

Quadrilaterals, Areas and Circles

Mathematics · Class 9 · 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 unless stated. Rough work may be done at the side of each page.

Section A — Mathematical Reasoning

Q1–Q8 · 1 mark each

- The sum of the four interior angles of a quadrilateral is _____.
 (A) 360° (B) 270°
 (C) 180° (D) 540°
- In a parallelogram, the diagonals _____.
 (A) Bisect each other (B) Are always equal
 (C) Are perpendicular to each other (D) Bisect the angles of the parallelogram
- The diagonals of a rhombus always _____.
 (A) Are equal in length (B) Intersect at right angles
 (C) Are parallel to a pair of sides (D) Trisect each other
- A quadrilateral with exactly one pair of parallel sides is called a _____.
 (A) Rhombus (B) Parallelogram
 (C) Trapezium (D) Kite
- The angle in a semicircle is _____.
 (A) 45° (B) 60°
 (C) 180° (D) 90°
- Two chords of a circle are equal in length. Then they are _____.
 (A) Equidistant from the centre (B) Always parallel
 (C) Both diameters (D) Perpendicular to each other
- The line segment joining the mid-points of two sides of a triangle is _____.
 (A) Equal to the third side (B) Parallel to the third side and half of it
 (C) Perpendicular to the third side (D) Twice the third side

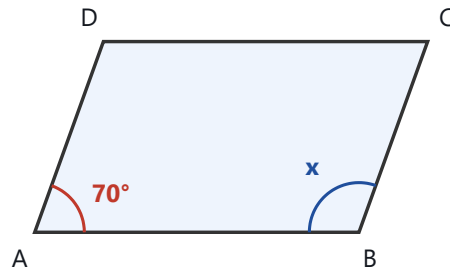
8. An arc of a circle subtends an angle of 80° at the centre. The angle it subtends at any point on the remaining part of the circle is _____.

- (A) 20° (B) 80°
(C) 40° (D) 160°

Section B — Everyday Mathematics and Reasoning

Q9–Q15 · 1 mark each

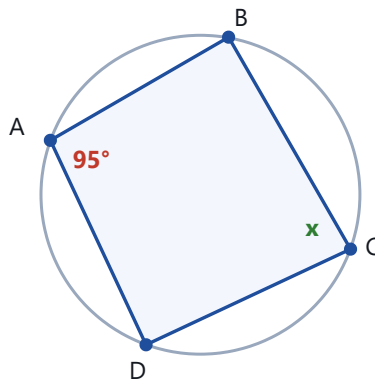
9. ABCD shown below is a parallelogram with $\angle A = 70^\circ$. The value of x is _____.



Parallelogram ABCD

- (A) 70° (B) 90°
(C) 140° (D) 110°

10. ABCD below is a cyclic quadrilateral with $\angle A = 95^\circ$. The value of x is _____.



Cyclic quadrilateral ABCD inscribed in a circle

- (A) 85° (B) 95°
(C) 105° (D) 180°

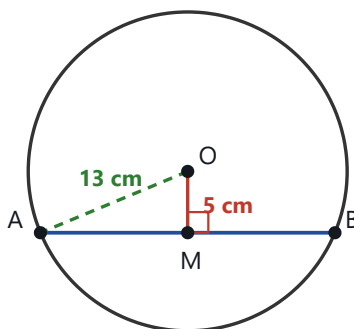
11. A triangle and a parallelogram stand on the same base and between the same pair of parallel lines. If the area of the parallelogram is 84 cm^2 , the area of the triangle is _____.

- (A) 84 cm^2 (B) 42 cm^2
(C) 168 cm^2 (D) 28 cm^2

12. The diagonals of a rhombus measure 16 cm and 12 cm. Its area is _____.

- (A) 48 cm^2 (B) 192 cm^2
(C) 96 cm^2 (D) 100 cm^2

13. In the circle below, O is the centre, $OA = 13$ cm and the perpendicular distance OM from the centre to the chord AB is 5 cm. The length of chord AB is _____.



Chord AB of a circle with centre O and $OM \perp AB$

- (A) 12 cm
(B) 18 cm
(C) 26 cm
(D) 24 cm
14. One row of the table below is **incorrectly** matched. Which row is it?

Row	Quadrilateral	Property
(A)	Rhombus	All four sides are equal
(B)	Rectangle	Diagonals are equal in length
(C)	Parallelogram	Opposite angles are equal
(D)	Trapezium	Both pairs of opposite sides are parallel

Table 5.1 — Quadrilaterals and their properties

- (A) (A)
(B) (B)
(C) (C)
(D) (D)
15. In $\triangle ABC$, D and E are the mid-points of AB and AC respectively. If $BC = 10$ cm, then $DE =$ _____.
- (A) 5 cm
(B) 2.5 cm
(C) 10 cm
(D) 20 cm

Achievers Section

Q16–Q18 · 3 marks each

16. In parallelogram ABCD, $\angle A$ and $\angle B$ are in the ratio 4 : 5. The measure of $\angle C$ is _____.
- (A) 90°
(B) 80°
(C) 100°
(D) 120°
17. In a cyclic quadrilateral ABCD, $\angle A = (2x + 4)^\circ$ and $\angle C = (3x + 6)^\circ$. The value of x is _____.
- (A) 30
(B) 34
(C) 36
(D) 40
18. ABCD is a parallelogram of area 60 cm^2 , and P is any point lying on the side CD. The area of $\triangle APB$ is _____.
- (A) 15 cm^2
(B) 20 cm^2
(C) 30 cm^2
(D) It depends on where P lies

Answer Key

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

Solutions

1. Answer: (A) 360°

A diagonal splits any quadrilateral into two triangles, each contributing 180° . So the four angles total $2 \times 180^\circ = 360^\circ$.

2. Answer: (A) Bisect each other

The diagonals of a parallelogram always **bisect each other**, cutting one another into two equal halves. They are equal only in a rectangle, and perpendicular only in a rhombus, so those properties do not hold for every parallelogram.

3. Answer: (B) Intersect at right angles

In a rhombus all four sides are equal, which forces the diagonals to **intersect at right angles** (and bisect each other). Equal diagonals belong to a rectangle; a square, being both, has equal perpendicular diagonals.

4. Answer: (C) Trapezium

A **trapezium** has exactly one pair of parallel sides. A parallelogram (and hence a rhombus) has two such pairs, while a kite has none but has two pairs of equal adjacent sides.

5. Answer: (D) 90°

A diameter subtends a straight angle of 180° at the centre, and the angle at any point of the circle is half the angle at the centre. So the angle in a semicircle is $180^\circ \div 2 = 90^\circ$.

6. Answer: (A) Equidistant from the centre

Equal chords of a circle are always **equidistant from the centre**, and conversely chords equidistant from the centre are equal. Their directions, however, are unrestricted, so they need be neither parallel nor perpendicular.

7. Answer: (B) Parallel to the third side and half of it

This is the Mid-point Theorem: the segment joining the mid-points of two sides is **parallel to the third side and half its length**. Its converse — a line through one mid-point parallel to another side bisects the third side — is equally useful.

8. Answer: (C) 40°

The angle subtended by an arc at the centre is twice the angle it subtends at any point on the remaining part of the circle. So the required angle is $80^\circ \div 2 = 40^\circ$.

9. Answer: (D) 110°

AD is parallel to BC, so $\angle A$ and $\angle B$ are co-interior angles between the parallels AD and BC cut by AB, and therefore add to 180° . Hence $x = 180^\circ - 70^\circ = 110^\circ$. (Equivalently, adjacent angles of a parallelogram are supplementary.)

10. Answer: (A) 85°

Opposite angles of a cyclic quadrilateral are supplementary, so $\angle A + \angle C = 180^\circ$. Hence $x = 180^\circ - 95^\circ = 85^\circ$.

11. Answer: (B) 42 cm^2

Both figures share the same base b and the same height h , since the parallel lines fix the distance between them. The parallelogram has area bh and the triangle $\frac{1}{2}bh$, so the triangle's area is half: $84 \div 2 = 42 \text{ cm}^2$.

12. Answer: (C) 96 cm^2

The diagonals of a rhombus bisect each other at right angles, splitting it into four right triangles of legs 8 cm and 6 cm. Area = $\frac{1}{2} \times d_1 \times d_2 = \frac{1}{2} \times 16 \times 12 = 96 \text{ cm}^2$. (Each side, by Pythagoras, is $\sqrt{8^2 + 6^2} = 10 \text{ cm}$.)

13. Answer: (D) 24 cm

The perpendicular from the centre bisects the chord, so $AM = MB$. In right $\triangle OMA$, $AM = \sqrt{13^2 - 5^2} = \sqrt{169 - 25} = \sqrt{144} = 12 \text{ cm}$. Hence $AB = 2 \times 12 = 24 \text{ cm}$.

14. Answer: (D) (D)

A trapezium has *exactly one* pair of parallel sides; two such pairs would make it a parallelogram. So row (D) is the incorrect one. The other three properties are correctly stated.

15. Answer: (A) 5 cm

By the Mid-point Theorem, DE is parallel to BC and half of it, so $DE = 10 \div 2 = \mathbf{5\text{ cm}}$.

16. Answer: (B) 80°

Adjacent angles of a parallelogram are supplementary, so $4k + 5k = 180^\circ$, giving $9k = 180^\circ$ and $k = 20^\circ$. Thus $\angle A = 80^\circ$ and $\angle B = 100^\circ$. Opposite angles are equal, so $\angle C = \angle A = \mathbf{80^\circ}$.

17. Answer: (B) 34

Opposite angles of a cyclic quadrilateral are supplementary: $(2x + 4) + (3x + 6) = 180$, so $5x + 10 = 180$ and $x = \mathbf{34}$.
Checking, $\angle A = 72^\circ$ and $\angle C = 108^\circ$, which do add to 180° .

18. Answer: (C) 30 cm^2

$\triangle APB$ and the parallelogram stand on the same base AB and lie between the same parallels AB and DC, so the triangle's area is half the parallelogram's: $60 \div 2 = \mathbf{30\text{ cm}^2}$. Moving P along DC changes the shape of the triangle but not its height above AB, so the area stays the same.