



MATHS

NCERT - NCERT

MATHEMATICS(ENGLISH)

QUADRILATERALS

Exercise 8 1

1. If the two diagonals of a parallelogram are equal; it is a rectangle.

A. Rectangle

B. Rhombus

C. Square

D. Kite

Answer: A



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2. Show that if the diagonals of a quadrilateral bisect each other at right angles, then it is a rhombus.



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3. The angles of a quadrilateral are in the ratio $3 : 5 : 9 : 13$. Find all the angles of the quadrilateral.

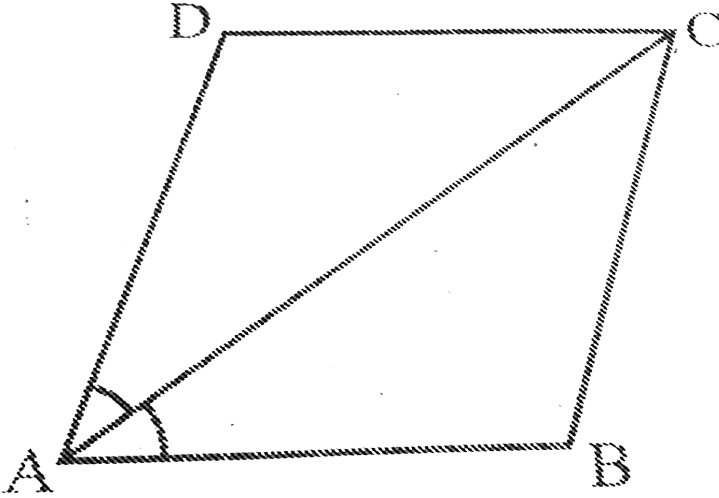


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4. Diagonal AC of a parallelogram $ABCD$ bisects $\angle A$. Show that

(i) it bisects $\angle C$ also,

(ii) $ABCD$ is a rhombus.



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5. $ABCD$ is a rhombus. Show that diagonals AC bisects $\angle A$ as well as $\angle C$ and diagonal BD bisects $\angle B$ as well as $\angle D$



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6. Show that the diagonals of a square are equal and bisect each other at right angles.



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7. Show that if the diagonals of a quadrilateral are equal and bisect each other at right angle, then it is a square.



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8. ABCD is a rectangle in which diagonal AC bisects $\angle A$ as well as $\angle C$. Show that: (i) ABCD is a square (ii) diagonal BD bisects $\angle B$ as well as $\angle D$.



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

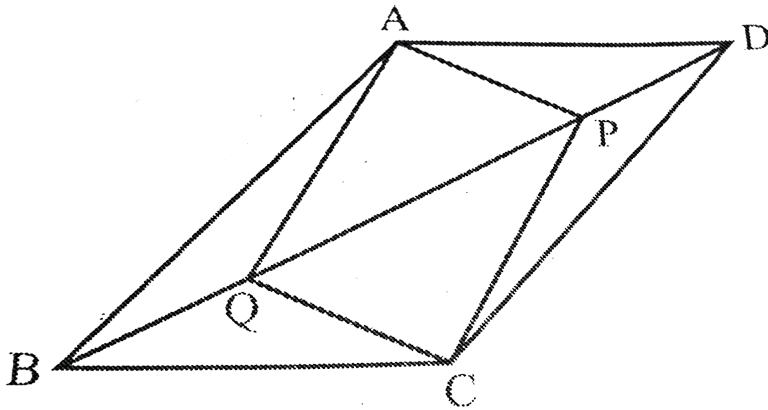
(i) $\triangle APD \cong \triangle CQB$

(ii) $AP = CQ$

(iii) $\Delta AQB \cong \Delta CPD$

(iv) $AQ = CP$

(v) APCQ is a parallelogram.



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10. In $\triangle ABC$ and $\triangle DEF$, $AB = DE$,
 $AB \parallel DE$, $BC = EF$ and $BC \parallel EF$.

Vertices A, B and C are joined to vertices D, E and F respectively (see Fig. 8.22). Show that

(i) quadrilateral ABED is a parallelogram

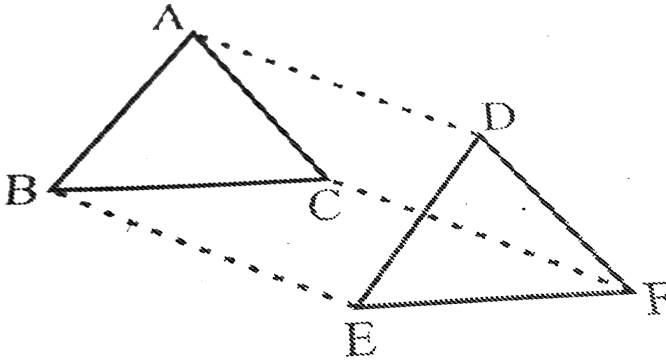
(ii) quadrilateral BEFC is a parallelogram

(iii) $AD \parallel CF$ and $AD = CF$

(iv) quadrilateral ACFD is a parallelogram

(v) $AC = DF$

(vi) $\triangle ABC \cong \triangle DEF$.

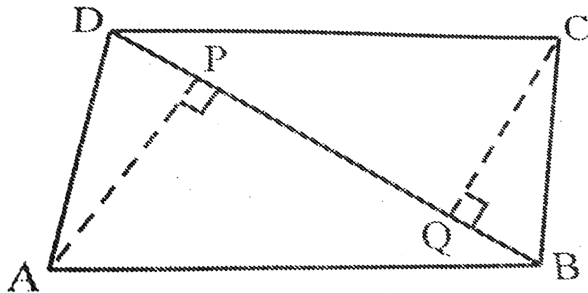


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11. $ABCD$ is a parallelogram and AP and CQ are perpendiculars from vertices A and C on diagonal BD . Show that

(i) $\triangle APB \cong \triangle CQD$

(ii) $AP = CQ$



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12. In Figure, $ABCD$ is a trapezium in which

$AB \parallel CD$ and $AD = BC$. Show that :

(i) $\angle A = \angle B$

(ii) $\angle C = \angle D$

(iii) $ABC \cong BAD$

(iv) diagonal $AC = diagonal BD$



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Solved Examples

1. Show that each angle of a rectangle is a right angle.



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2. ABC is an isosceles triangle in which $AB = AC$. AD bisects exterior angle PAC and $CD \parallel AB$. Show that (i) $\angle DAC = \angle BCA$ and (ii) ABCD is a parallelogram.



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3. Show that the diagonals of a rhombus are perpendicular to each other



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4. Show that the bisectors of angles of a parallelogram form a rectangle.



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5. Two parallel lines l and m are intersected by a transversal p . Show that the quadrilateral formed by the bisectors of interior angles is a rectangle.



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6. ABCD is a parallelogram in which P and Q are mid-points of opposite sides AB and CD (see Fig. 8.18). If AQ intersects DP at S and BQ intersects CP at R, show that: (i) APCQ is a parallelogram. (ii) DPBQ is a parallelogram.



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7. l, m and n are three parallel lines intersected by transversals p and q such that l, m and n cut off equal intercepts AB and BC on p (see

Fig.). Show that l , m and n cut off equal intercepts DE and EF on q also



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8. D , E and F are respectively the mid-points of the sides AB , BC and CA of a $\triangle ABC$. Prove that by joining these mid-points D , E and F , the $\triangle ABC$ is divided into four congruent triangles.



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Exercise 8 2

1. ABCD is a rectangle and P, Q, R and S are mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rhombus.



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2. P, Q, R and S are respectively the mid-points of the sides AB, BC, CD and DA of a

quadrilateral ABCD such that $AC \perp BD$. Prove that PQRS is a rectangle.



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3. ABCD is a quadrilateral in which P, Q, R and S are mid-points of the sides AB, BC, CD and DA.

AC is a diagonal. Show that : (i) $SR \parallel AC$ and

$SR = \frac{1}{2}AC$ (ii) $PQ = SR$ (iii) PQRS is a

parallelogram



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4. ABC is a triangle right angled at C. A line through the mid-point M of hypotenuse AB and parallel to BC intersects AC at D. Show that (i) D is the mid-point of AC (ii) $MD \perp AC$ (iii) $CM = MA = \frac{1}{2}AB$



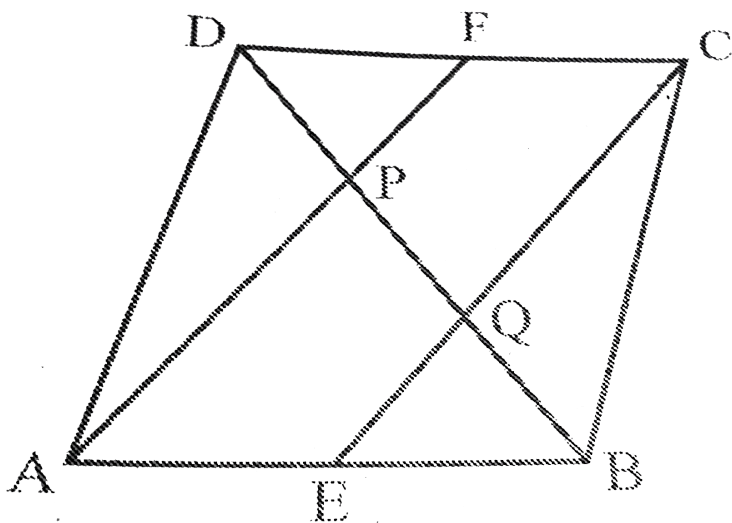
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5. Show that the line segments joining the mid-points of the opposite sides of a quadrilateral bisect each other.



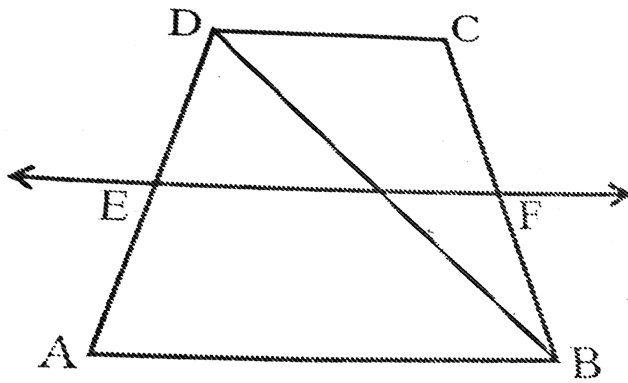
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6. In a parallelogram $ABCD$, E and F are the mid-points of sides AB and CD respectively. Show that the line segments AF and EC trisect the diagonal BD .



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7. ABCD is a trapezium in which $AB \parallel DC$, BD is a diagonal and E is the mid-point of AD. A line is drawn through E parallel to AB intersecting BC at F (see Fig. 8.30). Show that F is the mid-point of BC.



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