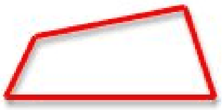
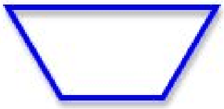
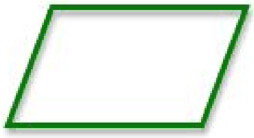
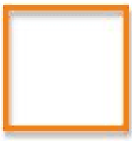
NCERT Class 9 Solutions: Quadrilaterals (Chapter 8) Exercise 8.1 – Part 5

Quadrilateral Classification Chart

Shape	Characteristics	Name
	No parallel sides	Trapezium
	Exactly one pair of parallel sides	Trapezoid
	Two pairs of parallel sides	Parallelogram
	Parallelogram with congruent sides	Rhombus
	Parallelogram with right angles	Rectangle
	Rectangle with congruent sides	Square
Note that squares, rectangles, and rhombuses are types of parallelograms and that a square is a type of rectangle and a type of rhombus.		

Q-9 In parallelogram ABCD, two points P and Q are taken on diagonal BD such that $DP = BQ$ (see Fig.) . Show that:

1. $\Delta APD \cong \Delta CQB$
2. $AP = CQ$
3. $\Delta AQB \cong \Delta CPD$
4. $AQ = CP$
5. APCQ is a parallelogram

Solution:

1. In ΔAPD andΔCQB ,
2. $DP = BQ$ (Given)
3. $\angle ADP = \angle CBQ$ (Alternate interior angles)
4. $AD = BC$ (Opposite sides of a parallelogram)

Thus, $\Delta APD \cong \Delta CQB$ by Side-Angle-Side congruence condition.

1. $AP = CQ$ By Corresponding parts of congruent triangles as $\Delta APD \cong \Delta CQB$.
2. In ΔAQB andΔCPD ,
3. $BQ = DP$ (Given)
4. $\angle ABQ = \angle CDP$ (Alternate interior angles)
5. AB = CD (Opposite sides of a parallelogram)

Thus, ΔAQB ≅ ΔCPD by Side-Angle-Side congruence condition.

1. $AQ = CP$ By Corresponding Parts of Congruent Triangles as $\Delta AQB \cong \Delta CPD$.
2. The diagonal of a parallelogram bisect each other.
3. $OB + OD$
4. $OB - BQ = OD - DP|BQ = DP$ Given
5. $OQ = OP$ ... equation (1)

Also, $OA = OC$ ... equation (2) (diagonal of a parallelogram bisect each other)

From equation (1) and (2) , APCQ is parallelogram

Q-10 ABCD is a parallelogram and AP and CQ are perpendiculars from vertices A and C on on diagonal BD (see Fig.) . Show that

1. $\triangle APB \cong \triangle CQD$
2. $AP = CQ$

Solution:

Given,

- ABCD is parallelogram
- AP and CQ are perpendiculars from A and C on diagonal BD

Solution (i)

In ΔAPB and ΔCQD ,

- $AB = CD$ (Opposite side of parallelogram ABCD)
- $\angle ABP = \angle CDQ$ (Alternate interior angles)
- $\therefore AB \parallel DC$

Now,

- $\angle APB = \angle CQD$ (Equal to right angles as AP and CQ are perpendiculars)
- $AB = CD$ (ABCD is a parallelogram)
- Thus, $\Delta APB \cong \Delta CQD$ by Angle-Angle-Side congruence condition.

Solution (ii)

$AP = CQ$ by Corresponding Parts of Congruent Triangles as $\Delta APB \cong \Delta CQD$.