

CLASS 8

MATHS

NCERT SOLUTIONS

## NCERT Solutions for Class 8 Maths Chapter 4: Quadrilaterals – Free PDF Download

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Chapter 4 — Quadrilaterals — explores rectangles, squares, parallelograms, rhombuses, kites and trapeziums through their diagonal properties, and builds every property using triangle congruence (SSS, SAS, ASA) rather than just measurement. The chapter has three Figure It Out blocks (5+3+11 = 19 questions). Below...

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Chapter 4 — Quadrilaterals — explores rectangles, squares, parallelograms, rhombuses, kites and trapeziums through their diagonal properties, and builds every property using triangle congruence (SSS, SAS, ASA) rather than just measurement. The chapter has three Figure It Out blocks ( $5+3+11 = 19$  questions). Below are complete, verified answers, cross-checked across independent sources and independently re-derived geometrically. These Class 8 Mathematics Chapter 4 solutions are also useful as quick revision notes before exams.

## NCERT Solutions for Class 8 Maths Chapter 4: Quadrilaterals

### Figure It Out — Rectangles and Squares

#### 1. Find all remaining angles in the given rectangles, given one angle.

Using the fact that a rectangle's diagonals bisect each other (creating isosceles triangles) plus linear-pair and vertical-angle rules, all other angles can be chased around the figure step by step from the one given angle.

#### 2. Draw a quadrilateral whose diagonals are 8 cm, bisect each other, and meet at (i) $30^\circ$ (ii) $40^\circ$ (iii) $90^\circ$ (iv) $140^\circ$ .

(i), (ii), (iv) each give a **rectangle** (equal diagonals bisecting each other, non- $90^\circ$  angle between them). (iii) gives a **square** (equal diagonals, bisecting, and perpendicular).

#### 3. PL and AM are perpendicular diameters of a circle. What figure is APML?

**A square** — both diagonals equal  $2r$  (both are diameters), they bisect each other at the centre, and they're perpendicular — equal + bisecting + perpendicular diagonals always give a square.

#### 4. Using two equal sticks and a thread (no paper), how can you make an exact $90^\circ$ angle?

Pin two equal sticks together at their midpoints; adjust until the thread confirms both halves from one end to the other stick's end are equal. This makes the two triangles formed congruent (SSS), forcing the angle between the sticks to be exactly  $90^\circ$  (since it equals its own linear-pair angle).

#### 5. Is every quadrilateral with opposite sides parallel and equal a rectangle?

**No.** Opposite sides parallel and equal only guarantees a **parallelogram** — nothing forces any angle to be  $90^\circ$ , so it may be a non-rectangular parallelogram. The right-angle condition is essential and separate.

### Figure It Out — Angles, Parallelograms & Rhombus

#### 1. Find the remaining angles in given parallelograms/rhombus figures.

Using co-interior angles (sum to  $180^\circ$  along parallel sides), opposite angles equal, and — for a rhombus — diagonals bisecting the vertex angles, every remaining angle can be chased from the one or two given angles.

#### 2. Construct a parallelogram with diagonals 7 cm and 5 cm meeting at $140^\circ$ .

Draw one diagonal (7 cm) with its midpoint marked; at that midpoint draw a  $140^\circ$  angle and mark the second diagonal's endpoints 2.5 cm each side (5 cm total, bisected); join all four endpoints.

#### 3. Construct a rhombus with diagonals 4 cm and 5 cm.

Draw one diagonal (4 cm) with midpoint marked; draw a **perpendicular** through the midpoint; mark the second diagonal's endpoints 2.5 cm each side; join all four endpoints — perpendicular bisecting diagonals of unequal length always give a rhombus.

### Figure It Out — Kite, Trapezium & Mixed Reasoning

**1. Find the sides and angles formed by joining two equilateral triangles (side 4 cm).**

All sides = 4 cm; angles are  $120^\circ$ ,  $60^\circ$ ,  $120^\circ$ ,  $60^\circ$  (a rhombus shape).

**2. Construct a kite with diagonals 6 cm and 8 cm.**

Draw the 8 cm diagonal; erect a perpendicular at any point on it (not necessarily the midpoint); mark the 6 cm diagonal's endpoints 3 cm each side of that point; join all four endpoints.

**3. Find remaining angles in given trapeziums.**

Using co-interior angles along the pair of parallel sides (they sum to  $180^\circ$ ), the remaining angles can be found directly from the given ones.

**4. Venn diagram of parallelograms, kites, rhombuses, rectangles, squares: (i) both kite and parallelogram? (ii) both kite and rectangle? (iii) is every kite a rhombus?**

(i) **A rhombus** sits in the overlap of kite and parallelogram. (ii) **No** — no quadrilateral is both a kite and a rectangle. (iii) **No** — the relationship runs the other way: every **rhombus is a kite**, not every kite is a rhombus.

**5. Two overlapping rectangles PAIR and RODS share structure; given a  $30^\circ$  angle, find  $\angle IOD$ .**

Using a construction line parallel to one rectangle's side and the fact each rectangle contributes a  $90^\circ$  corner,  $\angle IOD$  works out to  $30^\circ$  by angle chasing.

**6. Construct a square with diagonal 6 cm without using a protractor.**

Draw the 6 cm diagonal AB; using compass arcs of equal radius from A and B (radius  $>3$  cm), find the perpendicular bisector without a protractor; mark the other two vertices 3 cm from the midpoint along this perpendicular; join to complete the square.

**7. CASE is a square; U, V, W, X are midpoints of its sides. What is UVWX?**

**UVWX is also a square** — the four corner triangles formed are congruent (SAS), making all four sides of UVWX equal and each interior angle  $90^\circ$ . This works for any equal offset from each corner, not just midpoints, giving infinitely many inscribed squares.

**8. A quadrilateral has 4 equal sides and one  $90^\circ$  angle — is it a square?**

**Yes.** A diagonal splits it into two congruent isosceles right triangles (SSS), forcing every angle to be  $90^\circ$  and confirming a square.

**9. What type of quadrilateral has opposite sides equal? Justify with a diagonal.**

**A parallelogram.** Drawing one diagonal creates two congruent triangles (SSS with the shared diagonal), giving equal alternate angles, which forces both pairs of opposite sides to be parallel.

**10. Does the angle sum of any quadrilateral equal  $360^\circ$ ?**

**Yes, always.** Any diagonal splits a simple quadrilateral into two triangles; their angle sums ( $180^\circ + 180^\circ$ ) regroup exactly into the quadrilateral's four angles, totalling  $360^\circ$ .

**11. True or False, with justification:**

(i) Equal, bisecting diagonals  $\Rightarrow$  must be a square — **False** (it's always a rectangle; needs perpendicularity too for a square). (ii) Three right angles  $\Rightarrow$  must be a rectangle — **True** (angle sum forces the 4th angle to  $90^\circ$  too). (iii) Diagonals bisecting each other  $\Rightarrow$  must be a parallelogram — **True**. (iv) Perpendicular diagonals  $\Rightarrow$  must be a rhombus — **False** (a kite also has perpendicular diagonals without equal sides). (v) Opposite angles equal  $\Rightarrow$  must be a parallelogram — **True**. (vi) All angles equal  $\Rightarrow$  is a rectangle — **True**. (vii) Isosceles trapeziums are parallelograms — **False** (the equal legs aren't parallel to each other).

## Why This Chapter Matters

This chapter teaches the ‘Deduce  $\rightarrow$  Verify  $\rightarrow$  Prove’ method using triangle congruence, which is the backbone of formal geometry proofs used throughout later chapters and higher classes.

## Class 8 Mathematics Chapter 4 – Notes and Extra Questions

Along with these NCERT Solutions, students can also use the [Class 8 Mathematics Chapter 4 Extra Questions](#) and [Class 8 Mathematics Chapter 4 Revision Notes](#) for quick revision and extra practice.

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