Quadrilaterals

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. Three angles of a quadrilateral are 55°, 80°, 104°. The fourth angle is:
(a) 131° **(b)** 239° **(c)** 59° **(d)** 121°

2. One angle of a parallelogram is 130°. The angle opposite it is:
(a) 130° **(b)** 50° **(c)** 230° **(d)** 40°

3. The diagonals of a rhombus are 14 cm and 48 cm. Each side of the rhombus is:
(a) 50 cm **(b)** 31 cm **(c)** 32 cm **(d)** 25 cm

4. A rectangle is 20 cm by 48 cm. Each of its diagonals is:
(a) 28 cm **(b)** 68 cm **(c)** 53 cm **(d)** 52 cm

5. The angles of a quadrilateral add up to:
(a) 270° **(b)** 180° **(c)** 360° **(d)** 540°

6. The angles of a quadrilateral are in the ratio 2 : 3 : 3 : 7. The largest angle is:
(a) 168° **(b)** 72° **(c)** 48° **(d)** 192°

7. In △ABC, D and E are the mid-points of AB and AC. If BC = 38 cm, then DE is:
(a) 20 cm **(b)** 38 cm **(c)** 76 cm **(d)** 19 cm

8. Assertion (A): In △ABC, D and E are the mid-points of AB and AC. If BC = 12 cm, then DE = 6 cm.
Reason (R): The line segment joining the mid-points of two sides of a triangle equals the third side.
(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. Two adjacent angles of a parallelogram are (4x + 36)° and (2x + 6)°. Find x and all four angles.

10. Two opposite angles of a parallelogram are (x + 3)° and (3x − 45)°. Find x and the angles of the parallelogram.

11. The angles of a quadrilateral are x°, (x + 18)°, 2x° and (2x + 78)°. Find x and the four angles.

12. The diagonals of a rhombus are 40 cm and 96 cm. Find its side and perimeter.

13. The diagonals of parallelogram ABCD meet at O. AO = (5x + 29) cm and OC = (2x + 47) cm. Find x and AC.

14. The sides of a triangle are 21 cm, 26 cm and 8 cm. Find the perimeter of the triangle formed by joining the mid-points of its sides.

15. ABCD is a rectangle with diagonals AC = (x + 23) cm and BD = (4x − 34) cm. Find x and the length of each diagonal.

16. The perimeter of a parallelogram is 148 cm and one side is 35 cm. Find the other sides.

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

17. A rectangular field is 60 m by 80 m. How much shorter is it to walk along the diagonal than along two sides?

18. A plot is shaped like a rhombus with diagonals of 120 m and 126 m. Find the length of fencing needed round it.

19. A triangular park has sides of 90 m, 102 m and 84 m. Paths join the mid-points of the three sides. What is the total length of the paths?

20. A floor tile is a parallelogram with one angle of 124°. Find its other three angles.

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Answer key

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Q	Answer	Working
1	**(d) 121°**	360° − 239° = 121°
2	**(a) 130°**	opposite angles are equal
3	**(d) 25 cm**	the diagonals bisect at right angles: $\sqrt{(7^2 + 24^2)} = 25$
4	**(d) 52 cm**	$\sqrt{(20^2 + 48^2)} = 52$
5	**(c) 360°**	—
6	**(a) 168°**	15 parts = 360°, 1 part = 24°
7	**(d) 19 cm**	DE = BC ÷ 2 (mid-point theorem)
8	**(c) A is true, but R is false.**	A is true: DE = BC ÷ 2 = 6. R is false.
9	**x = 23; 128°, 52°, 128°, 52°**	adjacent angles are supplementary: 6x + 42 = 180
10	**x = 24; 27°, 153°, 27°, 153°**	opposite angles are equal: −2x = −48
11	**x = 44; 44°, 62°, 88°, 166°**	6x + 96 = 360
12	**side 52 cm, perimeter 208 cm**	half-diagonals 20 and 48 meet at 90°: side = $\sqrt{(20^2 + 48^2)} = 52$
13	**x = 6; AC = 118 cm**	the diagonals bisect each other: AO = OC, so 3x = 18
14	**27.5 cm**	each side of the new triangle is half a side of the old one: 55 ÷ 2
15	**x = 19; 42 cm**	the diagonals of a rectangle are equal: −3x = −57
16	**35 cm, 39 cm, 35 cm, 39 cm**	opposite sides are equal: 2 × (35 + y) = 148, y = 39
17	**40 m**	diagonal = $\sqrt{(60^2 + 80^2)} = 100$ m; 140 − 100 = 40
18	**348 m**	side = $\sqrt{(60^2 + 63^2)} = 87$ m; 4 × 87
19	**138 m**	each path is half the side it is parallel to (mid-point theorem)
20	**56°, 124° and 56°**	adjacent angles add to 180°; opposite angles are equal

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