



MATHS

NCERT - NCERT Maths(Telugu)

QUADRILATERALS

Illustrative Examples

1. ABCD is a parallelogram and $\angle A = 60^\circ$. Find the remaining angles.



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2. In a parallelogram $ABCD$, $\angle DAB = 40^\circ$ find the other angles of the parallelogram.



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3. Two adjacent sides of a parallelogram are 4.5 cm and 3 cm. Find its perimeter.



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4. In a parallelogram $ABCD$, the bisectors of the consecutive angles $\angle A$ and $\angle B$ intersect at P . Show that $\angle APB = 90^\circ$.



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5. \overleftrightarrow{AB} and \overleftrightarrow{DC} are two parallel lines and a transversal l , intersects \overleftrightarrow{AB} at P and \overleftrightarrow{DC} at R .

Prove that the bisectors of the interior angles form a rectangle.

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6. In a triangle ABC , AD is the median drawn on the side BC is produced to E such that $AD = ED$ prove that $ABEC$ is a parallelogram.

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7. In $\triangle ABC$, D , E and F are the midpoints of sides AB , BC and CA respectively. Show that $\triangle ABC$ is divided into four congruent triangles, when the three midpoints are joined to each other. ($\triangle DEF$ is called medial triangle)



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8. l , m and n are three parallel lines intersected by the transversals p and q at A , B , C and D , E , F such that they make equal intercepts AB and BC on the transversal p . Show that the intercepts DE and EF on q are also equal.



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9. In the Fig. AD and BE are medians of $\triangle ABC$ and $BE \parallel DF$. Prove that $CF = \frac{1}{4}AC$.

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10. ABC is a triangle and through A, B, C lines are drawn parallel to BC, CA and AB respectively intersecting at P, Q and R . Prove that the perimeter of $\triangle PQR$ is double the perimeter of $\triangle ABC$.

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11. ABCD is a parallelogram and $\angle A = 60^\circ$. Find the remaining angles.



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12. In a parallelogram $ABCD$, $\angle DAB = 40^\circ$ find the other angles of the parallelogram.



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13. Two adjacent sides of a parallelogram are 4.5 cm and 3 cm. Find its perimeter.



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14. In a parallelogram ABCD, the bisectors of the consecutive angles angleA and angleB intersect at P. Show that $\angle APB = 90^\circ$.

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15. In a triangle ABC, AD is the median drawn on the side BC is produced to E such that $AD = ED$ prove that ABEC is a parallelogram.

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16. In the Fig. AD and BE are medians of $\triangle ABC$ and $BE \parallel DF$. Prove that $CF = \frac{1}{4} AC$.



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17. ABC is a triangle and through A, B, C lines are drawn parallel to BC , CA and AB respectively intersecting at P, Q and R. Prove that the perimeter of $\triangle PQR$ is double the perimeter of $\triangle ABC$.



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Think Discuss And Write

1. Show that the diagonals of a square are equal and right bisectors of each other.

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2. Show that the diagonals of a rhombus divide it into four congruent triangles.

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3. Show that the diagonals of a square are equal and right bisectors of each other.

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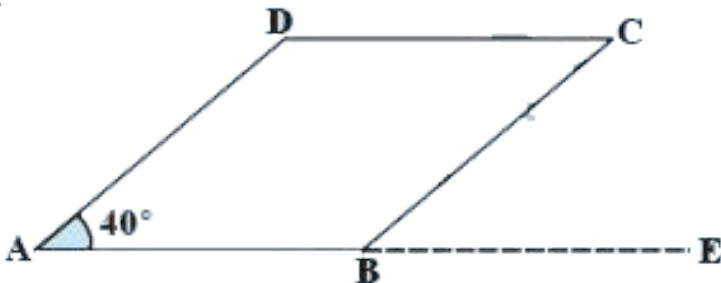
4. Show that the diagonals of a rhombus divide it into four congruent triangles.

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Try This

1. Extend AB to E . Find $\angle CBE$. What do you notice.

What kind of angles are $\angle ABC$ and $\angle CBE$?





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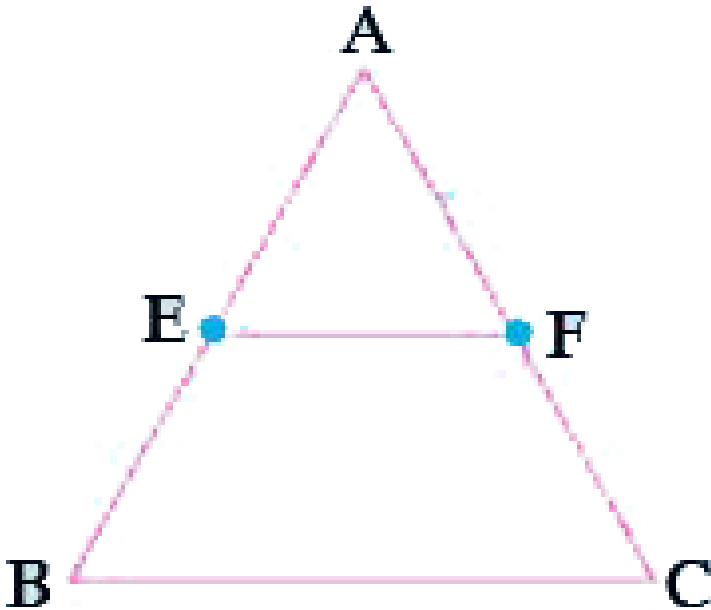
2. Draw a triangle ABC and mark the midpoints E and F of two sides of triangle. \overline{AB} and \overline{AC} respectively. Join the point E and F as shown in the figure.

Measure EF and the third side BC of the triangle. Also measure $\angle AEF$ and $\angle ABC$.

We find $\angle AEF = \angle ABC$ and $\overline{EF} = \frac{1}{2}\overline{BC}$

As these are corresponding angles made by the

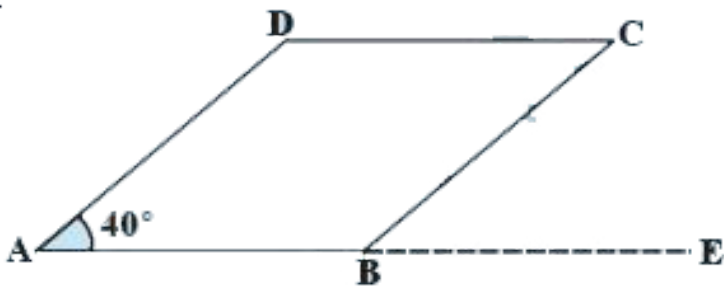
transversal AB with lines EF and BC, we say $EF \parallel BC$.



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3. Extend AB to E . Find $\angle CBE$. What do you notice.

What kind of angles are $\angle ABC$ and $\angle CBE$?



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4. Cut out a parallelogram from a sheet of paper again and cut along one of its diagonal. What kind of shapes you obtain ? What can you say about these triangles ?

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Exercise 8 1

1. State whether the statements are True or False.

(i) Every parallelogram is a trapezium ()



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2. State whether the statements are True or False.

(ii) All parallelograms are quadrilaterals ()



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3. State whether the statements are True or False.

(iii) All trapeziums are parallelograms ()



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4. State whether the statements are True or False.

(iv) A square is a rhombus ()



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5. State whether the statements are True or False.

(v) Every rhombus is a square ()



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6. State whether the statements are True or False.

(vi) All parallelograms are rectangles



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7. Complete the following table by writing (YES) if the property holds for the particular Quadrilateral and (NO) if property does not holds.

Properties	Trapezium	Parallelogram	Rhombus	Rectangle	square
a. Only one pair of opposite sides are parallel	YES				
b. Two pairs of opposite sides are parallel					
c. Opposite sides are equal					
d. Opposite angles are equal					
e. Consecutive angles are supplementary					
f. Diagonals bisect each other					
g. Diagonals are equal					
h. All sides are equal					
i. Each angle is a right angle					
j. Diagonals are perpendicular to each other.					



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8. ABCD is trapezium in which $AB \parallel CD$. If $AD = BC$, show that $\angle A = \angle B$ and $\angle C = \angle D$.



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9. The four angles of a quadrilateral are in the ratio 1:2:3:4. Find the measure of each angle of the quadrilateral.



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10. ABCD is a rectangle AC is diagonal. Find the nature of $\triangle ACD$. Give reasons.



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11. ABCD is trapezium in which $AB \parallel CD$. If $AD = BC$, show that $\angle A = \angle B$ and $\angle C = \angle D$.

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12. The four angles of a quadrilateral are in the ratio 1:2:3:4. Find the measure of each angle of the quadrilateral.

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13. ABCD is a rectangle AC is diagonal. Find the nature of $\triangle ACD$. Give reasons.



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Exercise 8 2

1. In the adjacent figure ABCD is a parallelogram ABEF is a rectangle show that $\triangle AFD \cong \triangle BEC$.



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2. Show that the diagonals of a rhombus divide it into four congruent triangles.

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3. If a quadrilateral ABCD, the bisector of $\angle C$ and $\angle D$ intersect at O.

Prove that $\angle COD = \frac{1}{2}(\angle A + \angle B)$

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4. Show that the diagonals of a rhombus divide it into four congruent triangles.

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5. If a quadrilateral ABCD, the bisector of $\angle C$ and $\angle D$ intersect at O.

Prove that $\angle COD = \frac{1}{2}(\angle A + \angle B)$



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Exercise 8 3

1. The opposite angles of a parallelogram are $(3x - 2)^\circ$ and $(x + 48)^\circ$.

Find the measure of each angle of the parallelogram.



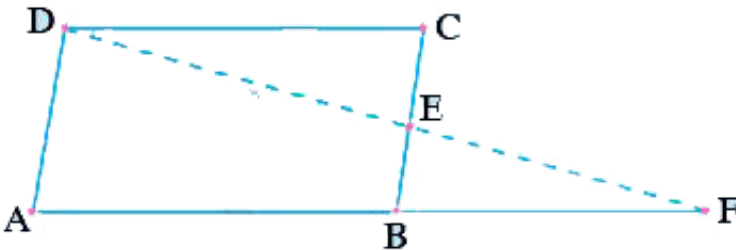
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2. Find the measure of all the angles of a parallelogram, if one angle is 24° less than the twice

of the smallest angle.

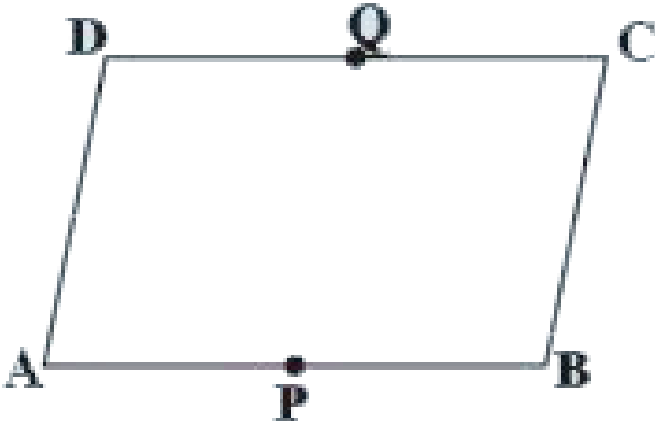
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3. In the adjacent figure ABCD is a parallelogram and E is the midpoint of the side BC. If DE and AB are produced to meet at F, show that $AF = 2AB$.



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4. In the adjacent figure ABCD is a parallelogram P and Q are the midpoints of sides AB and DC respectively. Show that PBCQ is also a parallelogram.



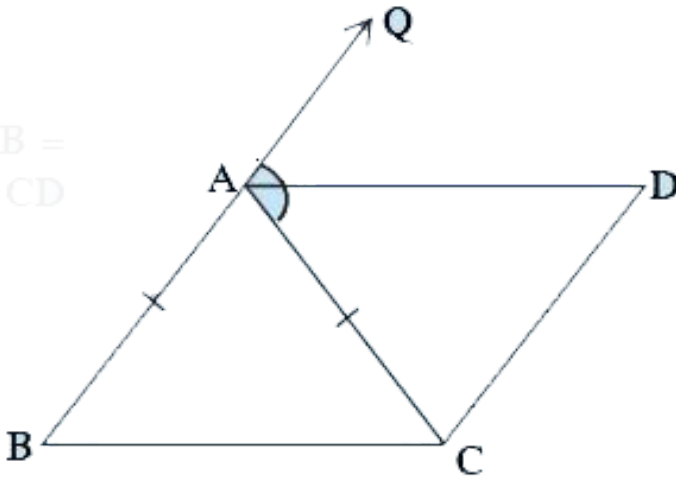
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5. ABC is an isosceles triangle in which $AB = AC$. AD bisects exterior angle

QAC and $CD \parallel BA$ as shown in the figure. Show that

(i) $\angle DAC = \angle BCA$

(ii) ABCD is a parallelogram



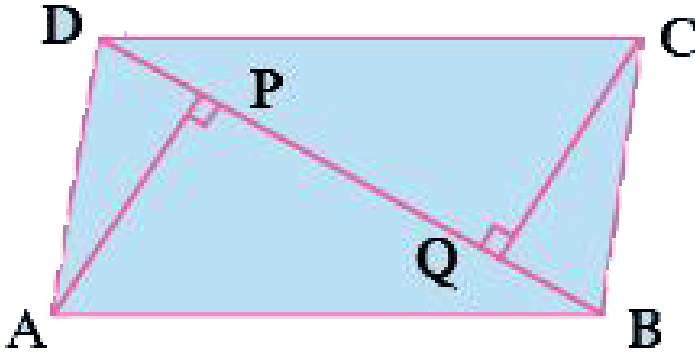
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6. ABCD is a parallelogram AP and CQ are perpendiculars drawn from vertices A and C on

diagonal BD (see figure) show that

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

(ii) $AP = CQ$



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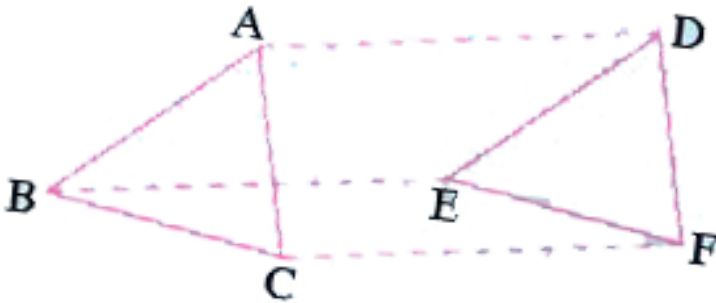
7. In $\triangle^s ABC$ and $\triangle^s DEF$, $AB \parallel DE$, $BC = EF$ and $BC \parallel EF$.
Vertices A, B and C are joined to vertices D, E and F respectively (see figure). Show that

(i) ABED is a parallelogram

(ii) BCFE is a parallelogram

(iii) $AC = DF$

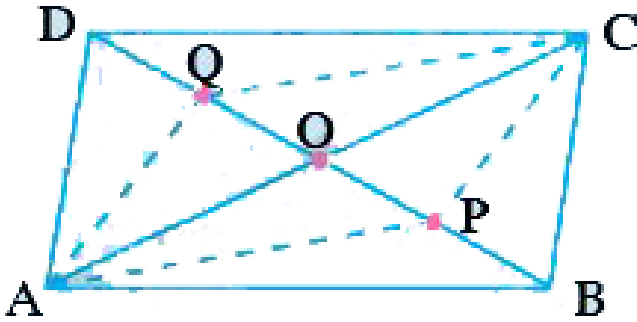
(iv) $\triangle ABC \cong \triangle DEF$



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8. ABCD is a parallelogram. AC and BD are the diagonals intersect at O. P and Q are the points of trisection of the diagonal BD. Prove that $CQ \parallel AP$ and

also AC bisects PQ (see figure).



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9. ABCD is a square. E, F, G and H are the mid points of AB , BC , CD and DA respectively. Such that $AE = BF = CG = DH$. Prove that EFGH is a square.

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10. The opposite angles of a parallelogram are $(3x - 2)^\circ$ and $(x + 48)^\circ$.

Find the measure of each angle of the parallelogram.



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11. Find the measure of all the angles of a parallelogram, if one angle is 24° less than the twice of the smallest angle.



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12. ABCD is a square. E, F, G and H are the mid points of AB , BC , CD and DA respectively. Such that $AE = BF = CG = DH$. Prove that EFGH is a square.



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Exercise 8 4

1. ABC is a triangle . D is a point of AB such that $AD = \frac{1}{4}AB$ and E is a point on AC such that $AE = \frac{1}{4}AC$. If $DE = 2cm$ find BC.



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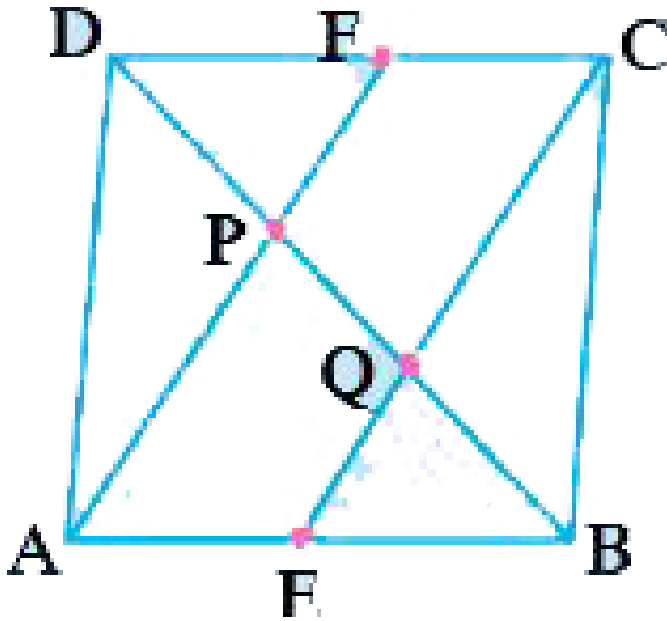
2. ABCD is quadrilateral E, F, G and H are the midpoints of AB , BC , CD and DA respectively. Prove that EFGH is a parallelogram.

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3. Show that the figure formed by joining the midpoints of sides of a rhombus successively is a rectangle.

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4. In a parallelogram $ABCD$, E and F are the midpoints of the sides AB and DC respectively. Show that the line segments AF and EC trisect the diagonal BD .



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5. Show that the line segments joining the midpoints of the opposite sides of a quadrilateral and bisect each other.



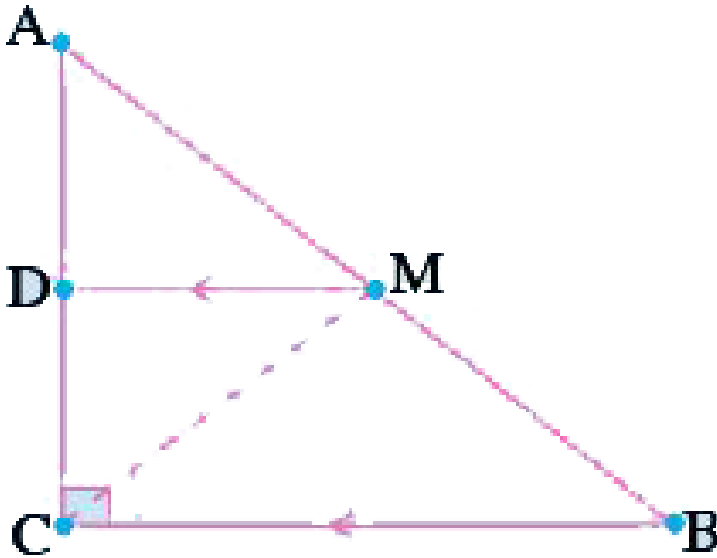
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6. ABC is a triangle right angled at C. A line through the midpoint M of hypotenuse AB and Parallel to BC intersects AC at D. Show that

(i) D is the midpoint of AC

(ii) $MD \perp AC$

(iii) $CM = MA = \frac{1}{2}AB$.



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7. ABC is a triangle. D is a point of AB such that

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$AE = \frac{1}{4}AC$. If $DE = 2\text{cm}$ find BC .

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8. ABCD is quadrilateral E, F, G and H are the midpoints of AB , BC , CD and DA respectively. Prove that EFGH is a parallelogram.



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9. Show that the figure formed by joining the midpoints of sides of a rhombus successively is a rectangle.



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10. Show that the line segments joining the midpoints of the opposite sides of a quadrilateral and bisect each other.

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[Watch Video Solution](#)

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[Watch Video Solution](#)

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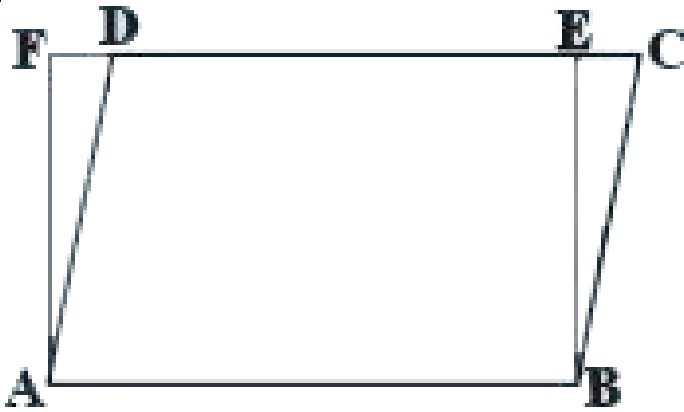
9. The four angles of a quadrilateral is in the ratio of 1:2:3:4. Find the measure of each angle of the quadrilateral.

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Prove that $\angle COD = \frac{1}{2}(\angle A + \angle B)$

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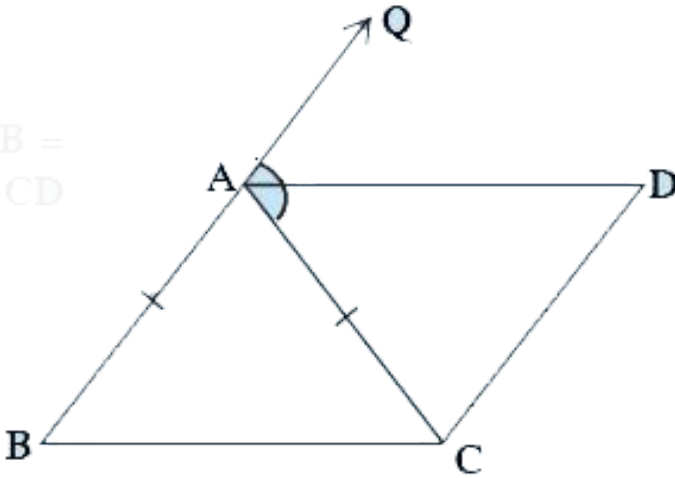
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18. ABC is an isosceles triangle in which $AB = AC$. AD bisects exterior angle QAC and $CD \parallel BA$ as shown in the figure. Show that

(i) $\angle DAC = \angle BCA$

(ii) ABCD is a parallelogram

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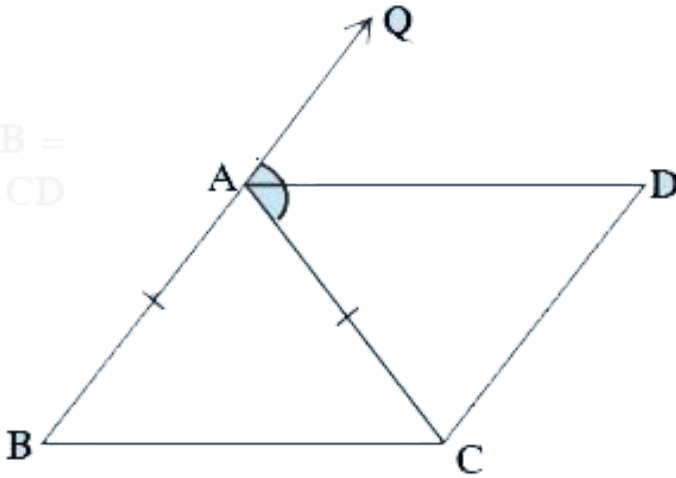
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19. ABC is an isosceles triangle in which $AB = AC$. AD bisects exterior angle QAC and $CD \parallel BA$ as shown in the figure. Show that

(i) $\angle DAC = \angle BCA$

(ii) ABCD is a parallelogram

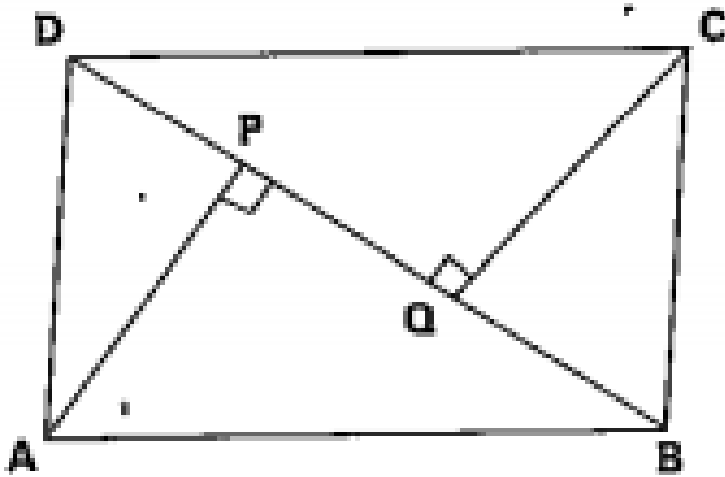
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20. ABCD is a parallelogram and AP and CQ are perpendicular from vertices A and C on diagonal BD

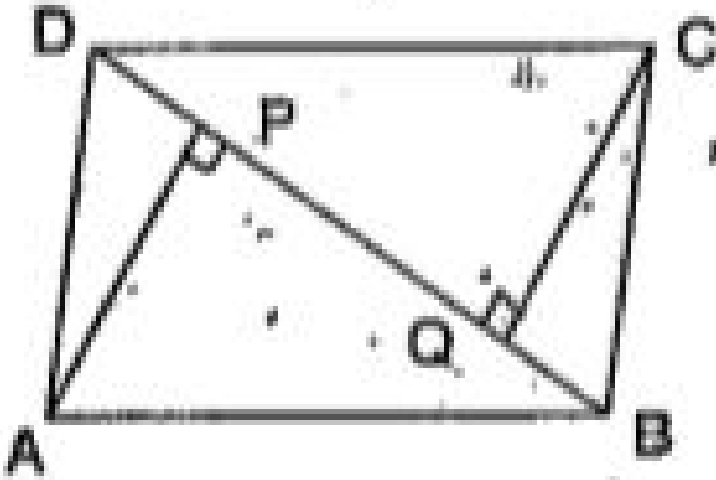
(see figure) show that : $\triangle APB \cong \triangle CQD$



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21. ABCD is a parallelogram AP and CQ are perpendiculars drawn from vertices A and C on diagonal BD (see figure)..Show that : i)

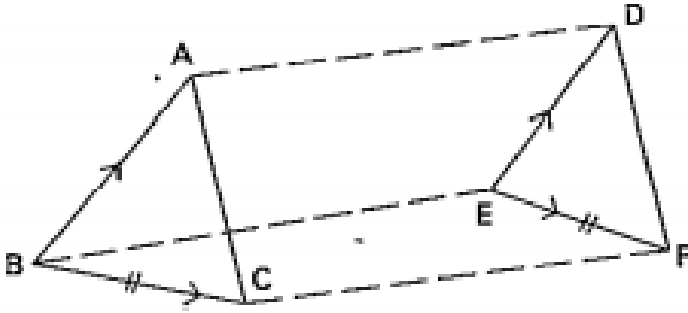
$$\Delta APB = \Delta CQD.$$



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22. In Δ^s ABC and DEF, DE and AB $\parallel \parallel$ DE, $BC = EF$ and $BC \parallel \parallel EF$. Vertices A, B and C are joined to vertices D, E and F respectively (see figure).

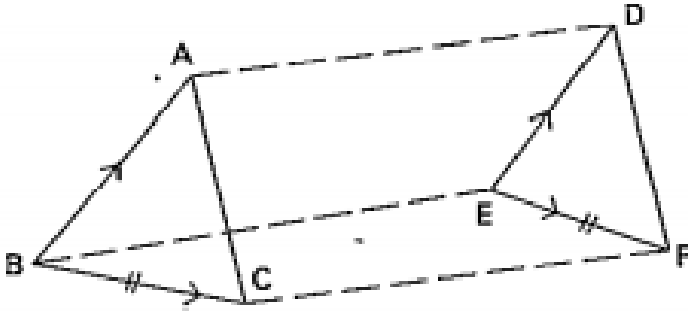
Show that : $ABED$ is a parallelogram.



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23. In Δ^s ABC and DEF , DE and $AB \parallel \parallel DE$,
 $BC = EF$ and $BC \parallel \parallel EF$. Vertices A , B and C are
joined to vertices D , E and F respectively (see figure).

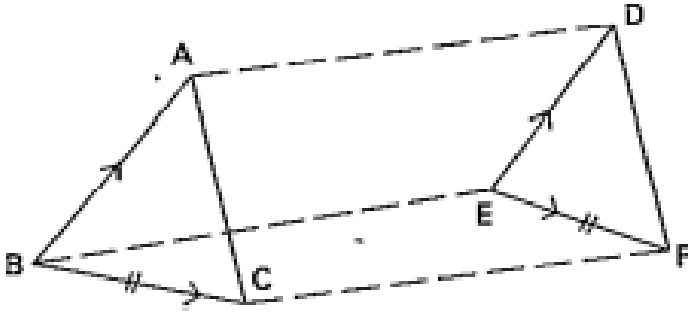
Show that : $BCFE$ is a parallelogram.



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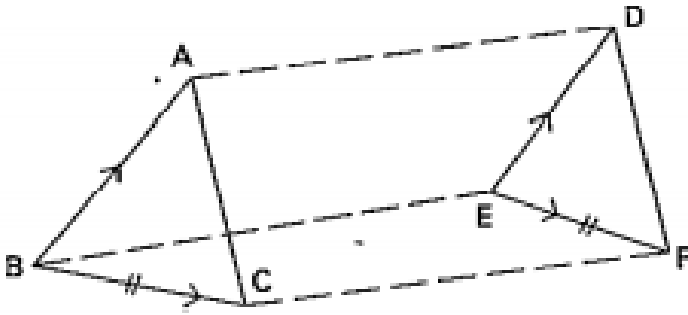
24. In $\Delta^s ABC$ and DEF , DE and $AB \parallel \parallel DE$, $BC=EF$ and $BC \parallel \parallel EF$. Vertices A, B and C are joined to vertices D, E and F respectively (see figure). Show that :

$$AC = DF$$



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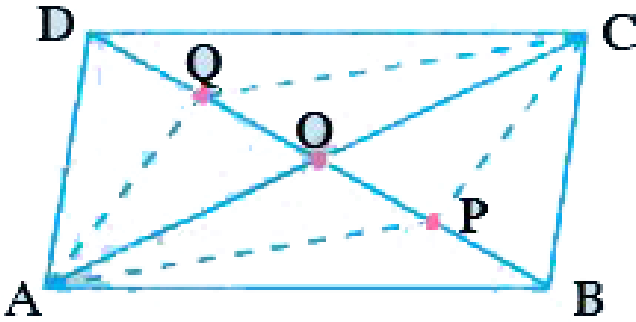
25. In Δ^s ABC and DEF, DE and $AB \parallel \parallel DE$, $BC=EF$ and $BC \parallel \parallel EF$. Vertices A, B and C are joined to vertices D, E and F respectively (see figure). Show that :

$\triangle ABC$ \approx $\triangle DEF$ 

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26. ABCD is a parallelogram. AC and BD are the diagonals intersect at O. P and Q are the points of trisection of the diagonal BD. Prove that $CQ \parallel AP$ and

also AC bisects PQ (see figure).



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27. $ABCD$ is a square. E, F, G and H are the mid points of AB, BC, CD and DA respectively. Such that $AE = BF = CG = DH$. Prove that $EFGH$ is a square.

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28. Draw a triangle ABC and mark the midpoints E and F of two sides of triangle. \overline{AB} and \overline{AC} respectively.

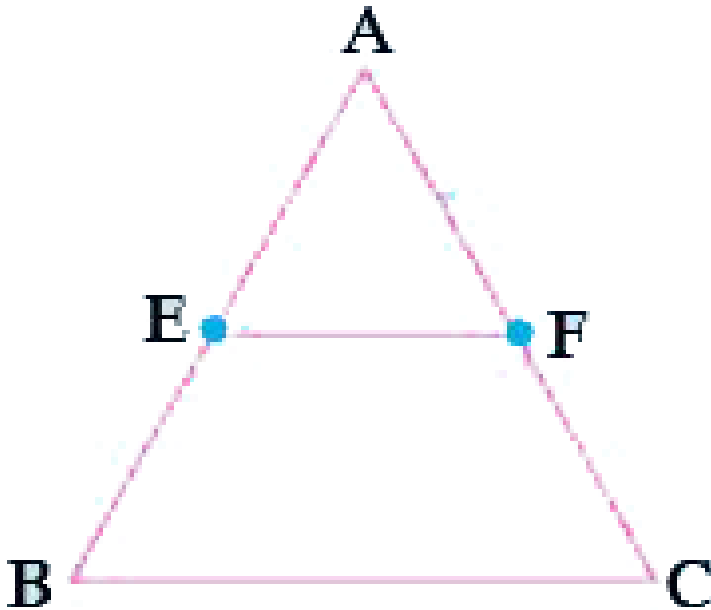
Join the point E and F as shown in the figure.

Measure EF and the third side BC of the triangle. Also measure $\angle AEF$ and $\angle ABC$.

We find $\angle AEF = \angle ABC$ and $\overline{EF} = \frac{1}{2}\overline{BC}$

As these are corresponding angles made by the

transversal AB with lines EF and BC, we say $EF \parallel BC$.



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30. ABCD is quadrilateral E, F, G and H are the midpoints of AB , BC , CD and DA respectively. Prove that EFGH is a parallelogram.



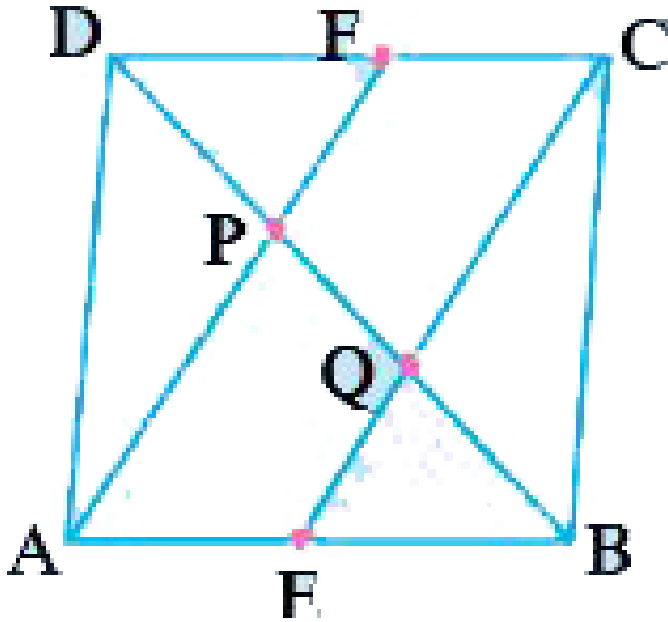
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31. Show that the figure formed by joining the midpoints of sides of a rhombus successively is a rectangle.



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32. In a parallelogram ABCD, E and F are the midpoints of the sides AB and DC respectively. Show that the line segments AF and EC trisect the diagonal BD.



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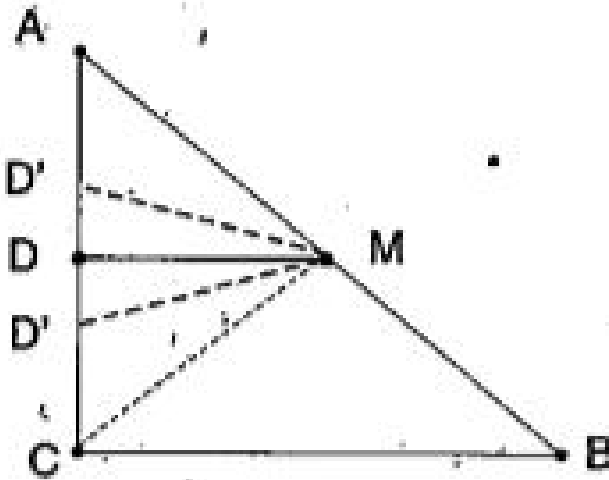
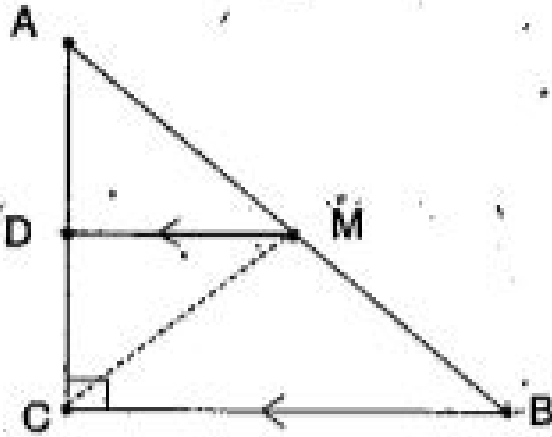
33. Show that the line segments joining the midpoints of the opposite sides of a quadrilateral and bisect each other.



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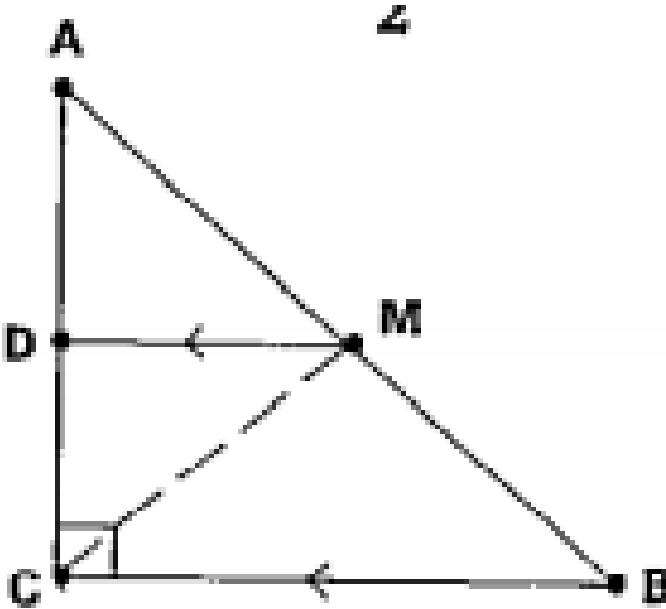
34. ABC is a triangle right angled at 'C'. A line through the midpoint M of hypotenuse AB and parallel to BC

intersects AC at D. Show that : D is the midpoint of AC.



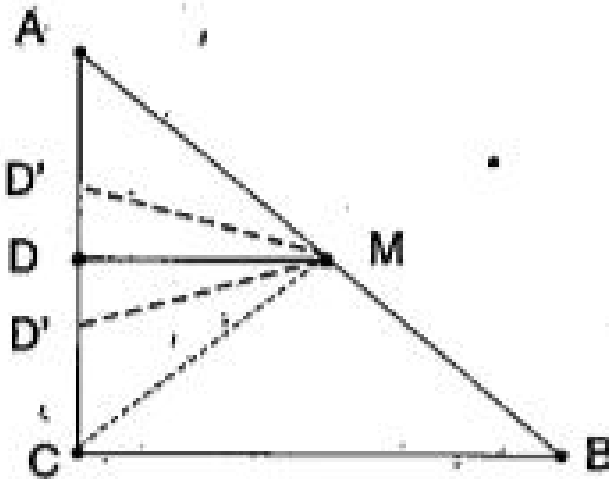
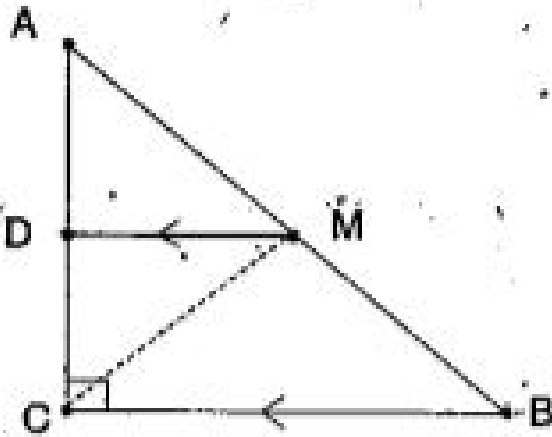
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35. ABC is a triangle right angled at C. A line through the midpoint M of hypotenuse AB and parallel to BC intersects AC at D. Show that : $MD \perp AC$



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36. ABC is a triangle right angled at 'C'. A line through the midpoint M of hypotenuse AB and parallel to BC intersects AC at D. Show that : $CM = MA = \frac{1}{2}AB$.



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37. ABCD is a parallelogram and P is a point of \overline{CD} . Show that $ar(\triangle ABP) = ar(\triangle ADP) + ar(\triangle BCP)$.

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38. PQRS is a parallelogram. K, L are the midpoints on PQ, RS respectively. \overline{PL} intersects \overline{SK} at M and RK and QL intersects at N. Show that KNLN is a parallelogram.

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39. ABCD is a parallelogram and P, Q are the mid points of \overline{AD} and \overline{BC} respectively such that $AP=1/3AD$ and $CQ=1/3BC$, Show that : AQCP is a parallelogram.



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40. ABCD is a parallelogram and P, Q are the mid points of \overline{AD} and \overline{BC} respectively. Show that : \overline{BD} and \overline{PQ} bisect each other.



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41. In $\triangle ABC$, AD is the median on \overline{BC} . 'E' is the midpoint of AD. Draw \overline{BF} through E. Show that

$$AF = 1/3AC$$



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42. In a Parallelogram PQRS, $\angle SPQ = 70^\circ$ and $\angle SQR = 65^\circ$. Find the other angles of the parallelogram.



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43. In a parallelogram ABCD, $\angle ABC = 50^\circ$. Find the other angles.



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44. The four angles of a quadrilateral is in the ratio of 3:4:5: 6. Find the measure of each angle.

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45. The four angles of a quadrilateral is in the ratio of 2 : 3:5: 8. Find the measure of each angle.

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46. The opposite angles of a parallelogram are $(2x - 3)^\circ$ and $(x + 4)^\circ$. Find each angle of its angles.



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47. In $\triangle ABC$, P, Q, R are the mid points of \overline{AB} , \overline{BC} , \overline{CA} respectively. If area of $\triangle POR = 3$ sq. units. Find the area of the $\triangle ABC$.



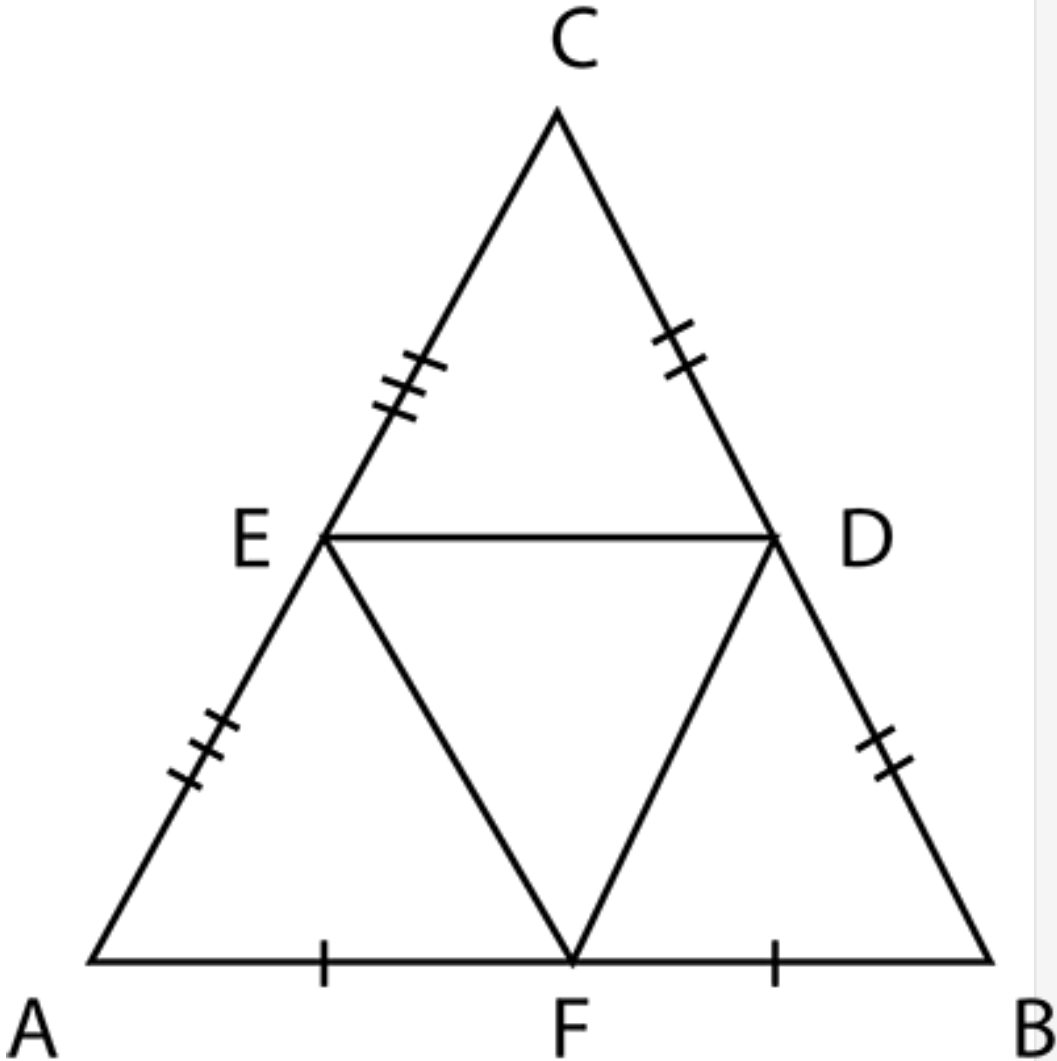
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48. The sum of the measures of two consecutive sides of a parallelogram is 18 cm. Find its perimeter.



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49. In $\triangle ABC$, D, E, F are the mid-points of \overline{AB} , \overline{BC} , \overline{CA} and if $\overline{AB} = 11$ cm, $\overline{BC} = 9$ cm, $\overline{CA} = 8$ cm. Find the lengths of \overline{DE} , \overline{EF} and \overline{DF} .



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50. In $\triangle PQR$, A, B, C are the mid-points of \overline{PQ} , \overline{QR} , \overline{RP} and if $AB=4$ cm, $BC=6$ cm, $AC=5$ cm. Find \overline{PQ} , \overline{QR} , \overline{RP} .

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51. ABCD is a trapezium. $AB \parallel CD$, P, Q are the mid-points AD and BC respectively. If $AB = 10$ cm, $CD=18$ cm, then $PQ=?$

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52. KLMN is a trapezium and $KL \parallel MN$. P, Q are the midpoints of KN and LM respectively. If $KL = 18\text{cm}$, $PQ = 10\text{ cm}$, Find $MN = ?$



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53. ABC is a triangle . D is a point of AB such that $AD = \frac{1}{4}AB$ and E is a point on AC such that $AE = \frac{1}{4}AC$. If $DE = 2\text{cm}$ find BC.



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54. In $\triangle KLM$, P is the midpoint of KL. such that $KP = \frac{1}{4}KL$ and Q is the midpoint on KM such that $KQ = \frac{1}{4}KM$ and if $PQ = 11$ cm. Find LM?



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55. Any two consecutive angles of a parallelogram are

- A. Equal
- B. Supplementary
- C. Complementary
- D. Obtuse

Answer:



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56. Show that the diagonals of a square are equal and right bisectors of each other.

A. Trapezium

B. Rectangle

C. Rhombus

D. square

Answer:



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57. If a parallelogram has its sides equal and each angle is 90° , then it is called_____.

- A. Rhombus
- B. Rectangle
- C. Square
- D. Trapezium

Answer:



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58. In a parallelogram PQRS, if $\angle P = 70^\circ$, then $\angle R =$ _____.

A. 110°

B. 70°

C. 290°

D. 20°

Answer:



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59. If two adjacent sides of a parallelogram are 3.5, 6cms. Then its perimeter is ___.

A. 9.5

B. 15.5

C. 18

D. 19

Answer:



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60. The angle bisectors of a parallelogram form a

A. Square

B. Rhombus

C. Rectangle

D. Parallelogram

Answer:



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61. In the adjacent figure ABCD is a parallelogram
angle $A = 50^\circ$ and angle $C = ?$

A. 50°

B. 130°

C. 80°

D. 40°

Answer:



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62. In $\triangle ABC$, \overline{AD} and \overline{BE} are the midpoints of \overline{BC} and \overline{AC} . If $AC = 10\text{cm}$, then $CE =$

A. 5 cm

B. $\frac{10}{3}$ cm

C. 2.5 cm

D. 3.5cm

Answer:



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63. ABCD is a trapezium in which $AB \parallel CD$. P and Q are midpoints of \overline{AD} and \overline{BC} respectively. If $AB = 10\text{cm}$, $PQ = 8\text{ cm}$, then $CD = _ _$.

A. 5 cm

B. 4 cm

C. 9 cm

D. 6cm

Answer:



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64. In a figure $\overline{PQ} \parallel \overline{BC}$ and P, Q are midpoints of \overline{AB} , \overline{AC} respectively. If $PQ = 4\text{cm}$, then $BC = _ _ _$.

A. 6 cm

B. 7 cm

C. 8 cm

D. 16 cm

Answer:



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65. Fill in the Blanks :A figure formed by joining the mid points of a parallelogram is_____

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66. Fill in the Blanks:If the mid-points of the sides of a square are joined the figure so formed is____

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67. Fill in the Blanks:The sum of four angles in a quadrilateral is_____right angles.

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68. Fill in the Blanks: In a parallelogram PQRS, the bisectors of consecutive angles P and Q intersect at K.
 $\angle PKQ = \underline{\hspace{2cm}}$.

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69. The angles of a quadrilateral are in ratio of 2:3:4:6.
Find the measure of smallest angle.

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70. A parallelogram in which two adjacent sides are equal is a



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71. Fill in the Blanks: The diagonals of a rhombus divide it into ___ congruent angles.



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72. Fill in the Blanks: The diagonals of a rectangle are of ___



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73. Fill in the Blanks: The diagonals of a square are equal and _____ each other.



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74. Fill in the Blanks: The ratio of areas of a triangle and a parallelogram are on the base and between the same parallel lines is _____



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75. ABCD is a parallelogram and P is a point of \overline{CD} .

Show that $ar(\triangle ABP) = ar(\triangle ADP) + ar(\triangle BCP)$.

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76. If $A = 45^\circ$ then find the value of $\tan 2A$.

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77. In a parallelogram ABCD, $\angle ABC = 50^\circ$. Find the other angles.

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78. The four angles of a quadrilateral is in the ratio of 2: 3:5:8. Find the measure of each angle.



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79. If the sum of two adjacent sides of a parallelogram is 32 cm. Find its perimeter.



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80. In $\triangle KLM$, P is the midpoint of KL. such that $KP = \frac{1}{4}KL$ and Q is the midpoint on KM such that $KQ = \frac{1}{4}KM$ and if $PQ = 11$ cm. Find LM?



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Examples

1. $ABCD$ is a parallelogram and $\angle A = 60^\circ$. Find the remaining angles.



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2. In a parallelogram $ABCD$, $\angle DAB = 40^\circ$ find the other angles of the parallelogram.



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3. Two adjacent sides of a parallelogram are 4.5 cm and 3 cm. Find its perimeter.

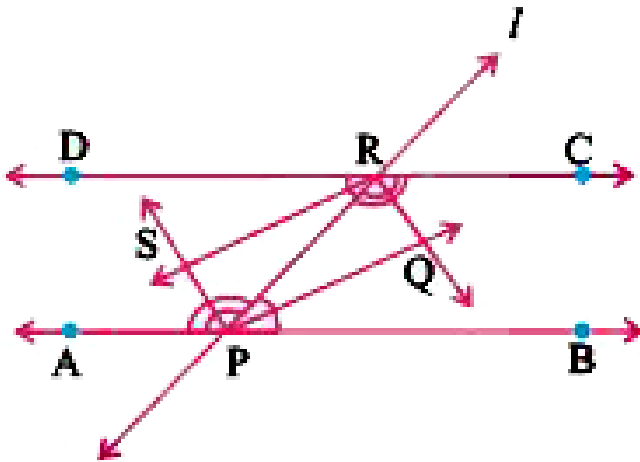
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4. In a parallelogram ABCD, the bisectors of the consecutive angles angle A and angle B intersect at P. Show that $\angle APB = 90^\circ$.

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5. \overline{AB} and \overline{DC} are two parallel lines and a transversal l , intersects \overline{AB} at P and \overline{DC} at R . Prove

that the bisectors of the interior angles form a rectangle .



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6. In a triangle ABC, AD is the median drawn on the side BC is produced to E such that $AD = ED$ prove that ABEC is a parallelogram.

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7. In $\triangle ABC$, D , E and F are the midpoints of sides AB , BC and CA respectively. Show that $\triangle ABC$ is divided into four congruent triangles, when the three midpoints are joined to each other. ($\triangle DEF$ is called medial triangle)



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8. l , m and n are three parallel lines intersected by the transversals p and q at A , B , C and D , E , F such that they make equal intercepts AB and BC on the transversal p .

Show that the intercepts DE and EF on q are also equal.

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9. In the Fig. AD and BE are medians of $\triangle ABC$ and $BE \parallel DF$. Prove that $CF = \frac{1}{4} AC$.

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10. ABC is a triangle and through A, B, C lines are drawn parallel to BC, CA and AB respectively intersecting at P, Q and R . Prove that the perimeter of $\triangle PQR$ is double the perimeter of $\triangle ABC$.



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Think Discuss And Write

1. Show that the diagonals of a square are equal and right bisectors of each other.



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2. Show that the diagonals of a rhombus divide it into four congruent triangles.



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Exercise 8 1

1. State whether the statements are True or False.

(i) Every parallelogram is a trapezium ()



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2. State whether the statements are True or False.

(ii) All parallelograms are quadrilaterals ()



[Watch Video Solution](#)

3. State whether the statements are True or False.

(iii) All trapeziums are parallelograms ()



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4. State whether the statements are True or False.

(iv) A square is a rhombus ()



[Watch Video Solution](#)

5. State whether the statements are True or False.

(v) Every rhombus is a square ()



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6. State whether the statements are True or False.

(vi) All parallelograms are rectangles



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7. Complete the following table by writing (YES) if the property holds for the particular Quadrilateral and

(NO) if property does not holds.

Properties	Trapezium	Parallelogram	Rhombus	Rectangle	square
a. Only one pair of opposite sides are parallel	YES				
b. Two pairs of opposite sides are parallel					
c. Opposite sides are equal					
d. Opposite angles are equal					
e. Consecutive angles are supplementary					
f. Diagonals bisect each other					
g. Diagonals are equal					
h. All sides are equal					
i. Each angle is a right angle					
j. Diagonals are perpendicular to each other.					



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8. ABCD is trapezium in which $AB \parallel CD$. If $AD = BC$, show that $\angle A = \angle B$ and $\angle C = \angle D$.



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9. The four angles of a quadrilateral are in the ratio 1:2:3:4. Find the measure of each angle of the quadrilateral.

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10. ABCD is a rectangle AC is diagonal. Find the nature of $\triangle ACD$. Give reasons.

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1. In the adjacent figure ABCD is a parallelogram ABEF is a rectangle show that $\triangle AFD \cong \triangle BEC$.



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2. Show that the diagonals of a rhombus divide it into four congruent triangles.

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3. If a quadrilateral $ABCD$, the bisector of $\angle C$ and $\angle D$ intersect at O .

Prove that $\angle COD = \frac{1}{2}(\angle A + \angle B)$



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Exercise 8 3

1. The opposite angles of a parallelogram are $(3x - 2)^\circ$ and $(x + 48)^\circ$.

Find the measure of each angle of the parallelogram.

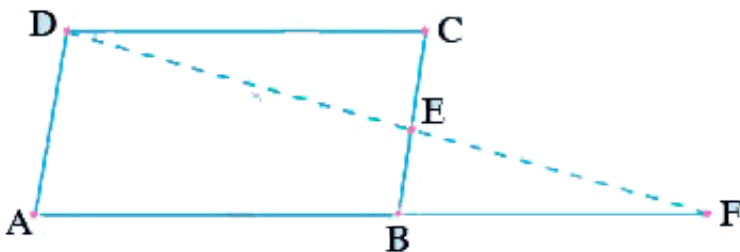


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2. Find the measure of all the angles of a parallelogram, if one angle is 24° less than the twice of the smallest angle.

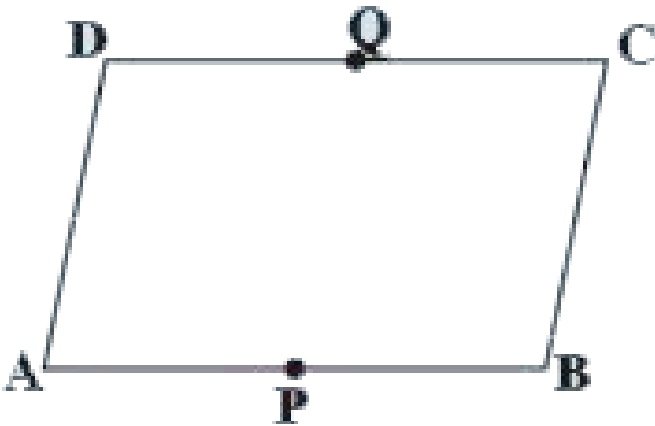
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3. In the adjacent figure ABCD is a parallelogram and E is the midpoint of the side BC. If DE and AB are produced to meet at F, show that $AF = 2AB$.



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4. In the adjacent figure ABCD is a parallelogram P and Q are the midpoints of sides AB and DC respectively. Show that PBCQ is also a parallelogram.

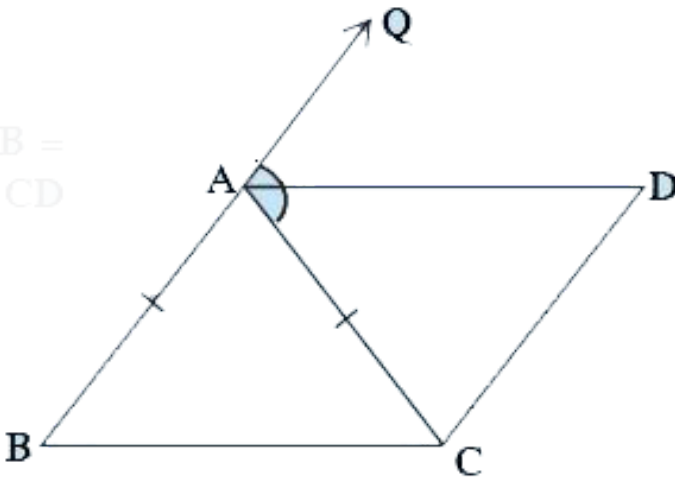


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5. ABC is an isosceles triangle in which $AB = AC$. AD bisects exterior angle QAC and $CD \parallel BA$ as shown in the figure. Show that

(i) $\angle DAC = \angle BCA$

(ii) $ABCD$ is a parallelogram

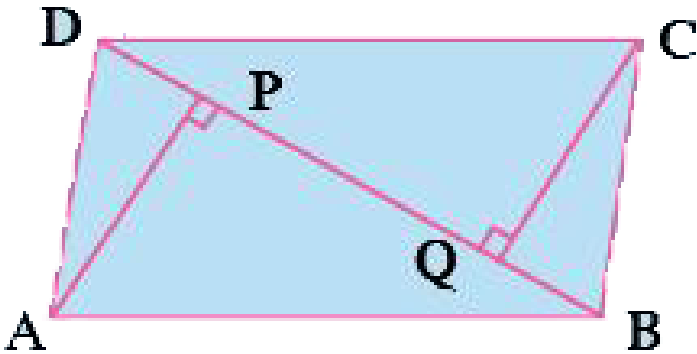


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6. ABCD is a parallelogram AP and CQ are perpendiculars drawn from vertices A and C on diagonal BD (see figure) show that

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

(ii) $AP = CQ$



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7.

In

$\Delta^s ABC$ and $\Delta^s DEF$, $AB \parallel DE$, $BC = EF$ and $BC \parallel EF$.

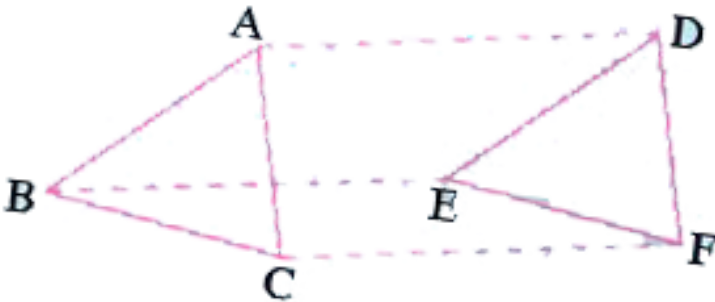
Vertices A, B and C are joined to vertices D, E and F respectively (see figure). Show that

(i) ABED is a parallelogram

(ii) BCFE is a parallelogram

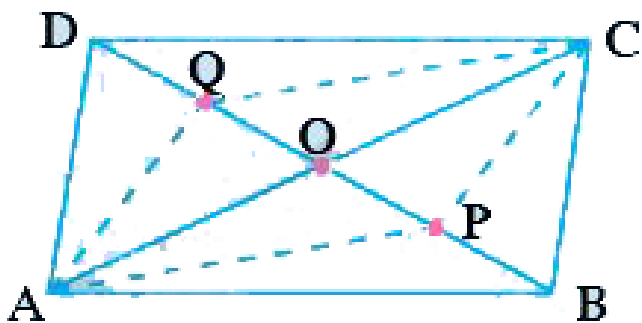
(iii) $AC = DF$

(iv) $\Delta ABC \cong \Delta DEF$



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8. ABCD is a parallelogram. AC and BD are the diagonals intersect at O. P and Q are the points of trisection of the diagonal BD. Prove that $CQ \parallel AP$ and also AC bisects PQ (see figure).



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9. ABCD is a square. E, F, G and H are the mid points of AB , BC , CD and DA respectively. Such that

$AE = BF = CG = DH$. Prove that EFGH is a square.



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Exercise 8 4

1. ABC is a triangle . D is a point of AB such that

$AD = \frac{1}{4}AB$ and E is a point on AC such that

$AE = \frac{1}{4}AC$. If $DE = 2cm$ find BC.



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2. ABCD is quadrilateral E, F, G and H are the midpoints of AB , BC , CD and DA respectively. Prove that EFGH is a parallelogram.



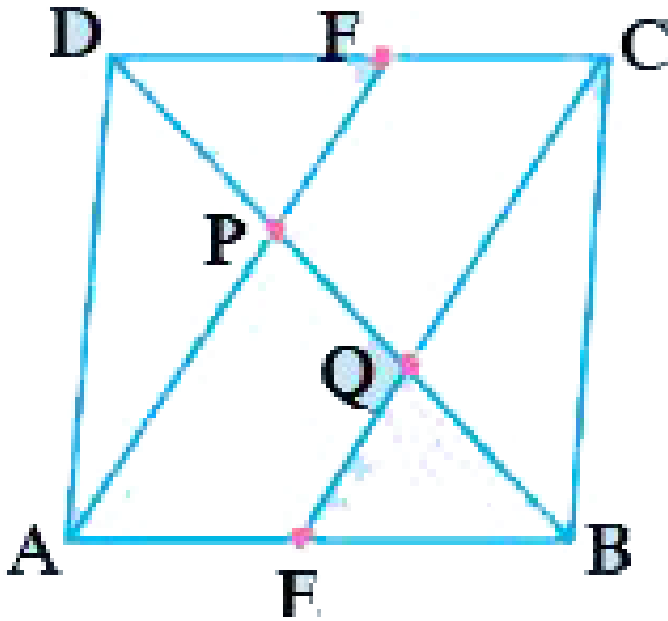
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3. Show that the figure formed by joining the midpoints of sides of a rhombus successively is a rectangle.



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4. In a parallelogram $ABCD$, E and F are the midpoints of the sides AB and DC respectively. Show that the line segments AF and EC trisect the diagonal BD .



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5. Show that the line segments joining the midpoints of the opposite sides of a quadrilateral and bisect each other.



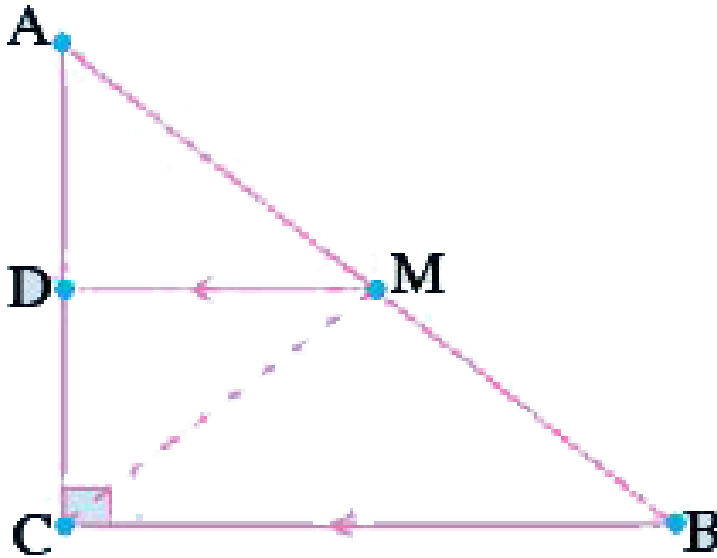
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6. ABC is a triangle right angled at C. A line through the midpoint M of hypotenuse AB and Parallel to BC intersects AC at D. Show that

(i) D is the midpoint of AC

(ii) $MD \perp AC$

(iii) $CM = MA = \frac{1}{2}AB$.



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Exercise 8 1 State Whether The Statements Are True Or False

1. State whether the statements are True or False.

(i) Every parallelogram is a trapezium ()



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2. State whether the statements are True or False.

(ii) All parallelograms are quadrilaterals ()



[Watch Video Solution](#)

3. State whether the statements are True or False.

(iii) All trapeziums are parallelograms ()



[Watch Video Solution](#)

4. State whether the statements are True or False.

(iv) A square is a rhombus ()



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5. State whether the statements are True or False.

(v) Every rhombus is a square ()



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6. State whether the statements are True or False.

(vi) All parallelograms are rectangles



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