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MATHS

NCERT - NCERT MATHEMATICS(HINGLISH)

QUADRILATERALS

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. ABCD is a rhombus 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 rectangle.

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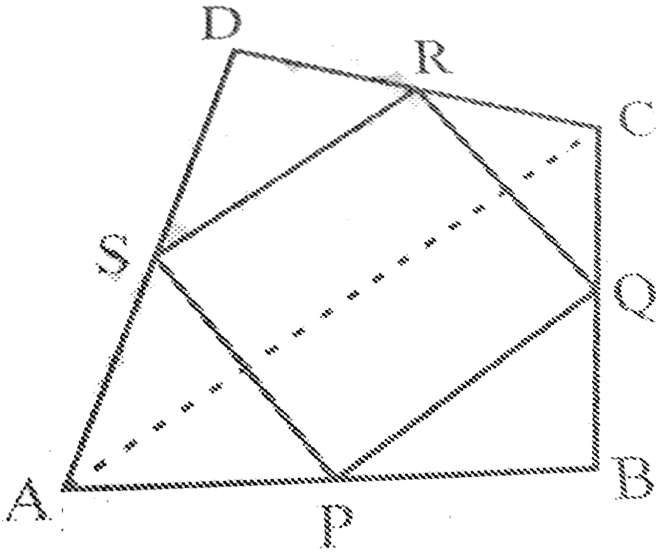
3. ABCD is a quadrilateral in which P, Q, R and S are mid-points of the sides AB, BC, CD and DA. AC is a diagonal. Show that :

(i) $SR \mid\mid AC$ 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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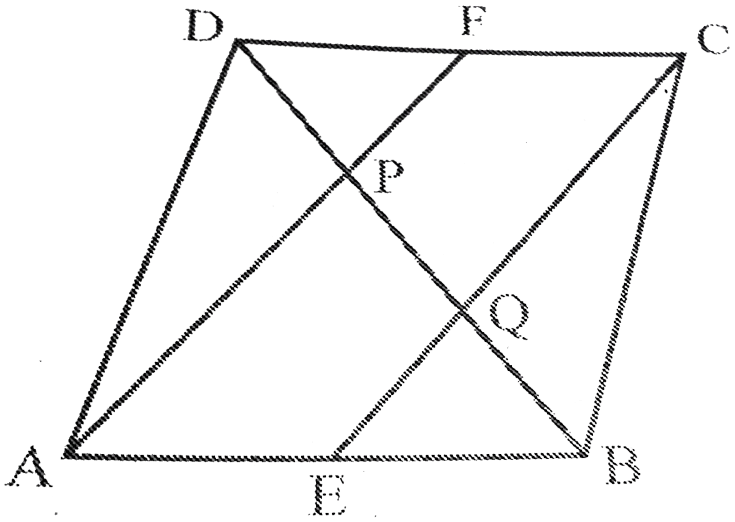
6. In a parallelogram ABCD, E and F are the mid-points of sides AB and CD respectively. Show that the line segments AF and EC trisect

the diagonal BD.



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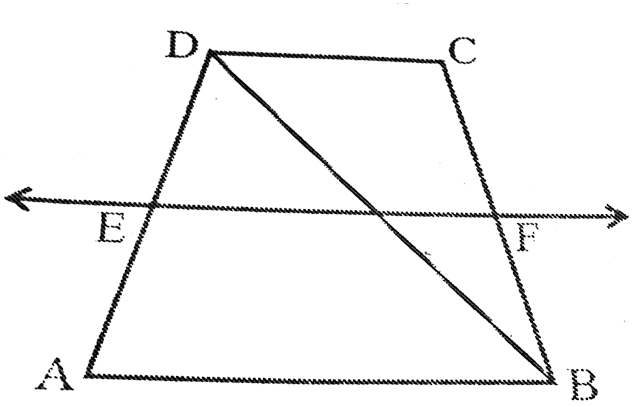
7. ABCD is a trapezium in which $AB \mid\mid DC$, BD is a diagonal and E is the mid-point of AD. A line is drawn through E parallel to AB

intersecting BC at F (see Fig. 8.30). Show that F is the mid-point of BC.



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Exercise 8 1

1. If the diagonals of a parallelogram are equal, then it is a

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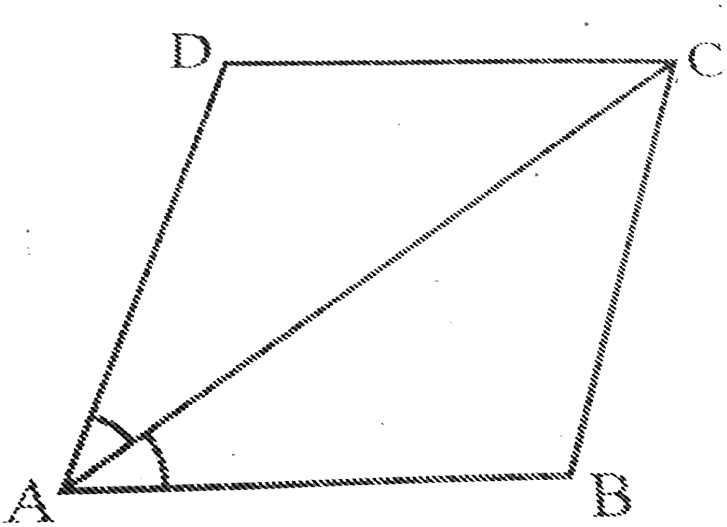
4. Diagonal AC of a parallelogram ABCD bisects $\angle A$. Show that

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

(ii) ABCD is a rhombus.



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5. ABCD is a rhombus. Show that diagonal 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 angles, 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:

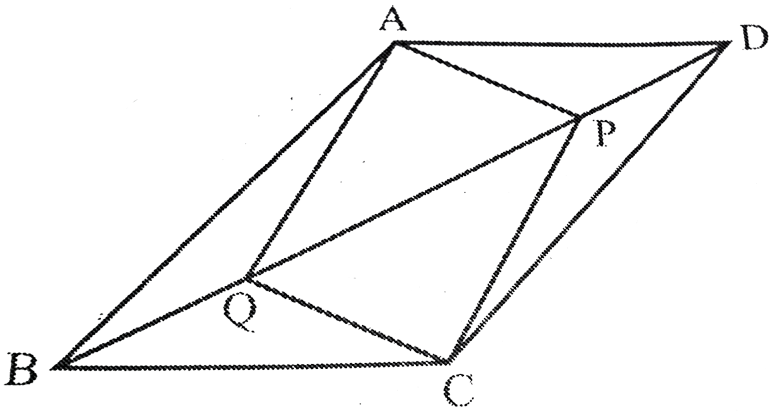
(i) $\Delta APD \cong \Delta CQB$

(ii) $AP = CQ$

(iii) ΔABC

(iv) $AQ = CP$

(v) APCQ is a parallelogram.



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10. In ΔABC and ΔDEF, $AB = DE$, $AB \parallel DE$, $BC = EF$ 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

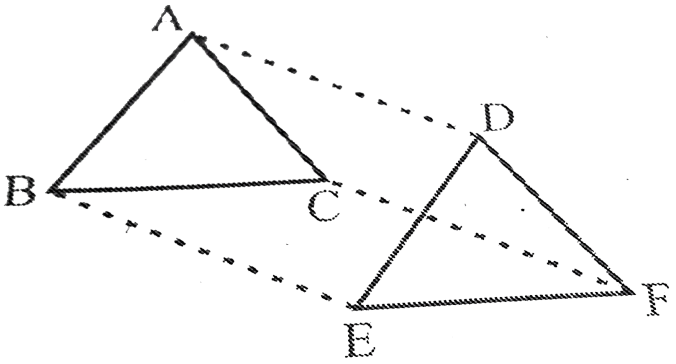
(ii) quadrilateral BEFC is a parallelogram

(iii) AD || CF and AD = CF

(iv) quadrilateral ACFD is a parallelogram

(v) AC = DF

(vi) Δ ABC $\cong$ Δ DEF.



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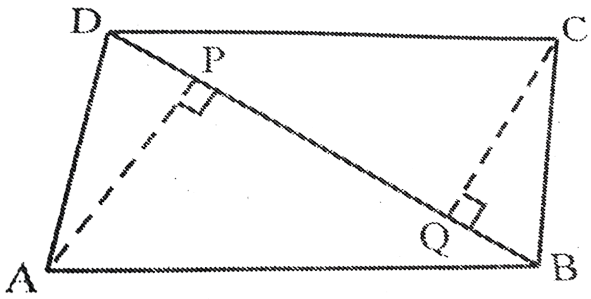
11. ABCD is a parallelogram and AP and CQ are perpendiculars from vertices A and C on diagonal BD . Show that

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

(ii) $AP = CQ$



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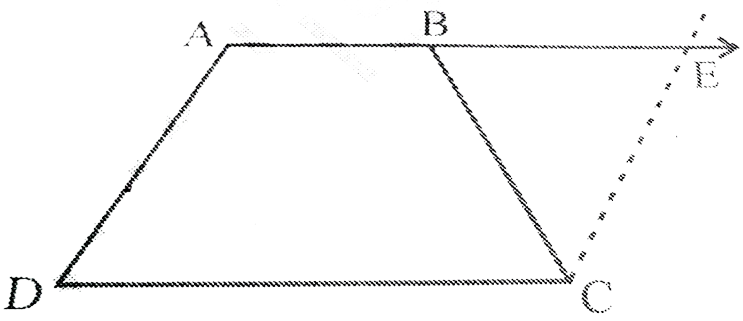
12. ABCD is a trapezium in which $AB \mid\mid CD$ and $AD = BC$. Show that

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

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

(iii) $\triangle ABC \cong = \triangle BAD$

(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 $CD \| AB$. 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 (see Fig. 8.15). 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.(iii) PSQR 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, mand n cut off equal intercepts AB and BC on p (see Fig. 8.28). Show that l, m and n cut off equal

intercepts DE and EF on q also

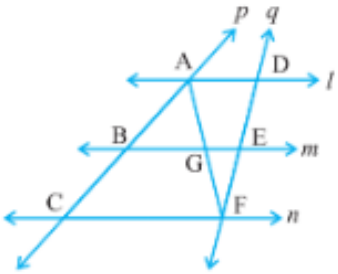

Fig. 8.28

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8. In ΔABC, D, E and F are respectively the mid-points of sides AB, BC and CA. Show that $\Delta ABC$is divided into four congruent triangles by joining D, E and F.

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