CLASS 8 · MATHEMATICS

Area

Sample paper · 15 questions · 22 marks

10 objective questions × 1 mark. Five written-response questions: 12 marks. Write your working where needed. Suggested time: 45 minutes. Answers and marking guidance follow the questions.

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Section A · Objective questions (10 marks)

1. The area of a triangle with base b and perpendicular height h is:

A. b + h

B. 2 x b x h

C. (1/2) x b x h

D. b x h

2. A triangle has base 12 cm and perpendicular height 7 cm. Its area is:

A. 42 cm2

B. 19 cm2

C. 38 cm2

D. 84 cm2

3. A diagonal of a rectangle divides it into:

A. Four equal triangles

B. Two triangles of different areas

C. A square and a triangle

D. Two congruent triangles of equal area

4. A parallelogram has base 10 cm and perpendicular height 6 cm. Its area is:

A. 60 cm2

B. 16 cm2

C. 30 cm2

D. 120 cm2

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5. A median of a triangle (the line from a vertex to the midpoint of the opposite side) divides the triangle into:

A. Three equal triangles

B. Two triangles of equal area

C. A triangle and a trapezium

D. Two congruent triangles always

6. Two triangles stand on the same base and lie between the same pair of parallel lines. Their areas are:

A. Always different

B. Impossible to compare

C. In the ratio 1 : 2

D. Equal

7. The diagonals of a rhombus are 10 cm and 8 cm. Its area is:

A. 18 cm2

B. 80 cm2

C. 20 cm2

D. 40 cm2

8. A square plot has side 9 m. Its area is:

A. 18 m2

B. 72 m2

C. 81 m2

D. 36 m2

9. A trapezium has parallel sides 8 cm and 12 cm, and the distance between them is 5 cm. Its area is:

A. 40 cm2

B. 100 cm2

C. 50 cm2

D. 60 cm2

10. A triangle has base 16 cm and area 64 cm2. Its perpendicular height is:

A. 16 cm

B. 2 cm

C. 8 cm

D. 4 cm

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Section B · Written responses (12 marks)

Attempt all five. Use a separate sheet if you need more space. The marks for each question are shown.

11. Find the area of a triangle with base 15 cm and perpendicular height 8 cm, and explain where the 'half' in the formula comes from. [2 marks]

12. A parallelogram has base 14 cm and area 126 cm2. Find its height. [2 marks]

13. Explain why two triangles on the same base and between the same pair of parallel lines must have equal areas. [2 marks]

14. The diagonals of a rhombus are 12 cm and 16 cm. Find its area, and show how splitting the rhombus along a diagonal leads to the formula (1/2) x d1 x d2. [3 marks]

15. A field is shaped like a trapezium with parallel sides 25 m and 15 m, 10 m apart. Find its area, and the cost of levelling it at Rs 12 per square metre. [3 marks]

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Answers & marking guidance

Use these after attempting the paper. Accept equivalent correct reasoning and sensible units. These are Evater model answers, not an official marking scheme.

Section A · 1 mark each

1. C — Two copies of a triangle form a parallelogram with the same base and perpendicular height. One triangle therefore has half the area base x height.

2. A — Area = (1/2) x 12 x 7 = 42 cm2.

3. D — The diagonal splits the rectangle into two congruent right triangles, each half the rectangle's area.

4. A — Area of a parallelogram = base x height = 10 x 6 = 60 cm2.

5. B — The two parts have equal bases (the side is halved) and the same height from the vertex, so their areas are equal.

6. D — Between the same parallels the height is the same, and the bases are equal, so the areas are equal.

7. D — Area of a rhombus = (1/2) x d1 x d2 = (1/2) x 10 x 8 = 40 cm2.

8. C — Area of a square = side x side = 9 x 9 = 81 m2.

9. C — Area = (1/2) x (8 + 12) x 5 = (1/2) x 20 x 5 = 50 cm2.

10. C — 64 = (1/2) x 16 x h gives h = 64 x 2 / 16 = 8 cm.

Section B · Model answers

11. Area = (1/2) x 15 x 8 = 60 cm2. Two copies of any triangle can be joined along a sloping side to form a parallelogram with the same base and perpendicular height. Its area is base x height, so the area of one triangle is half that.

Marking: 1 mark for 60 cm2; 1 mark for explaining that two identical triangles form a parallelogram of area base x height.

12. Area = base x height, so height = 126 / 14 = 9 cm.

Marking: 1 mark for using area = base x height; 1 mark for 9 cm.

13. The area of a triangle depends only on its base and its height. The two triangles share the same base, and because their top vertices lie on a line parallel to the base, both heights equal the distance between the parallel lines. Same base and same height give equal areas.

Marking: 1 mark for identifying equal heights from the parallels; 1 mark for the full same-base-same-height argument.

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14. Area = (1/2) x 12 x 16 = 96 cm2. One diagonal, 16 cm, splits the rhombus into two triangles. The diagonals of a rhombus bisect each other at right angles, so each triangle has base 16 and height 12 / 2 = 6. Each area is (1/2) x 16 x 6 = 48 cm2, and 2 x 48 = 96 cm2, matching the formula.

Marking: 1 mark for 96 cm2; 1 mark for splitting into two triangles; 1 mark for the height being half the other diagonal.

15. Area = (1/2) x (25 + 15) x 10 = (1/2) x 40 x 10 = 200 m2. Cost = 200 x 12 = Rs 2400.

Marking: 1 mark for the trapezium formula set up correctly; 1 mark for 200 m2; 1 mark for Rs 2400.

Topic references

NCERT Class 8 Mathematics, Ganita Prakash, Chapter 14: Area.

https://ncert.nic.in/textbook/pdf/hegp207.pdf

Concept reference only. Questions and model answers are original Evater practice material, not an official NCERT paper.

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