Measuring Space: Perimeter and Area

Standard difficulty · 20 questions · 40 marks · Time: 36 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. The semi-perimeter of a triangle with sides 15 cm, 36 cm and 39 cm is:
(a) 46 cm **(b)** 90 cm **(c)** 39 cm **(d)** 45 cm

2. The area of a triangle with sides 64 cm, 100 cm and 156 cm is:
(a) 3,840 cm^2 **(b)** 3,200 cm^2 **(c)** 1,920 cm^2 **(d)** 320 cm^2

3. The area of an equilateral triangle of side 20 cm is:
(a) 100 cm^2 **(b)** $200\sqrt{3}$ cm^2 **(c)** $60\sqrt{3}$ cm^2 **(d)** $100\sqrt{3}$ cm^2

4. The sides of a triangle are in the ratio 3 : 4 : 5 and its perimeter is 108 cm. Its area is:
(a) 6 cm^2 **(b)** 972 cm^2 **(c)** 108 cm^2 **(d)** 486 cm^2

5. In Heron's formula, s stands for:
(a) the area **(b)** the longest side
(c) half the perimeter **(d)** the perimeter

6. An isosceles triangle has equal sides of 30 cm and a base of 48 cm. Its area is:
(a) 480 cm^2 **(b)** 432 cm^2 **(c)** 1,440 cm^2 **(d)** 864 cm^2

7. For a triangle with sides 10 cm, 17 cm and 21 cm, $s(s-a)(s-b)(s-c)$ equals:
(a) 7,056 **(b)** 14,112 **(c)** 84 **(d)** 168

8. Assertion (A): The area of a triangle with sides 27 cm, 30 cm and 51 cm is 324 cm^2.
Reason (R): By Heron's formula, area = $\sqrt{s(s-a)(s-b)(s-c)}$, where s is the semi-perimeter.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

Section B — Short answer — 8 × 2 = 16 marks

9. Find the area of a triangle with sides 36 cm, 51 cm and 75 cm.

10. A rhombus has sides of 20 cm and one diagonal of 24 cm. Find its area.

11. The perimeter of an equilateral triangle is 24 cm. Find its area.

12. A triangular wall has sides 21 m, 72 m and 75 m. Find the cost of painting it at Rs 19 per m^2.

13. A triangle has a perimeter of 50 cm. Two of its sides are 16 cm and 17 cm. Find its area.

14. A triangle has sides 80 cm, 84 cm and 116 cm. Find the height on its longest side.

15. An isosceles triangle has a perimeter of 150 cm and a base of 72 cm. Find its area.

16. A parallelogram has sides of 26 cm and 40 cm, and one diagonal of 42 cm. Find its area.

Section C — Word problems — 4 × 4 = 16 marks

17. A triangular park has sides 32 m, 50 m and 78 m. Find its area, and the cost of planting grass at Rs 18 per m^2.

18. A traffic signboard is an equilateral triangle with sides of 42 cm. Find its area.

19. An umbrella is made of 12 triangular pieces of cloth, each with sides 5 cm, 5 cm and 6 cm. How much cloth is used?

20. A field ABCD has AB = 9 m, BC = 10 m, CD = 16 m, DA = 17 m and diagonal AC = 17 m. Find its area.

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Answer key

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Q	Answer	Working
1	**(d) 45 cm**	(15 + 36 + 39) ÷ 2 = 45
2	**(c) 1,920 cm^2**	s = 160; √(s(s − a)(s − b)(s − c)) = 1,920
3	**(d) 100√3 cm^2**	(√3/4) × 20^2 = 100√3
4	**(d) 486 cm^2**	sides 27, 36, 45; area 486
5	**(c) half the perimeter**	—
6	**(b) 432 cm^2**	s = 54; area = 432
7	**(a) 7,056**	it is the square of the area: 84^2 = 7,056
8	**(a) Both A and R are true, and R is the correct explanation of A.**	A is true: s = 54 and Heron's formula gives 324. R is true and explains A.
9	**810 cm^2**	s = 81; √(81 × 45 × 30 × 6) = 810
10	**384 cm^2**	the diagonal makes two triangles with sides 20, 20, 24, each 192 cm^2
11	**16√3 cm^2**	side = 8; (√3/4) × 8^2 = 16√3
12	**Rs 14,364**	area = 756 m^2; 756 × 19 = 14,364
13	**120 cm^2**	third side = 50 − 16 − 17 = 17; area = 120
14	**1680/29 cm**	area = 3,360; height = 2 × 3,360 ÷ 116 = 1680/29
15	**540 cm^2**	equal sides = (150 − 72) ÷ 2 = 39; area = 540
16	**1,008 cm^2**	the diagonal makes two equal triangles of 504 cm^2
17	**480 m^2; Rs 8,640**	s = 80; area = 480; × 18 = 8,640
18	**441√3 cm^2**	(√3/4) × 42^2 = 441√3
19	**144 cm^2**	one piece = 12 cm^2; × 12 = 144
20	**156 m^2**	△ABC = 36, △ACD = 120; total 156

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