

Understanding Quadrilaterals and Practical Geometry

Mathematics · Class 8 · Topic-wise Practice Worksheet

TIME 45 minutes	QUESTIONS 18	TOTAL MARKS 24	MAX. SCORE ___ / 24
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

- There are **18 questions** in this worksheet. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–15 carry **1 mark** each. Questions 16–18 (Achievers Section) carry **3 marks** each.
- There is no negative marking. Use of a calculator is **not** allowed.
- Figures are not drawn to scale. Rough work may be done at the side of each page.

Section A — Mathematical Reasoning

Q1–Q8 · 1 mark each

- The sum of the interior angles of any quadrilateral is _____.
 (A) 360° (B) 270°
 (C) 180° (D) 540°
- Each interior angle of a regular hexagon measures _____.
 (A) 60° (B) 108°
 (C) 135° (D) 120°
- The diagonals of a rhombus _____.
 (A) Bisect each other at right angles (B) Are equal in length
 (C) Do not intersect (D) Are parallel to each other
- A quadrilateral with exactly one pair of parallel sides is called a _____.
 (A) Parallelogram (B) Kite
 (C) Rhombus (D) Trapezium
- The sum of the exterior angles of any polygon, taken one at each vertex, is _____.
 (A) 180° (B) 360°
 (C) 540° (D) It depends on the number of sides
- How many diagonals does a pentagon have?
 (A) 4 (B) 5
 (C) 6 (D) 10
- In a parallelogram, the opposite angles are _____.
 (A) Equal (B) Supplementary
 (C) Complementary (D) In the ratio 1 : 2
- Each exterior angle of a regular polygon is 45° . How many sides does it have?
 (A) 6 (B) 8
 (C) 9 (D) 10

9. In parallelogram ABCD shown below, $\angle A = 65^\circ$. Find $\angle B$.

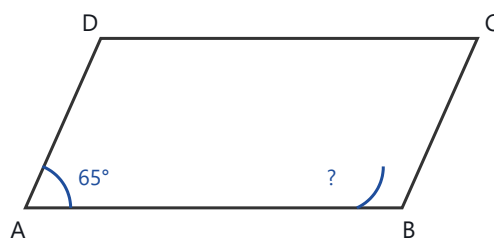


Fig. 9.1 — Parallelogram ABCD

- (A) 65° (B) 180°
 (C) 125° (D) 115°
10. The angles of a quadrilateral are in the ratio 1 : 2 : 3 : 4. The largest angle is _____.
 (A) 144° (B) 72°
 (C) 108° (D) 36°
11. The diagonals of a rhombus are 16 cm and 12 cm. The length of each side is _____.
 (A) 20 cm (B) 14 cm
 (C) 10 cm (D) 28 cm
12. Which of the following is **not** a parallelogram?
 (A) Rectangle (B) Rhombus
 (C) Square (D) Trapezium
13. The sum of the interior angles of an octagon is _____.
 (A) 1080° (B) 900°
 (C) 720° (D) 1440°
14. What is the least number of measurements needed to construct a unique quadrilateral?
 (A) 3 (B) 4
 (C) 5 (D) 6
15. In the table below, which row states a property that is **incorrect**?

Row	Figure	Property
(A)	Rectangle	Diagonals are equal
(B)	Square	Diagonals bisect at 90°
(C)	Kite	Both pairs of opposite sides are equal
(D)	Parallelogram	Diagonals bisect each other

Table 15.1 — Properties of quadrilaterals

- (A) Row (A) (B) Row (B)
 (C) Row (C) (D) Row (D)

16. Consider the following statements.

- (i) Every square is a rhombus.
- (ii) Every rhombus is a square.
- (iii) The diagonals of a rectangle bisect each other and are equal.

Which of the statements is/are correct?

- | | |
|-------------------------|------------------------|
| (A) (i) and (ii) only | (B) (i) and (iii) only |
| (C) (ii) and (iii) only | (D) All three |

17. In parallelogram ABCD, $\angle A = (3x - 10)^\circ$ and $\angle C = (x + 50)^\circ$. Find the value of x .

- | | |
|--------|--------|
| (A) 20 | (B) 25 |
| (C) 30 | (D) 35 |

18. Each interior angle of a regular polygon is 156° . How many sides does the polygon have?

- | | |
|--------|--------|
| (A) 12 | (B) 15 |
| (C) 18 | (D) 20 |

Answer Key

1	A	2	D	3	A	4	D	5	B
6	B	7	A	8	B	9	D	10	A
11	C	12	D	13	A	14	C	15	C
16	B	17	C	18	B				

Solutions

1. Answer: (A) 360°

A quadrilateral can be divided by one diagonal into two triangles, and each triangle has an angle sum of 180° . So the total is $2 \times 180^\circ = \mathbf{360^\circ}$.

2. Answer: (D) 120°

Sum of interior angles = $(n - 2) \times 180^\circ = (6 - 2) \times 180^\circ = 720^\circ$.

Each angle = $720^\circ \div 6 = \mathbf{120^\circ}$.

3. Answer: (A) Bisect each other at right angles

In a rhombus the diagonals cut each other into two equal halves and meet at 90° . They are *not* generally equal — equal diagonals would make it a square.

4. Answer: (D) Trapezium

A **trapezium** has exactly one pair of parallel sides. A parallelogram has two such pairs, and a kite has none.

5. Answer: (B) 360°

Walking once around a polygon turns you through one full revolution, so the exterior angles always add up to **360°** , whatever the number of sides.

6. Answer: (B) 5

Number of diagonals = $n(n - 3) \div 2 = 5 \times 2 \div 2 = \mathbf{5}$. (From each of the 5 vertices you can draw a diagonal to 2 non-adjacent vertices, and $5 \times 2 \div 2 = 5$ avoids double counting.)

7. Answer: (A) Equal

Opposite angles of a parallelogram are **equal**. It is the *adjacent* angles that are supplementary, adding up to 180° .

8. Answer: (B) 8

The exterior angles add up to 360° , so the number of sides is $360^\circ \div 45^\circ = \mathbf{8}$. It is a regular octagon.

9. Answer: (D) 115°

$\angle A$ and $\angle B$ are adjacent (co-interior) angles of a parallelogram, so they are supplementary:

$$\angle B = 180^\circ - 65^\circ = \mathbf{115^\circ}.$$

($\angle C$ would also be 65° and $\angle D$ 115° , and the four add up to 360° . $\checkmark$)

10. Answer: (A) 144°

Let the angles be x , $2x$, $3x$ and $4x$.

$$x + 2x + 3x + 4x = 360^\circ$$

$$10x = 360^\circ, \text{ so } x = 36^\circ.$$

The largest angle is $4x = 4 \times 36^\circ = \mathbf{144^\circ}$.

11. Answer: (C) 10 cm

The diagonals bisect each other at right angles, so they cut the rhombus into four right-angled triangles with legs $16 \div 2 = 8$ cm and $12 \div 2 = 6$ cm.

$$\text{Side} = \sqrt{(8^2 + 6^2)} = \sqrt{(64 + 36)} = \sqrt{100} = \mathbf{10 \text{ cm}}.$$

12. Answer: (D) Trapezium

A parallelogram must have *both* pairs of opposite sides parallel. A trapezium has only one such pair, so it is **not** a parallelogram. Rectangles, rhombuses and squares are all special parallelograms.

13. Answer: (A) 1080°

Sum = $(n - 2) \times 180^\circ$ with $n = 8$:

$$(8 - 2) \times 180^\circ = 6 \times 180^\circ = \mathbf{1080^\circ}.$$

14. Answer: (C) 5

A quadrilateral has 4 sides, 4 angles and 2 diagonals, but **5** suitably chosen measurements are enough to fix it — for example four sides and one diagonal, or three sides and two included angles. With only four measurements the shape can still flex.

15. Answer: (C) Row (C)

In a kite it is the two pairs of *adjacent* sides that are equal, not the opposite sides. The other three properties are all correct.

16. Answer: (B) (i) and (iii) only

Statement (i) is true — a square has four equal sides, which is exactly the definition of a rhombus. Statement (ii) is false; a rhombus need not have right angles, so it need not be a square. Statement (iii) is true. Hence **(i) and (iii)**.

17. Answer: (C) 30

$\angle A$ and $\angle C$ are opposite angles of a parallelogram, so they are equal:

$$3x - 10 = x + 50$$

$$2x = 60, \text{ so } x = \mathbf{30}.$$

$$\text{Check: } \angle A = 3(30) - 10 = 80^\circ \text{ and } \angle C = 30 + 50 = 80^\circ. \checkmark$$

18. Answer: (B) 15

Interior and exterior angles at a vertex are supplementary, so

$$\text{exterior angle} = 180^\circ - 156^\circ = 24^\circ.$$

Since the exterior angles add up to 360° ,

$$n = 360^\circ \div 24^\circ = \mathbf{15}.$$

$$\text{Check: } (15 - 2) \times 180^\circ \div 15 = 2340^\circ \div 15 = 156^\circ. \checkmark$$