]**
16.	(A) One diagonal of a rhombus is twice as long as the other diagonal. If the area of the rhombus is 144 cm^2, find the lengths of both diagonals. **OR** (B) The sides of a parallelogram are 15 cm and 10 cm. The altitude on the 15 cm side is 8 cm. Find the area of the parallelogram and the altitude on the 10 cm side.	**[2]**

Q. No.	Section – C	Marks
17.	(A) The parallel sides of a trapezium are 40 cm and 20 cm. Each of its non-parallel sides is 26 cm. Find the area of the trapezium. **OR** (B) The sides of a triangular plot are in the ratio 5 : 12 : 13 and its perimeter is 150 m. Find the area of the plot using Heron's formula.	**[3]**

Q. No.	Section – C	Marks
18.	(A) Prove that a median of a triangle divides it into two triangles of equal area. (In the figure, AD is the median and AH ⊥ BC.)  **OR** (B) In ΔABC, D is the midpoint of BC and P is any point on the median AD. Show that area (ΔABP) = area (ΔACP).  	**[3]**

Q. No.	Section – D	Marks
19.	(A) Two circles of equal radius 21 cm are drawn so that each passes through the centre of the other. They meet at C and D, and the outer (red) arcs make the boundary of the shape. (Take π = 22/7.) (i) Show that ΔABC is equilateral and hence ∠CAD = 120°. [2] (ii) Find the length of one red arc. [1] (iii) Find the perimeter of the shape. [1] (iv) Find the area of the sector of circle A with angle ∠CAD = 120°. [1]  **OR** (B) The inner boundary of lane 1 of a running track has two straight sections of 90 m each and two semicircular ends of radius 35 m. Lane 1 is 3.5 m wide. (Take π = 22/7.) (i) Find the length of the inner boundary. [1] (ii) Find the length of the outer boundary of lane 1. [2] (iii) Find the extra distance covered along the outer boundary, and say why it comes only from the curved ends. [2]  	**[5]**

Q. No.	Section – D	Marks
20.	(A) A triangular field has sides 13 m, 14 m and 15 m. (i) Find its semi-perimeter. [1] (ii) Find its area using Heron's formula. [2] (iii) Find the altitude on the side of 14 m. [1] (iv) Find the cost of levelling the field at ₹20 per m^2. [1] **OR** (B) The figure shows a square ABCD of side 14 cm. Four quarter circles of radius 7 cm are cut from the corners (centres A, B, C, D). (Take π = 22/7.) (i) Find the area of the square. [1] (ii) Find the total area of the four quarter circles. [2] (iii) Find the area of the shaded region. [1] (iv) Find the perimeter of the shaded region. [1] 	**[5]**

Q. No.	Section – E	Marks
21.	**Case Study:** A town plans a circular park of radius 21 m. A sector-shaped flower bed with central angle 120° is made in the park, and the remaining part is covered with grass (lawn), as shown. (Take π = 22/7.)  (i) Find the area of the whole park. **[1]** (ii) Find the area of the flower bed. **[1]** (iii) (A) Find the length of the fencing needed around the flower bed (its arc and the two straight edges). **[2]** **OR** (iii) (B) Find the area of the lawn. Find the cost of laying grass on it at ₹15 per m^2. **[2]**	**[4]**