



MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

QUADRILATERALS

Solved Examples

1. Three angles of a quadrilateral measure 110° , 82° and 68° .

Find the measure of the fourth angle.

- A. 80° .
- B. 100° .
- C. 200° .

D. 70° .

Answer: B



Watch Video Solution

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

A. $A = 36^\circ$, $\angle B = 50^\circ$, $\angle C = 108^\circ$ and $\angle D = 156^\circ$.

B. $A = 36^\circ$, $\angle B = 60^\circ$, $\angle C = 180^\circ$ and $\angle D = 156^\circ$.

C. $A = 36^\circ$, $\angle B = 60^\circ$, $\angle C = 108^\circ$ and $\angle D = 150^\circ$.

D. $A = 36^\circ$, $\angle B = 60^\circ$, $\angle C = 108^\circ$ and $\angle D = 156^\circ$.

Answer: D



Watch Video Solution

3. In a ||gm ABCD, if $\angle A = 115^\circ$, find $\angle B$, .

A. 75°

B. 85°

C. 65°

D. 55°

Answer: C



[Watch Video Solution](#)

4. Diagonals AC and BD of a parallelogram ABCD intersect at O. If

OA = 3 cm and OD = 2 cm, determine the lengths of AC and BD.

A. $AC = 6cm, BD = 2cm$

B. $AC = 6cm, BD = 4cm$

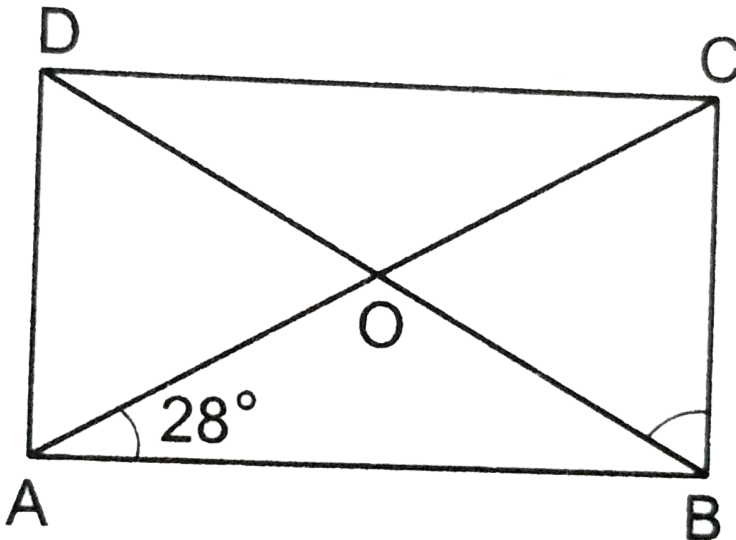
C. $AC = 3\text{cm}, BD = 4\text{cm}$

D. $AC = 3\text{cm}, BD = 3\text{cm}$

Answer: B

 [Watch Video Solution](#)

5. In the adjoining figure, ABCD is a rectangle whose diagonals AC and BD intersect at O. If $\angle OAB = 28^\circ$, find $\angle OBC$.



 [Watch Video Solution](#)

6. The diagonals AC and BD of a parallelogram $ABCD$ intersect each other at the point O . If $\angle DAC = 32^\circ$ and $\angle AOB = 70^\circ$, find $\angle DBC$.

A. 35°

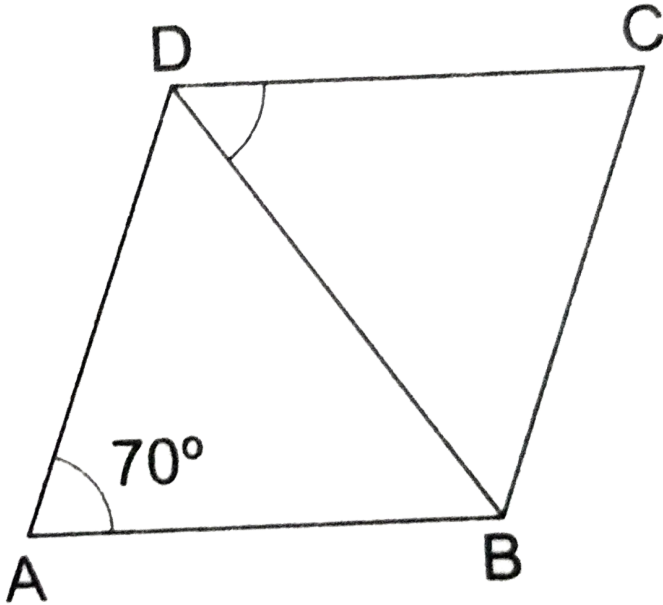
B. 38°

C. 40°

D. 45°

Answer: B

7. In the adjoining figure, ABCD is a rhombus. If $\angle A = 70^\circ$, find $\angle CDB$.



- A. $\angle CDB = 85^\circ$.
- B. $\angle CDB = 75^\circ$.
- C. $\angle CDB = 55^\circ$.
- D. $\angle CDB = 65^\circ$.

Answer: C

 [Watch Video Solution](#)

8. ABCD is a rhombus such that $\angle ACB = 40^\circ$. Find $\angle ADB$.

A. 20°

B. 30°

C. 50°

D. 40°

Answer: C

 [Watch Video Solution](#)

9. If D , E and F are respectively the midpoints of the sides BC , CA and AB of an equilateral triangle ABC , prove that $\triangle DEF$ is also an equilateral triangle.

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

11. Let ABC be an isosceles triangle with $AB = AC$ and let D , E , F be the mid-points of BC , CA and AB respectively. Show that $AD \perp FE$ and AD is bisected by FE .

 [Watch Video Solution](#)

[Watch Video Solution](#)

12. Let ABC be a triangle, right-angled at B and D be the midpoint of AC. Show that $DA = DB = DC$.

[Watch Video Solution](#)

13. The figure formed by joining the mid-points of the adjacent sides of a quadrilateral is

[Watch Video Solution](#)

14. E and F are respectively the midpoints of the non-parallel sides AD and BC of a trapezium ABCD. Prove that

(i) $EF \parallel AB$,

(ii) $EF = \frac{1}{2}(AB + CD)$.

 [Watch Video Solution](#)

15. Prove that the line joining the mid-points of the diagonals of a trapezium is parallel to the parallel sides of trapezium and is half of their difference.

 [Watch Video Solution](#)

16. 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.

 [Watch Video Solution](#)

17. ABC is a triangle right-angled at C. A line through the midpoint P of hypotenuse AB and parallel to BC intersects AC at

M. Show that

(i) M is the midpoint of AC,

(ii) $MP \perp AC$,

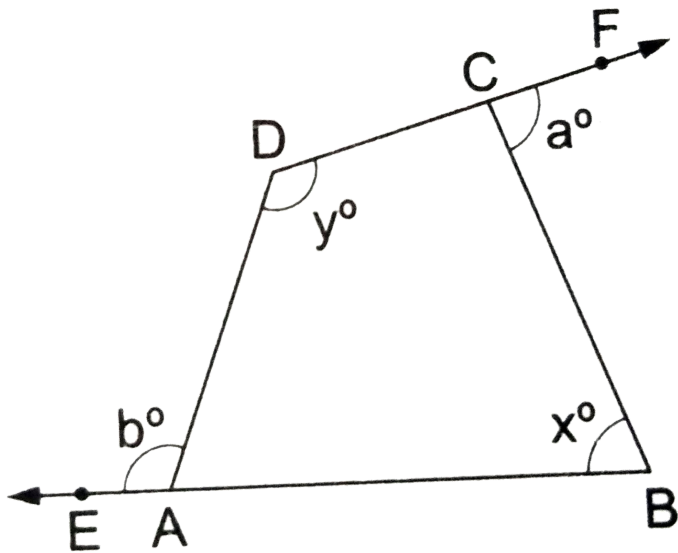
(iii) $CP = AP = \frac{1}{2}AB$.



Watch Video Solution

Example

1. The sides BA and DC of a quadrilateral are produced as shown in the given figure. Prove that $x + y = a + b$.

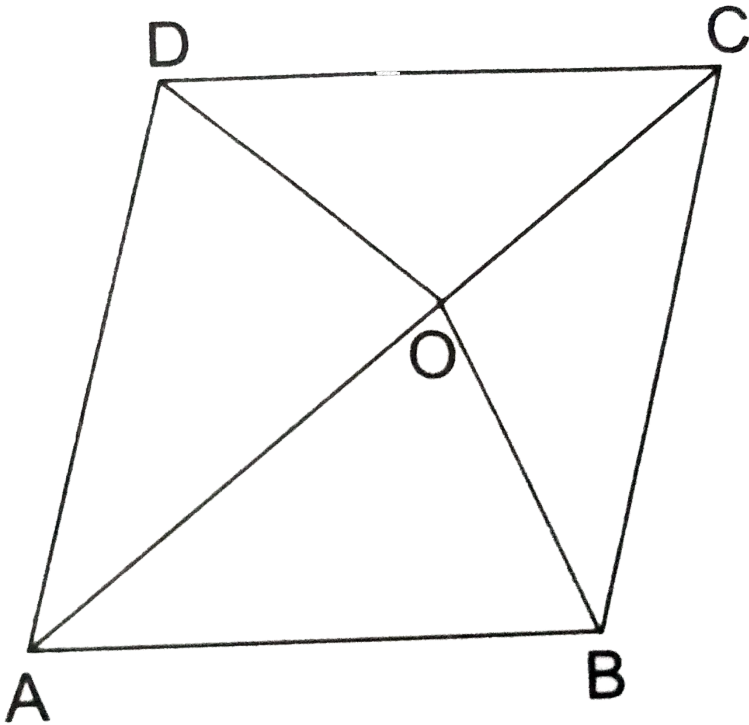


[Watch Video Solution](#)

2. In a quadrilateral ABCD the line segment bisecting $\angle C$ and $\angle D$ meet at E. Prove that $\angle A + \angle B = 2\angle CED$.

[Watch Video Solution](#)

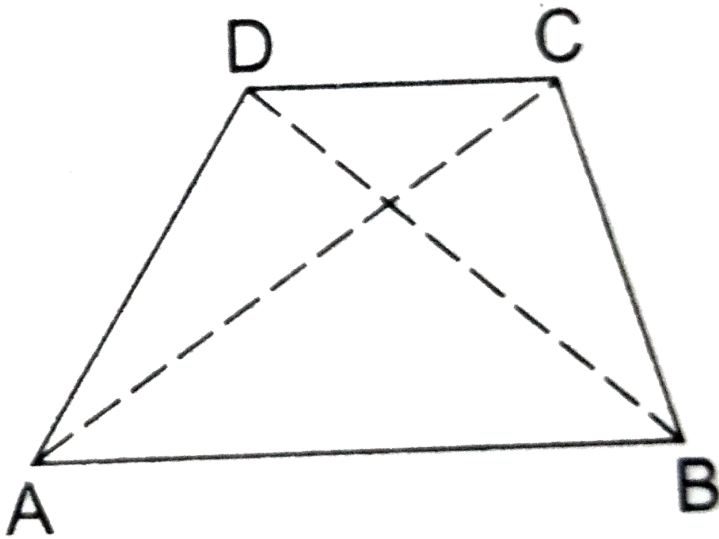
3. In the adjoining figure, a point O is taken inside an equilateral quad. $ABCD$ such that $OB = OD$. Show that A , O and C are in the same straight line.



 [Watch Video Solution](#)

4. In the adjoining figure, ABCD is a quadrilateral in which AB is the longest side and CD is the shortest side.

Prove that (i) $\angle C > \angle A$, (ii) $\angle D > \angle B$.



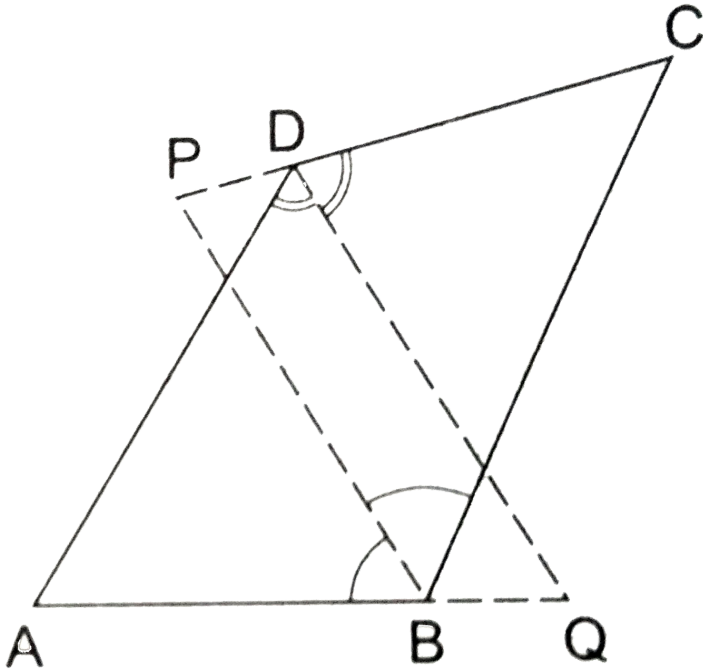
[Watch Video Solution](#)

5. In the adjoining figure, the bisectors of $\angle B$ and $\angle D$ of a quadrilateral ABCD meet CD and AB produced at P and Q

respectively.

Prove that

$$\angle P + \angle Q = \frac{1}{2}(\angle B + \angle D).$$

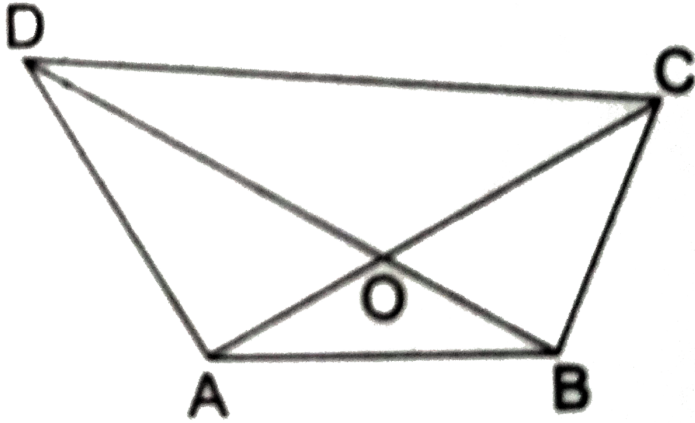


[Watch Video Solution](#)

6. If ABCD is a quadrilateral whose diagonals AC and BD intersect at O, prove that

(i) $(AB + BC + CD + DA) > (AC + BD)$,

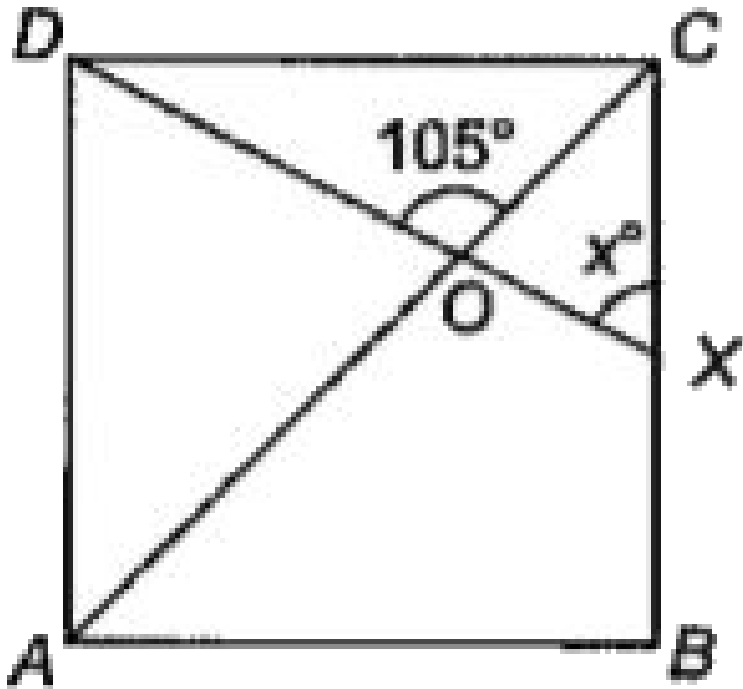
(ii) $(AB + BC + CD + DA) < 2(AC + BD)$.



 [Watch Video Solution](#)

7. In the given figure, ABCD is a square. A line segment DX cuts the side BC at X and the diagonal AC at O such that

$\angle COD = 105^\circ$ and $\angle OXC = x$. The value of x is



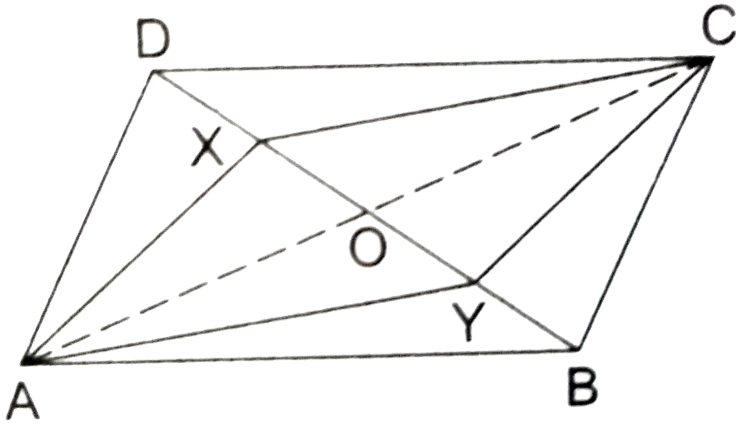
[Watch Video Solution](#)

8. In the adjoining figure, ABCD is a parallelogram and X, Y are the points on the diagonal BD such that $DX = BY$. Prove that

(i) CXAY is a parallelogram,

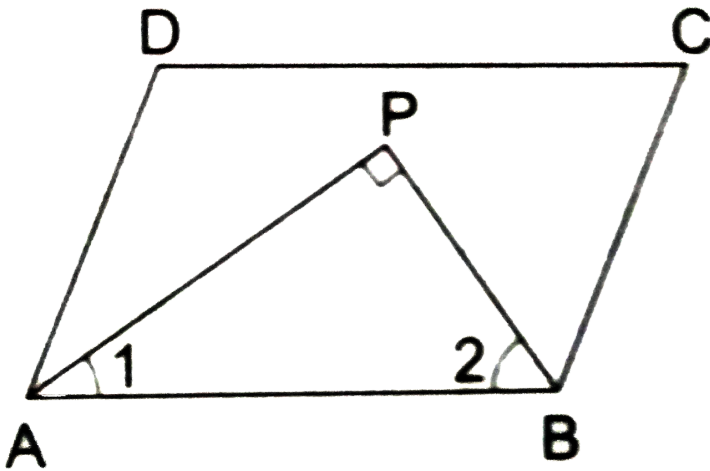
(ii) $\triangle ADX \cong \triangle CBY$ and $\triangle ABY \cong \triangle CDX$, and

(iii) $AX = CY$ and $CX = AY$.



[Watch Video Solution](#)

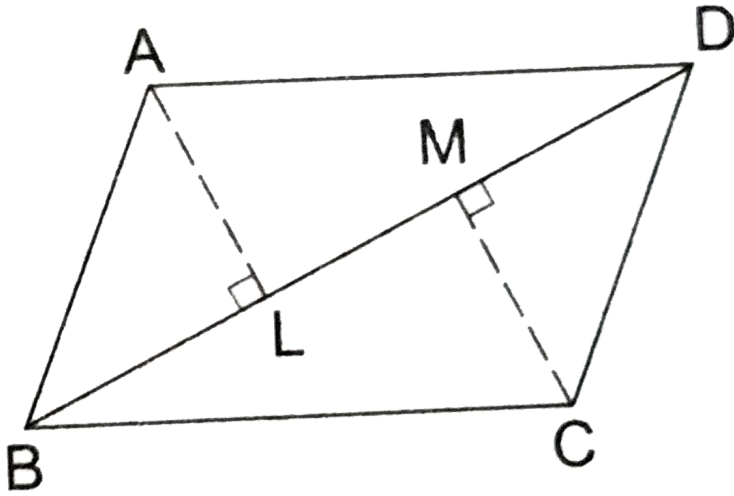
9. Prove that in a parallelogram, the bisectors of any two consecutive angles intersect at right angles.



[▶ Watch Video Solution](#)

10. ABCD is a parallelogram and AL and CM are perpendiculars from vertices A and C on diagonal BD, as shown in the adjoining

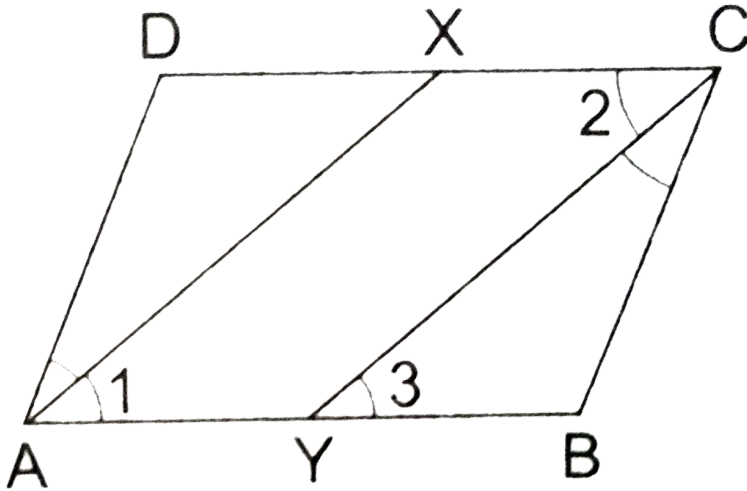
figure. Show that (i) $\triangle ALB \cong \triangle CMD$ and (ii) $AL = CM$.



[Watch Video Solution](#)

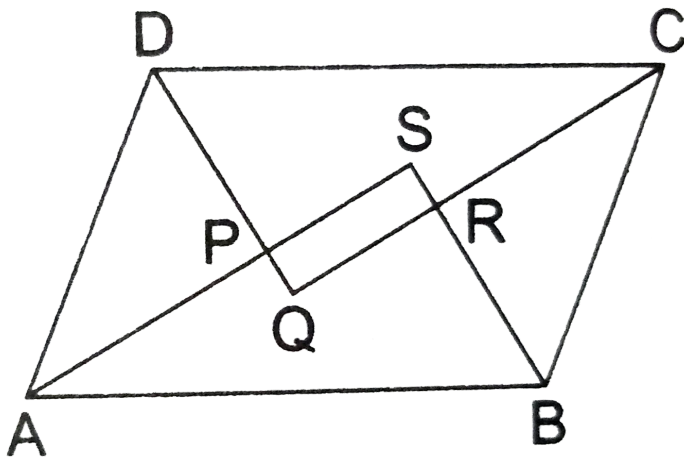
11. In the adjoining figure, ABCD is a parallelogram and line segments AX and CY bisect $\angle A$ and $\angle C$ respectively. Prove that

$AX \parallel CY$.



[Watch Video Solution](#)

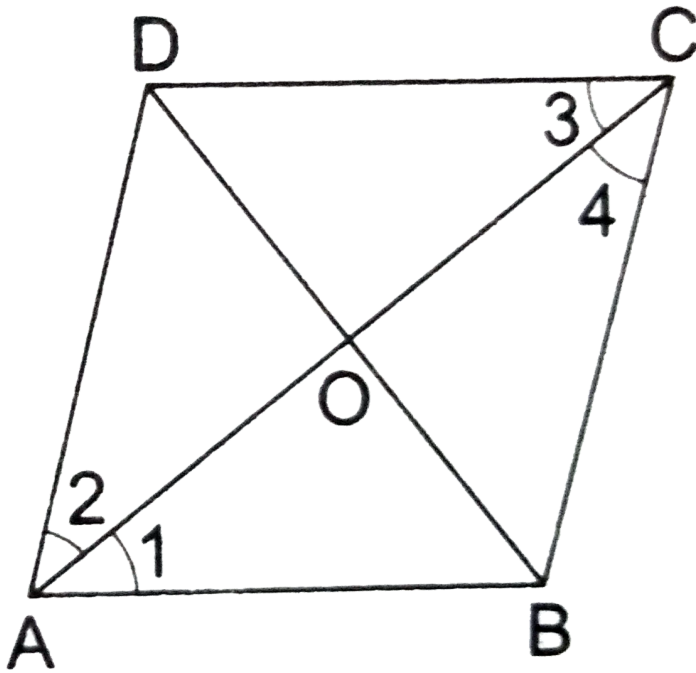
12. Show that the bisectors of the angles of a parallelogram enclose a rectangle.



[▶ Watch Video Solution](#)

13. If a diagonal of a parallelogram bisects one of the angles of the parallelogram, prove that it also bisects the angle opposite it, and that the two diagonals are perpendicular to each other.

Also, prove that it is a rhombus.



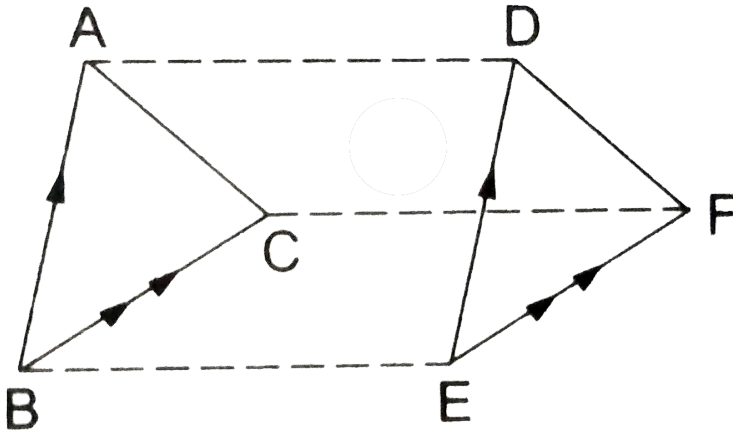
[View Text Solution](#)

14. Let $\triangle ABC$ and $\triangle DEF$ be two triangles given in such a way that $AB \parallel DE$, $AB = DE$, $BC \parallel EF$ and $BC = EF$.

Prove that

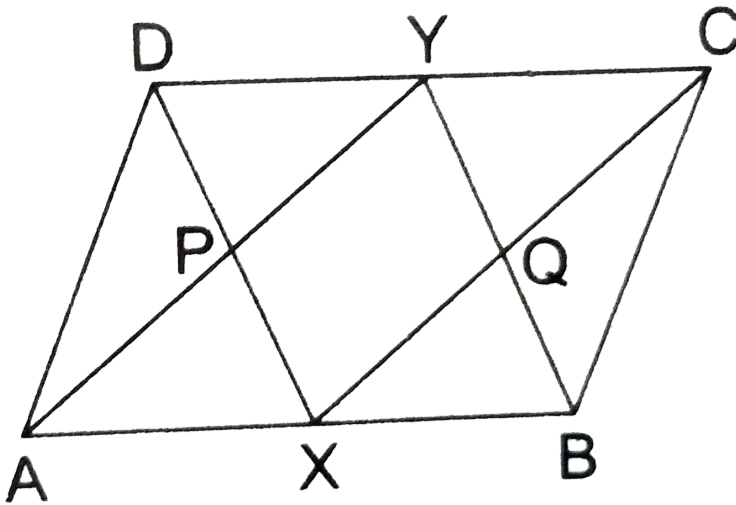
(i) $AC \parallel DF$ and $AC = DF$,

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



[Watch Video Solution](#)

15. In the adjoining figure, ABCD is a parallelogram in which X and Y are the midpoints of AB and DC respectively. If AY and DX intersect in P while CX and BY intersect in Q, show that

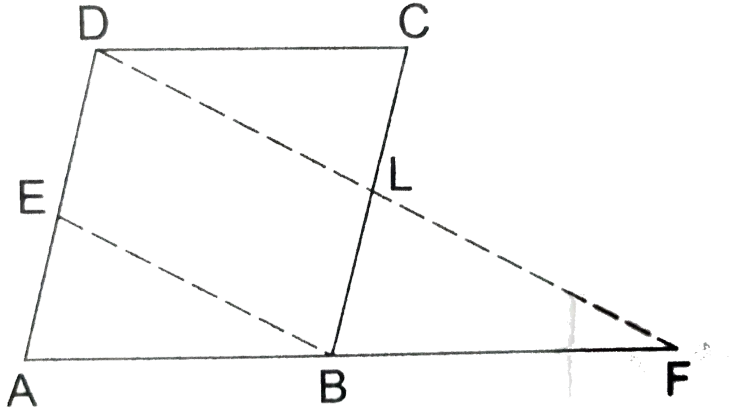


- (i) quad. $AXCY$ is a parallelogram,
- (ii) quad. $XBYD$ is a parallelogram,
- (iii) quad. $PXQY$ is a parallelogram.

[Watch Video Solution](#)

16. In the adjoining figure, $ABCD$ is a parallelogram and E is the midpoint of AD . A line through D , drawn parallel to EB , meets AB produced at F and BC at L . Prove that

(i) $AF = 2 DC$ and (ii) $DF = 2DL$.

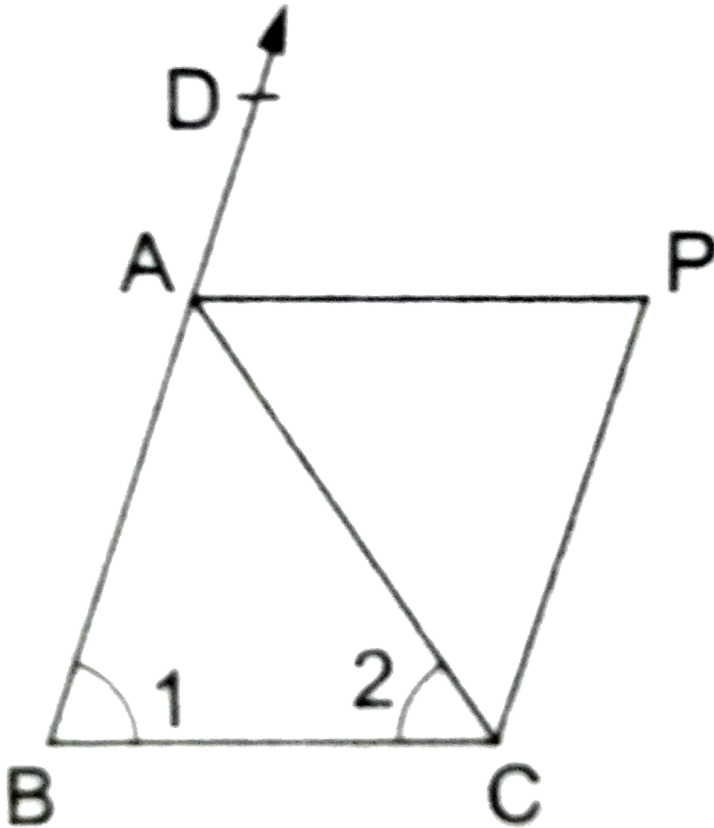


[Watch Video Solution](#)

17. In the adjoining figure, $AB = AC$: $CP \parallel BA$ and AP is the bisector of $\angle CAD$. Prove that

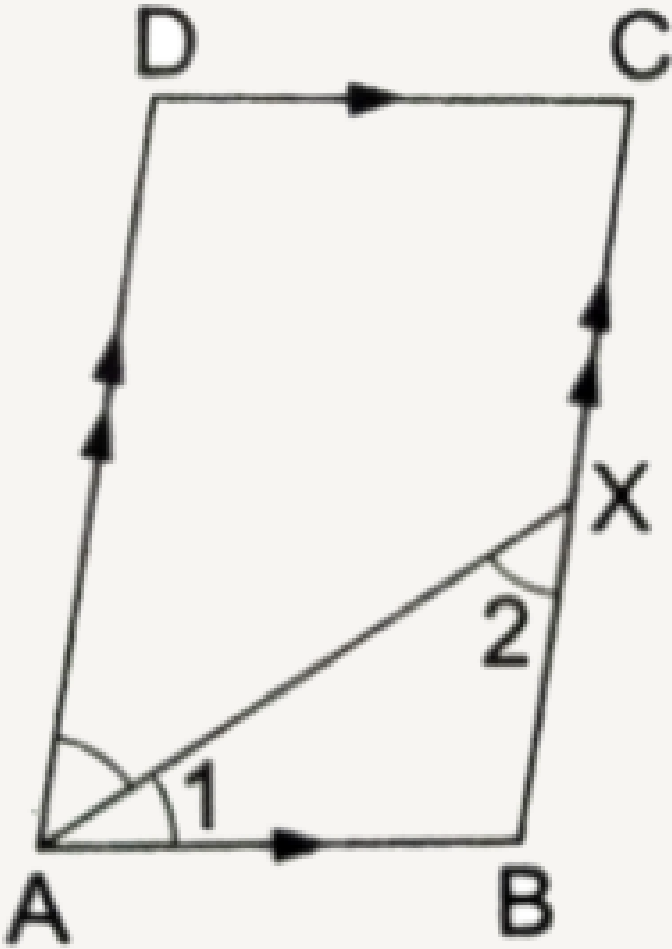
(i) $\angle PAC = \angle BCA$ and

(ii) ABCP is a parallelogram.



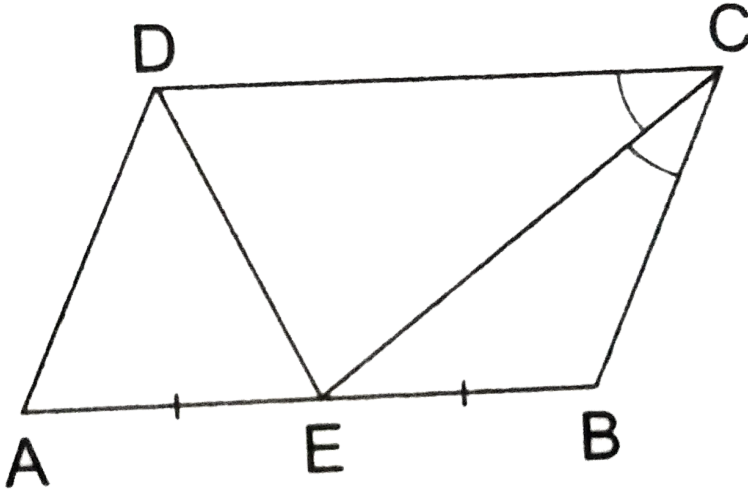
[Watch Video Solution](#)

18. In the adjoining figure, ABCD is a parallelogram and the bisector of $\angle A$ bisects BC at X. Prove that $AD = 2AB$.



Watch Video Solution

19. In the adjoining figure, ABCD is a parallelogram, E is midpoint of AB and CE bisects $\angle BCD$. Prove that



(i) $AE = AD$ (ii) DE bisects $\angle ADC$ and (iii) $\angle DEC = 90^\circ$.

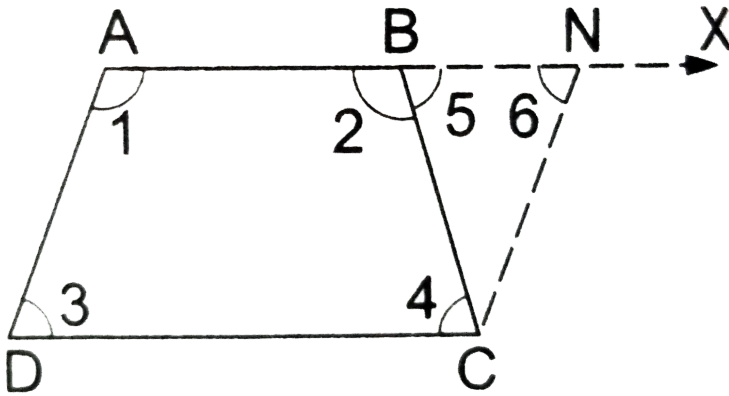
 [Watch Video Solution](#)

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

(i)

$\angle A = \angle B$ and $\angle C = \angle D$, (ii) $\triangle ABC \cong \triangle BAD$ and

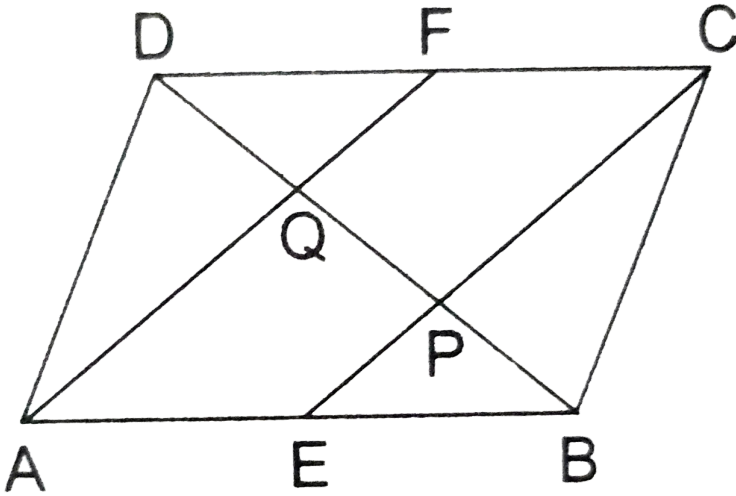
(ii) $AC = BD$.



[View Text Solution](#)

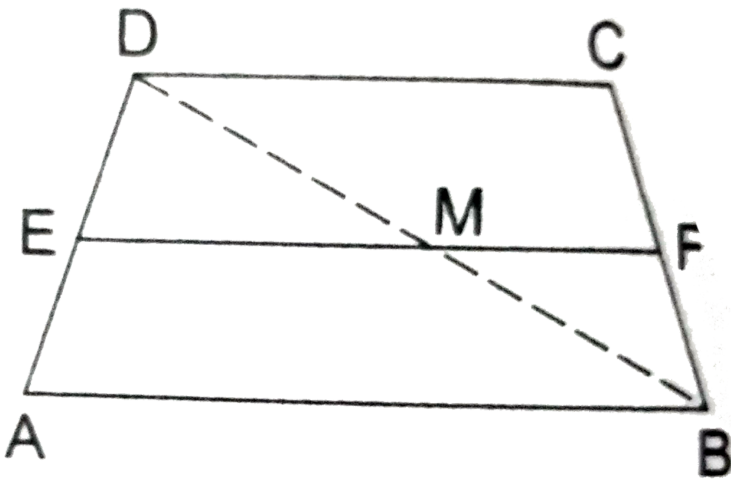
21. $ABCD$ is a parallelogram in which E and F are the midpoints of the sides AB and CD respectively. Prove that the line segments CE

and AF trisect the diagonal BD.



[Watch Video Solution](#)

22. Let ABCD be a trapezium in which $AB \parallel DC$ and let E be the midpoint of AD. Let F be a point on BC such that $EF \parallel AB$. Prove that



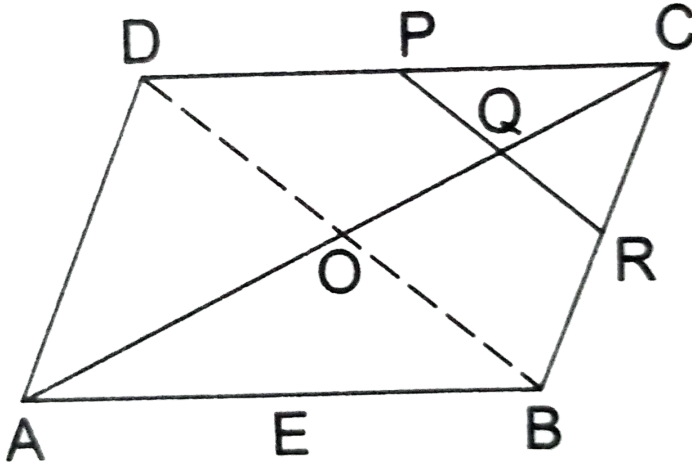
(i) F is the midpoint of BC, (ii) $EF = \frac{1}{2}(AB + DC)$.

 [Watch Video Solution](#)

23. In the adjoining figure, ABCD is a ||gm in which P is the midpoint of DC and Q is a point on AC such that $CQ = \frac{1}{4}AC$.

Also, PQ when produced meets BC at R. Prove that R is the

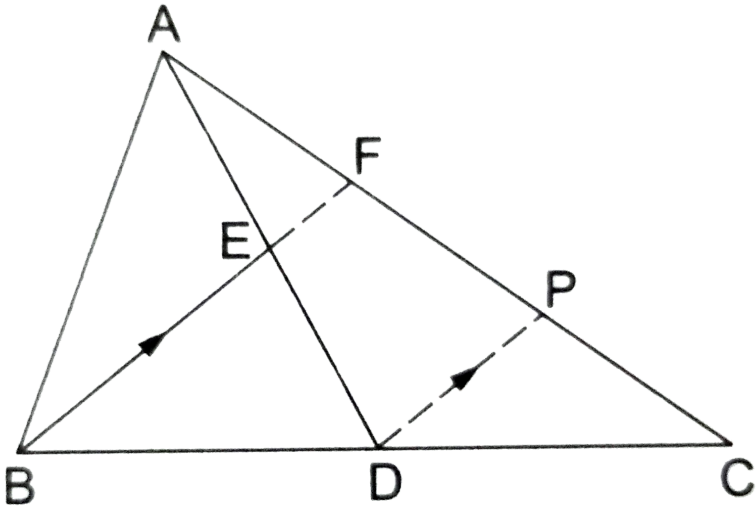
midpoint of BC.



[Watch Video Solution](#)

24. In the adjoining figure, AD is a median of $\triangle ABC$ and E is the midpoint of AD. Also, BE produced meets AC in F. Prove that

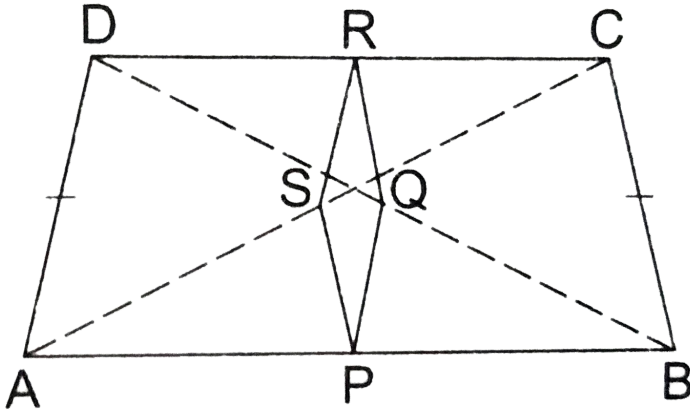
$$AF = \frac{1}{3}AC.$$



[▶ Watch Video Solution](#)

25. In the adjoining figure, ABCD is a trapezium in which $AB \parallel DC$ and $AD = BC$. If P, Q, R, S be respectively the midpoints of BA, BD, and AD = BC. If P, Q, R, S be respectively the midpoints of BA, BD,

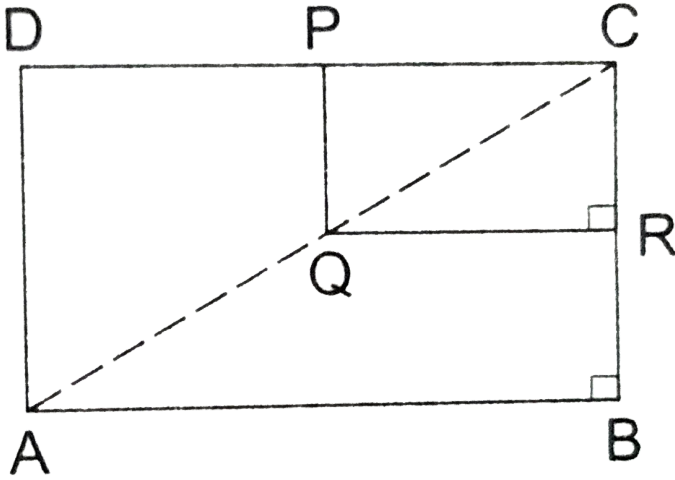
CD, CA then show that PQRS is a rhombus.



[Watch Video Solution](#)

26. In the adjoining figure, ABCD and PQRC are rectangles, where Q is the midpoint of AC. Prove that

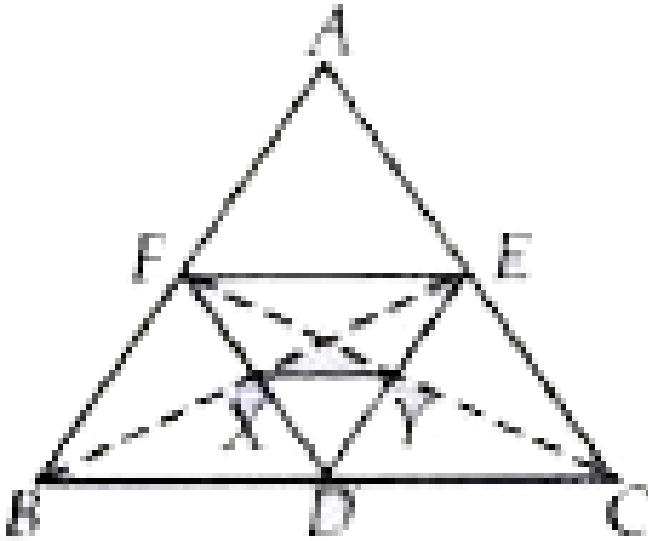
(i) $DP = PC$, (ii) $PR = \frac{1}{2}AC$.



 [Watch Video Solution](#)

27. In the given figure, D, E and F are the midpoints of the sides BC, CA and AB of $\triangle ABC$. BE bisect DF at X while CF bisect DE at

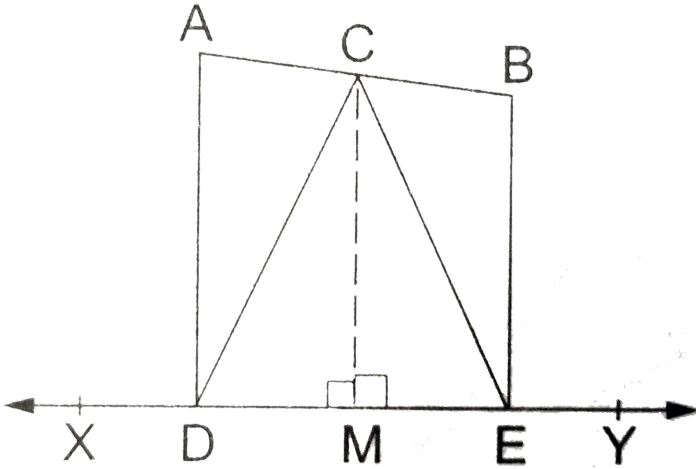
Y, then $BC = a XY$. Find a .



 [Watch Video Solution](#)

28. In the adjoining figure, two points A and B lie on the same side of a line XY . If $AD \perp XY$, $BE \perp XY$ and C is the midpoint

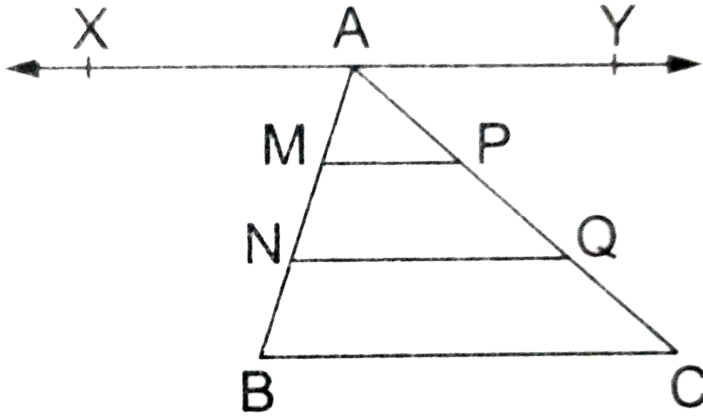
of AB, prove that $CD = CE$.



[Watch Video Solution](#)

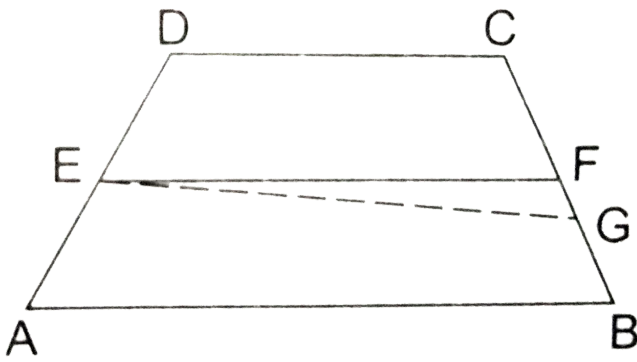
29. In the adjoining figure, points M and N divide the side AB of $\triangle ABC$ into three equal parts. Line segments MP and NQ are both parallel to BC and meet AC in P and Q respectively. Prove

that P and Q divide AC into three equal parts.



[View Text Solution](#)

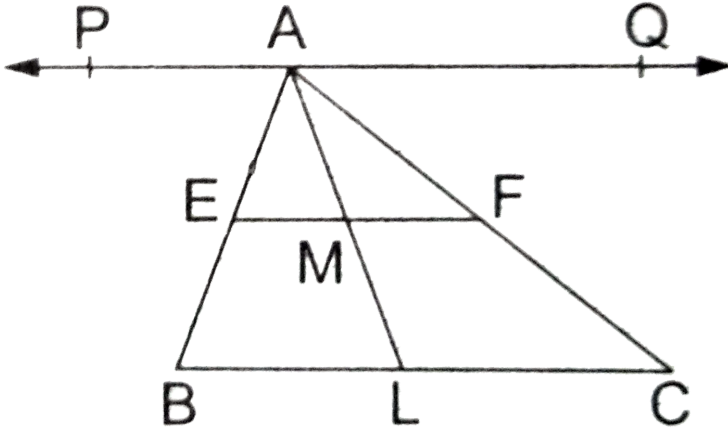
30. E and F are respectively the midpoints of nonparallel sides AD and BC of a trapezium ABCD. Prove that $EF \parallel AB$.



 [Watch Video Solution](#)

31. Prove that any line segment drawn from the vertex of a triangle to the base is bisected by the line segment joining the

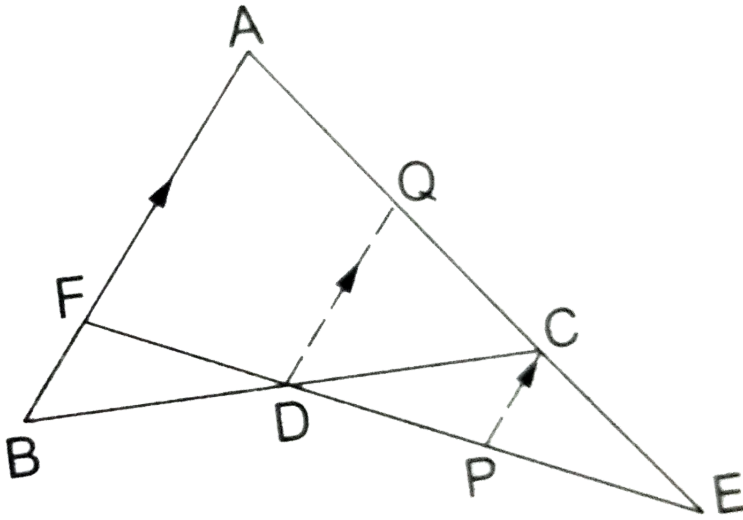
midpoints of the other sides of the triangle.



[Watch Video Solution](#)

32. In the adjoining figure, the side AC of $\triangle ABC$ is produced to E such that $CE = \frac{1}{2}AC$. If D is the midpoint of BC and ED produced meets AB at F, and CP, DQ are drawn parallel to BA,

prove that $FD = \frac{1}{3}FE$.



[Watch Video Solution](#)

Exercise 10 A

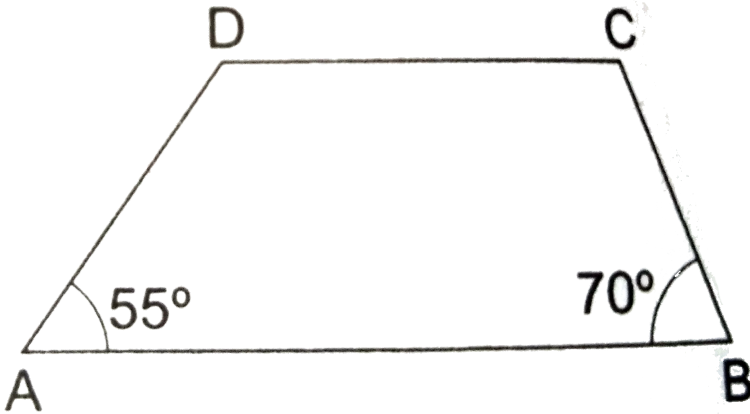
1. Three angles of a quadrilateral are 75° , 90° and 75° . Find the measure of the fourth angle.

[Watch Video Solution](#)

2. The angles of a quadrilateral are in the ratio 2:4:5:7. Find the angles.

 [Watch Video Solution](#)

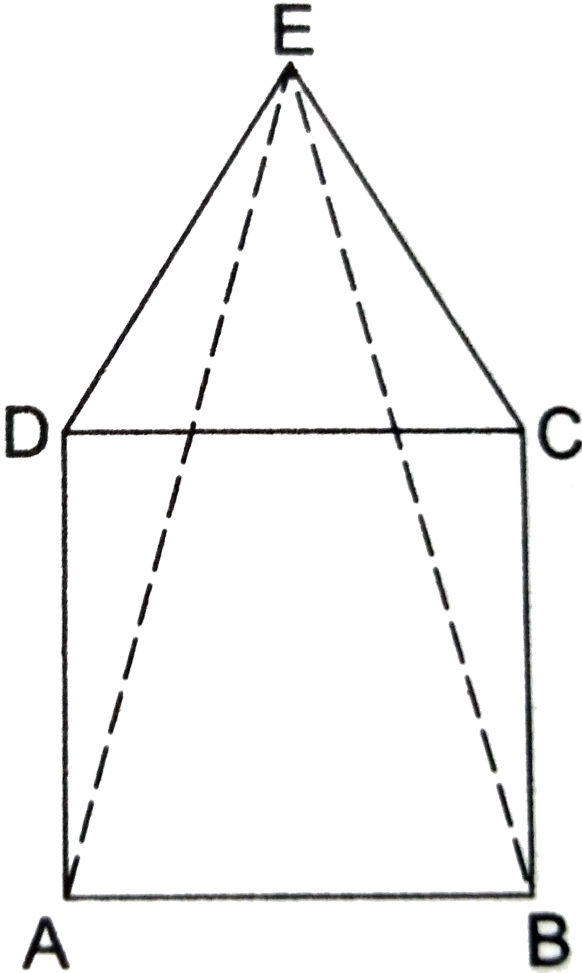
3. In the adjoining figure, ABCD is a trapezium in which $AB \parallel DC$. If $\angle A = 55^\circ$ and $\angle B = 70^\circ$, find $\angle C$ and $\angle D$.



 [Watch Video Solution](#)

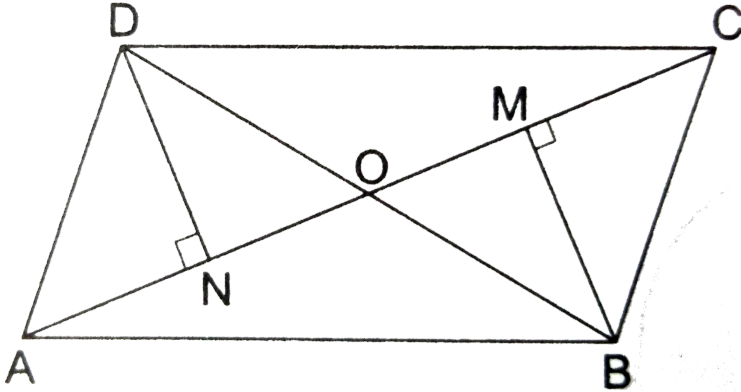
4. In the adjoining figure, ABCD is a square and $\triangle EDC$ is an equilateral triangle. Prove that

(i) $AE = BE$, (ii) $\angle DAE = 15^\circ$.



 Watch Video Solution

5. In the adjoining figure, $BM \perp AC$ and $DN \perp AC$. If $BM = DN$, prove that AC bisects BD .

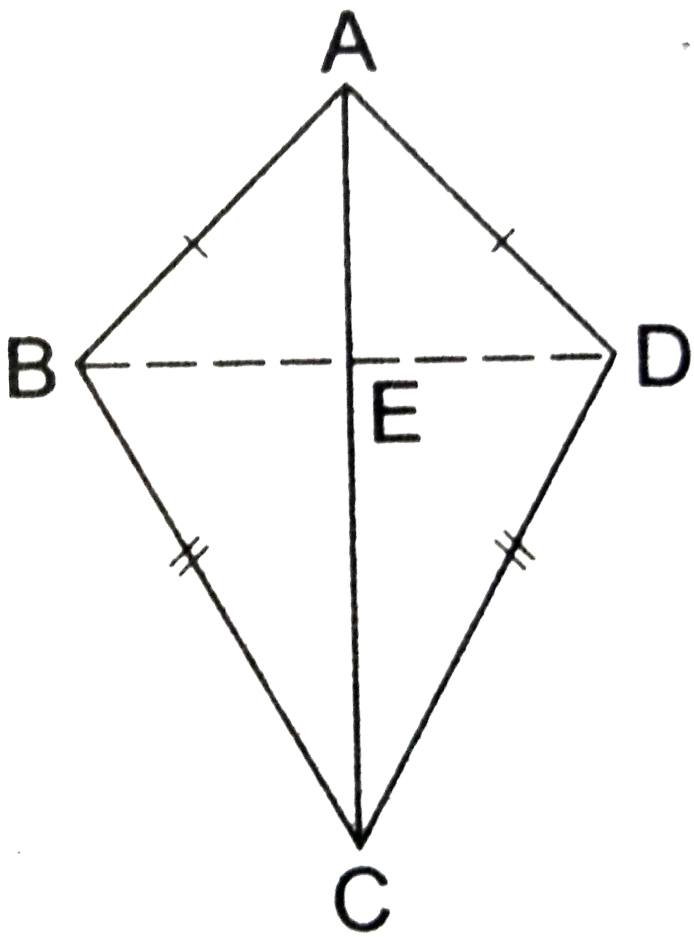


[Watch Video Solution](#)

6. In the given figure, ABCD is a quadrilateral in which $AB = AD$ and $BC = DC$, Prove that

(i) AC bisects $\angle A$ and $\angle C$, (ii) $BE = DE$,

(iii) $\angle ABC = \angle ADC$.

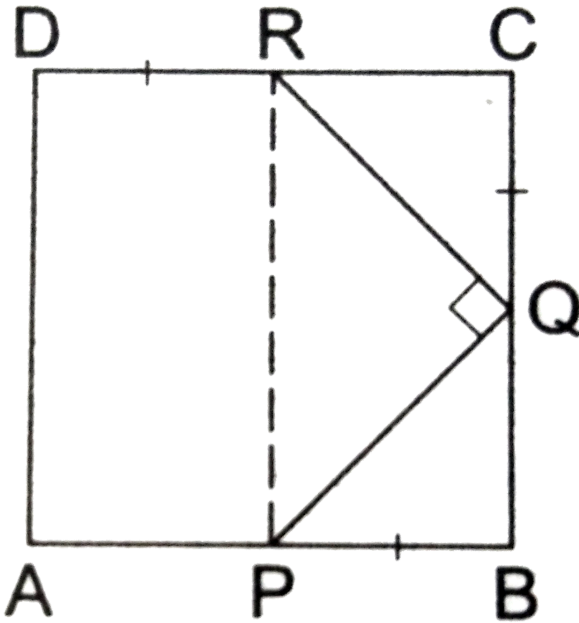


 Watch Video Solution

7. In the given figure, ABCD is a square and $\angle PQR = 90^\circ$. If $PB = QC = DR$, prove that

(i)

$QB = RC$, (ii) $PQ = QR$, (iii) $\angle QPR = 45^\circ$.



Watch Video Solution

8. If O is a point within a quadrilateral $ABCD$, show that $OA + OB + OC + OD > AC + BD$.

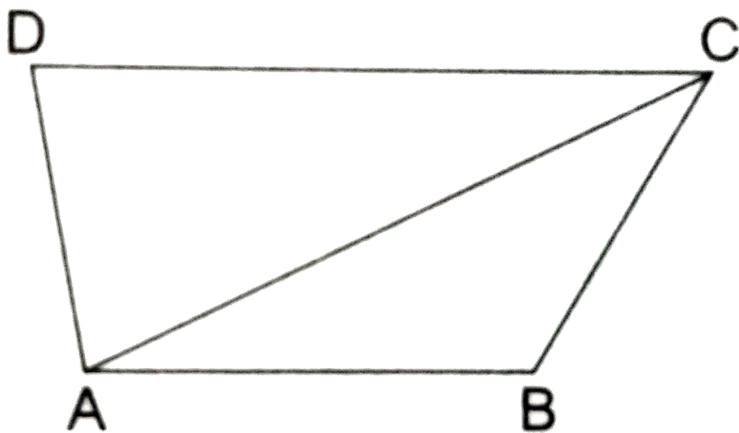
 [Watch Video Solution](#)

9. In the adjoining figure, $ABCD$ is a quadrilateral and AC is one of its diagonals. Prove that

(i) $AB + BC + CD + DA > 2AC$

(ii) $AB + BC + CD > DA$

(iii) $AB + BC + CD + DA > AC + BD$.





Watch Video Solution

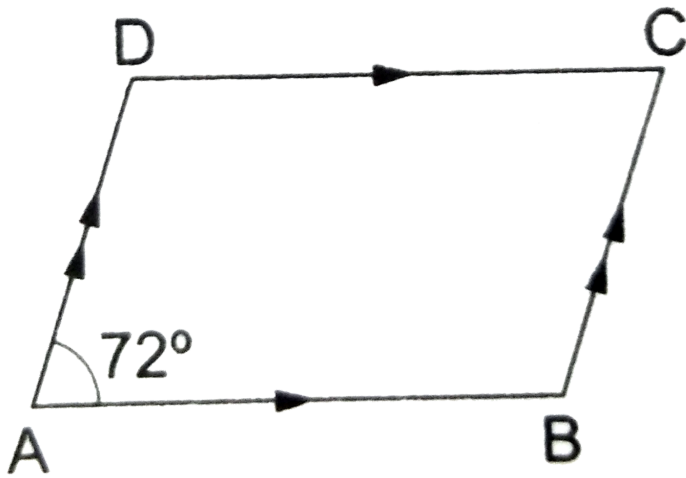
10. Theorem 1 the sum of the angles of a quadrilateral is 360° or 4 right angles.



Watch Video Solution

Exercise 10 B

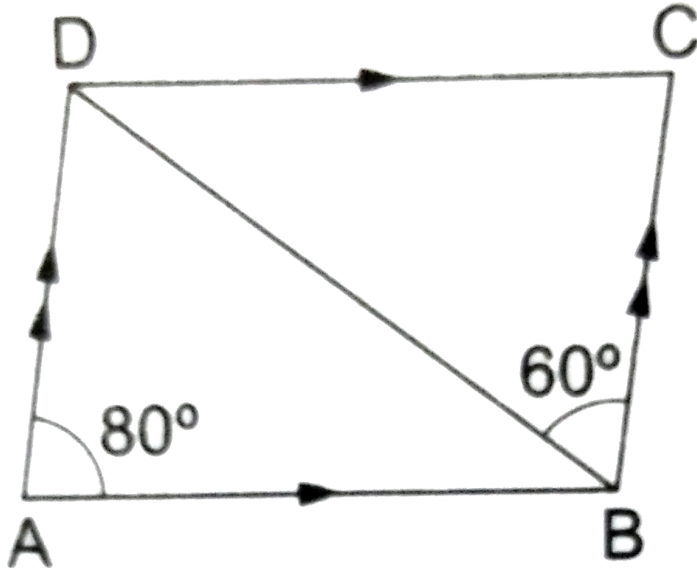
1. In the adjoining figure, ABCD is a parallelogram in which $\angle A = 72^\circ$. Calculate $\angle B$, $\angle C$ and $\angle D$.



[Watch Video Solution](#)

2. In the adjoining figure, ABCD is a parallelogram in which $\angle DAB = 80^\circ$ and $\angle DBC = 60^\circ$. Calculate

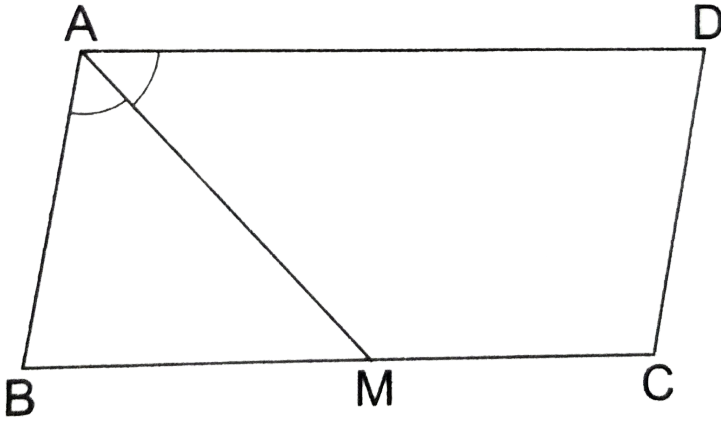
$\angle CDB$ and $\angle ADB$.



[▶ Watch Video Solution](#)

3. In the adjoining figure, M is the midpoint of side BC of a parallelogram ABCD such that $\angle BAM = \angle DAM$. Prove that

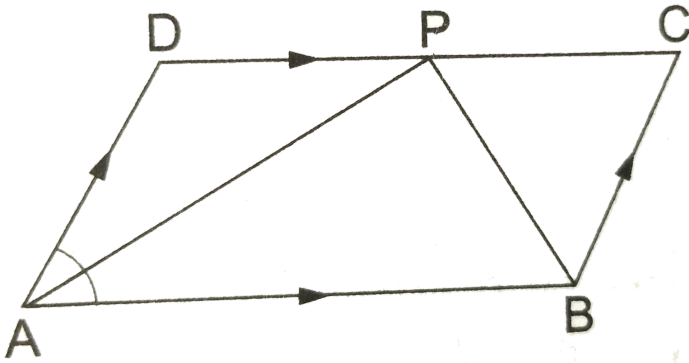
$$AD = 2CD.$$



[▶ Watch Video Solution](#)

4. In the adjoining figure, ABCD is a parallelogram in which $\angle A = 60^\circ$. If the bisectors of $\angle A$ and $\angle B$ meet DC at P, prove that (i) $\angle APB = 90^\circ$, (ii) $AD = DP$ and $PB = PC = BC$, (iii) $DC = 2$

AD.



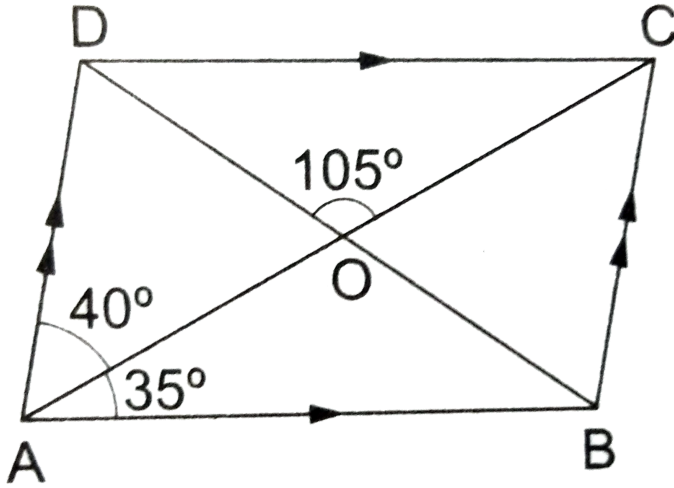
[▶ Watch Video Solution](#)

5. In the adjoining figure , ABCD is a parallelogram in which $\angle BAO = 35^\circ$, $\angle DAO = 40^\circ$ and $\angle COD = 105^\circ$.

Calculate

(i)

$\angle ABO$, (ii) $\angle ODC$, (iii) $\angle ACB$ and (iv) $\angle CBD$.



[Watch Video Solution](#)

6. In a parallelogram $ABCD$, if $\angle A = (2x + 25)^\circ$ and $\angle B = (3x - 5)^\circ$. Find the value of x and measure of each angle of the parallelogram.

A.

$$x = 32; \angle A = 69^\circ, \angle B = 91^\circ, \angle C = 69^\circ \text{ and } \angle D = 91^\circ$$

B.

$$x = 32; \angle A = 89^\circ, \angle B = 91^\circ, \angle C = 89^\circ \text{ and } \angle D = 91^\circ$$

C.

$$x = 32; \angle A = 89^\circ, \angle B = 90^\circ, \angle C = 89^\circ \text{ and } \angle D = 90^\circ$$

D.

$$x = 32; \angle A = 109^\circ, \angle B = 91^\circ, \angle C = 89^\circ \text{ and } \angle D = 109^\circ$$

Answer: B



[Watch Video Solution](#)

7. If an angle of a parallelogram is four fifths of its adjacent angle, find the angles of the parallelogram.

A. $90^\circ, 100^\circ, 90^\circ, 100^\circ$

B. $80^\circ, 100^\circ, 80^\circ, 100^\circ$

C. 80° , 110° , 80° , 110°

D. 80° , 200° , 80° , 200°

Answer: B



Watch Video Solution

8. Find the measure of each angle of a parallelogram, if one of its angles is 30° less than twice the smallest angle.

A. 70° , 120° , 70° , 120°

B. 80° , 110° , 80° , 110°

C. 70° , 110° , 70° , 110°

D. 90° , 110° , 70° , 110°

Answer: C



Watch Video Solution

9. ABCD is a parallelogram in which $AB=9.5$ cm and its perimeter is 30 c. Find the length of each side of the parallelogram.

A. $AB = 6.5\text{cm} = DC, BC = 5.5\text{cm} = DA$

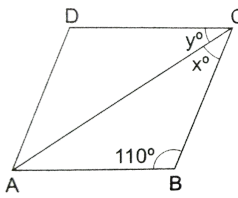
B. $AB = 5.5\text{cm} = DC, BC = 5.5\text{cm} = DA$

C. $AB = 9.5\text{cm} = DC, BC = 5.5\text{cm} = DA$

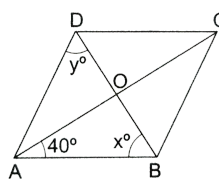
D. $AB = 8.5\text{cm} = DC, BC = 7.5\text{cm} = DA$

Answer: C

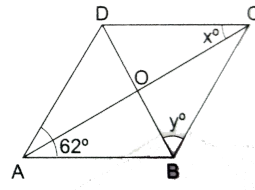
10. In each of the figures given below, ABCD is a rhombus. Find the value of x and y in each case.



(i)



(ii)



(iii)

[Watch Video Solution](#)

11. The length of the diagonals of a rhombus are 24cm and 18cm respectively, find the length of each side of a rhombus.

- A. 17 cm
- B. 15 cm
- C. 16cm
- D. 20 cm

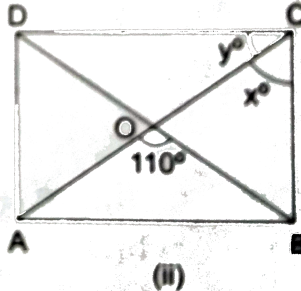
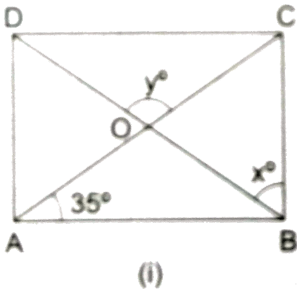
Answer: B

[Watch Video Solution](#)

12. Each side of a rhombus is 10 cm long and one of its diagonals measures 16 cm. Find the length of the other diagonal and hence find the area of the rhombus.

 [Watch Video Solution](#)

13. In each of the figures given below, ABCD is a rectangle. Find the value of x and y in each case.



 [Watch Video Solution](#)

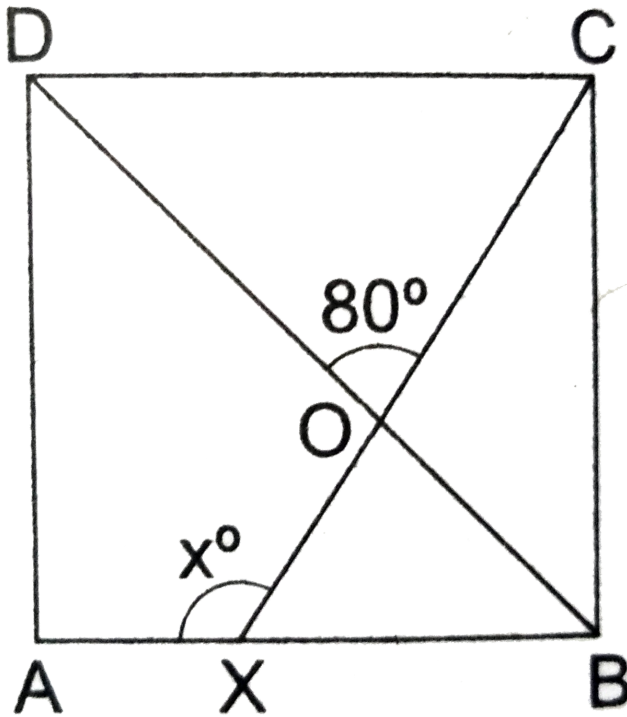
14. $ABCD$ is a rhombus in which the altitude from D to side AB bisects AB . Find the angles of the rhombus.



[Watch Video Solution](#)

15. In the adjoining figure, $ABCD$ is a square. A line segment CX cuts AB at X and the diagonal BD at O such that

$\angle COD = 80^\circ$ and $\angle OXA = x^\circ$. Find the value of x .

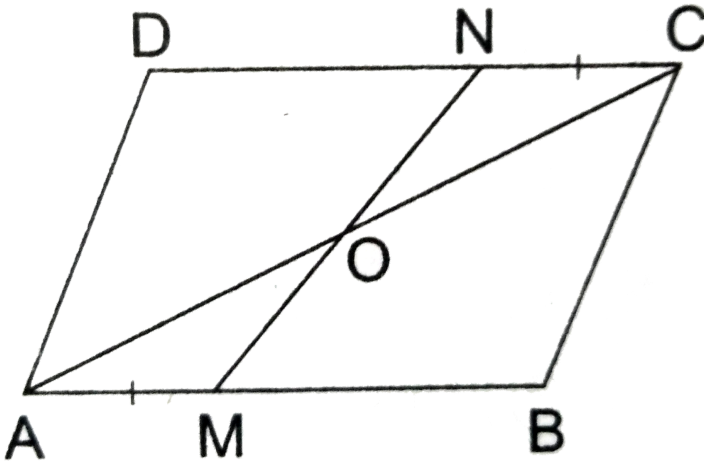


[Watch Video Solution](#)

16. 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 $\angle D$.

[Watch Video Solution](#)

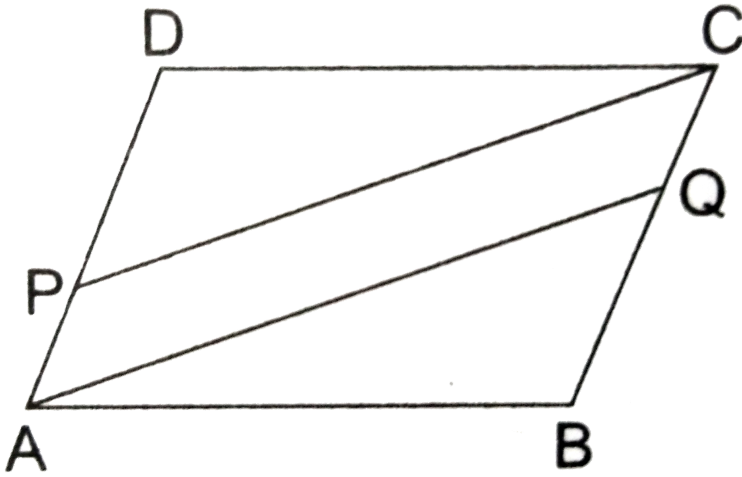
17. In a parallelogram ABCD, points M and N have been taken on opposite sides AB and CD respectively such that $AM = CN$. Show that AC and MN bisect each other.



[▶ Watch Video Solution](#)

18. In the adjoining figure, ABCD is a parallelogram. If P and Q are the points on AD and BC respectively such that $AP = \frac{1}{3}AD$ and $CQ = \frac{BC}{3}$, prove that AQCP is a parallelogram, prove that

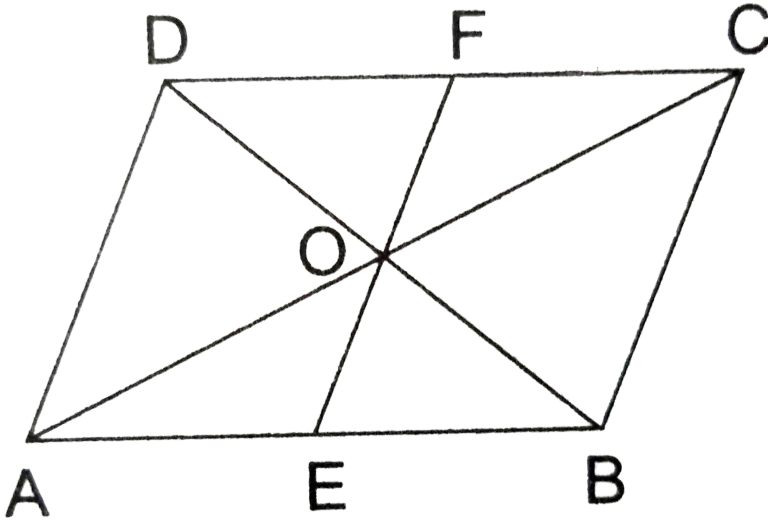
AQCP is a parallelogram.



[Watch Video Solution](#)

19. In the adjoining figure, ABCD is a parallelogram whose diagonals intersect each other at O. A line segment EOF is drawn

to meet AB at E and DC at F. Prove that $OE = OF$.



[Watch Video Solution](#)

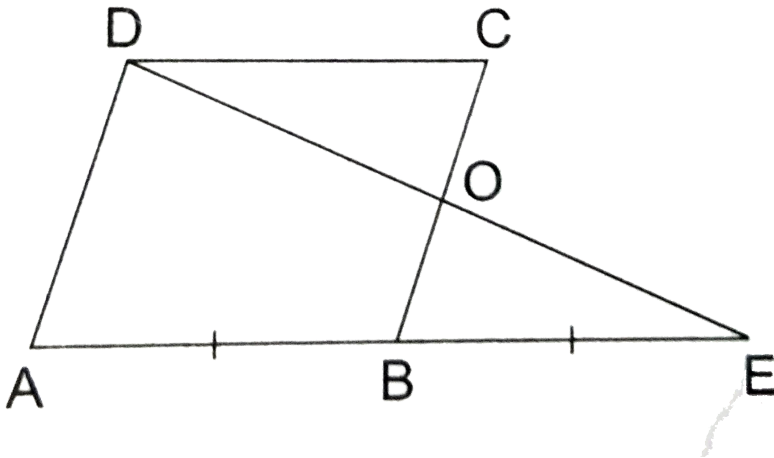
20. The angle between the altitudes of a parallelogram, through the same vertex of an obtuse angle of the parallelogram is 60° . Find the angles of parallelogram.

[Watch Video Solution](#)

21. 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 $\angle D$.

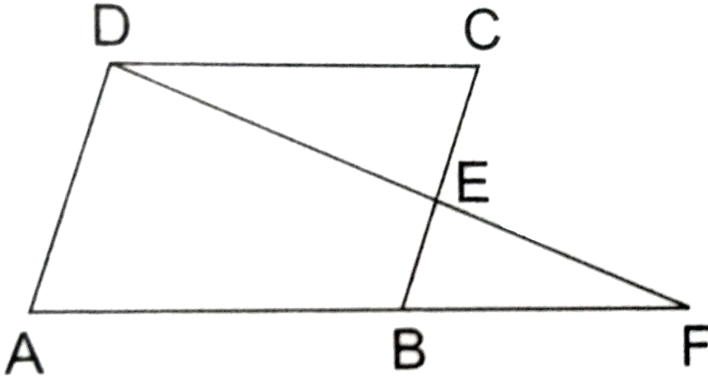
 Watch Video Solution

22. In the adjoining figure, ABCD is a parallelogram in which AB is produced to E so that $BE = AB$. Prove that ED bisects BC.



 Watch Video Solution

23. In the adjoining figure, ABCD is a parallelogram and E is the midpoint of side BC. If DE and AB when produced meet at F, prove that $AF = 2AB$.



[Watch Video Solution](#)

24. 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.

[Watch Video Solution](#)

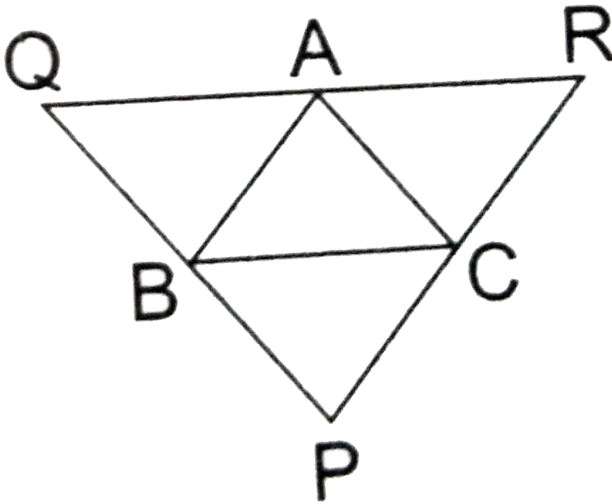
25. K, L, M and N are points on the sides AB, BC, CD and DA respectively of a square ABCD such that $AK = BL = CM = DN$. Prove that KLMN is a square.



[Watch Video Solution](#)

26. A $\triangle ABC$ is given. If lines are drawn through A, B, C, parallel respectively to the sides BC, CA and AB, forming $\triangle PQR$, as

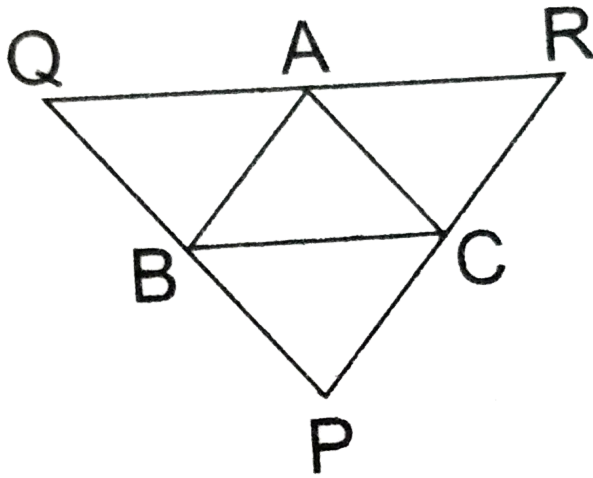
shown in the adjoining figure, show that $BC = \frac{1}{2}QR$.



 [Watch Video Solution](#)

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

is double the perimeter of $\triangle ABC$.



 Watch Video Solution

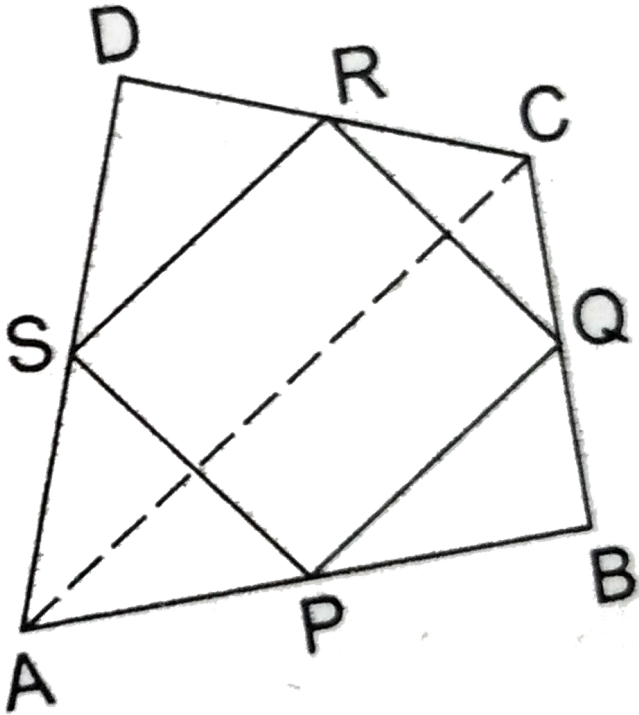
Exercise 10 C

1. P, Q, R and S are respectively the midpoints of the sides AB, BC, CD and DA of a quadrilateral ABCD. Show that

(i) $PQ \parallel AC$ and $PQ = \frac{1}{2}AC$

(ii) $PQ \parallel SR$

(iii) PQRS is a parallelogram .



[Watch Video Solution](#)

2. A square is inscribed in an isosceles right triangle so that the square and the triangle have an angle common. Show that the

vertex of the square opposite the vertex of the common angle
bisects the hypotenuse

 [Watch Video Solution](#)

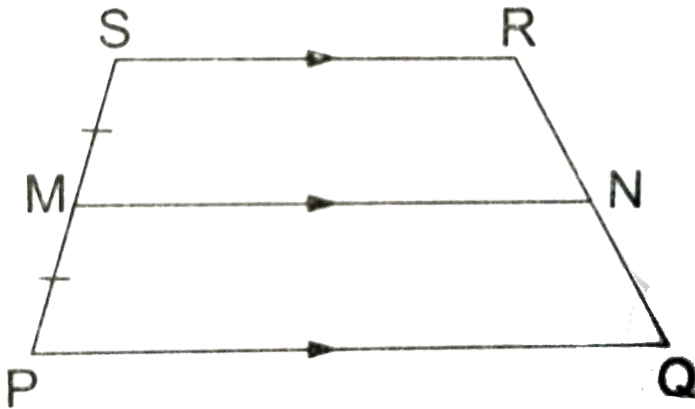
3. $ABCD$ is a parallelogram, E and F are the mid-points of AB and CD respectively. GH is any line intersecting AD, EF and BC at G, P and H respectively. Prove that $GP = PH$.

 [Watch Video Solution](#)

4. M and N are points on opposite sides AD and BC of a parallelogram ABCD such that MN passes through the point of intersection O of its diagonals AC and BD. Show that MN is bisected at O.

 [Watch Video Solution](#)

5. In the adjoining figure, PQRS is a trapezium in which $PQ \parallel SR$ and M is the midpoint of PS. A line segment $MN \parallel PQ$ meets QR at N. Show that N is the midpoint of QR.

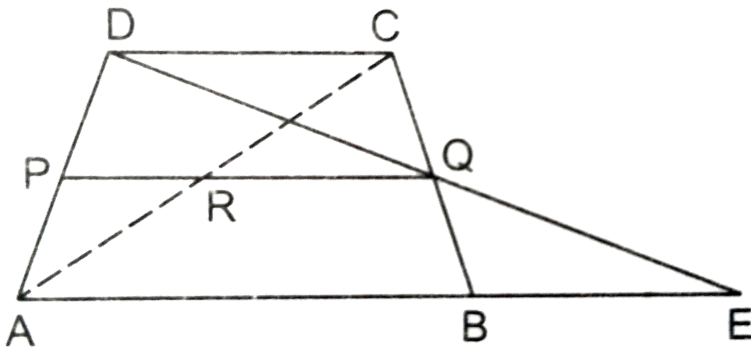


[Watch Video Solution](#)

6. In a parallelogram PQRS, $PQ = 12$ cm and $PS = 9$ cm. The bisector of $\angle P$ meet SR in M. PM and QR both when produced meet at T. Find the length of RT.

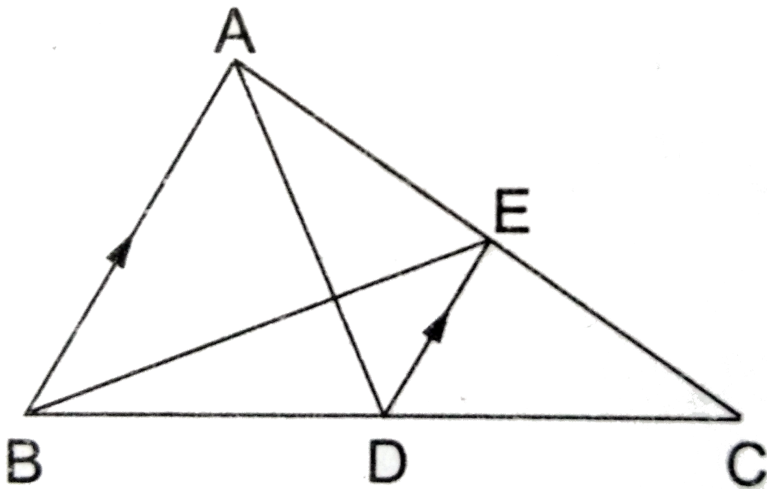
[Watch Video Solution](#)

7. In the adjoining figure, $ABCD$ is a trapezium in which $AB \parallel DC$ and P, Q are the midpoints of AD and BC respectively. DQ and AB when produced meet at E . Also, AC and PQ intersect at R . Prove that (i) $DQ = QE$, (ii) $PR \parallel AB$ and (iii) $AR = RC$.



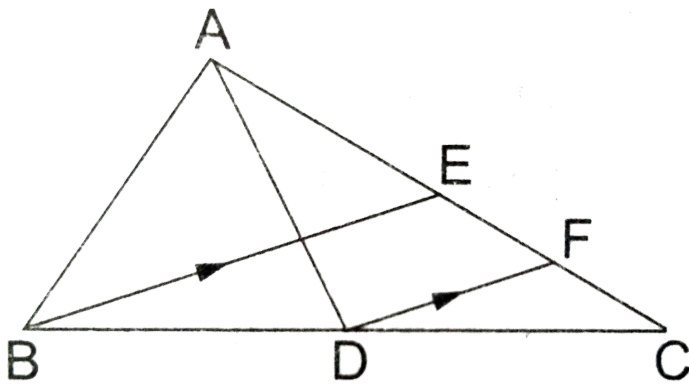
[Watch Video Solution](#)

8. In the adjoining figure, AD is a median of $\triangle ABC$ and $DE \parallel BA$. Show that BE is also a median of $\triangle ABC$.



[▶ Watch Video Solution](#)

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



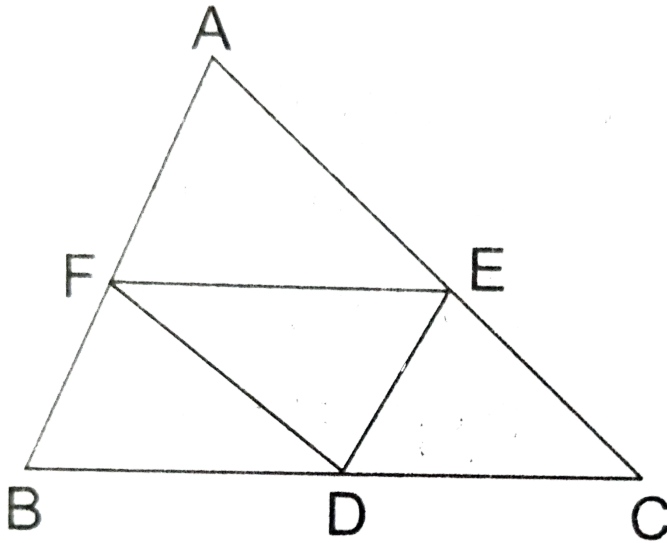
[Watch Video Solution](#)

10. Show that the diagonals of a parallelogram divide it into four triangles of equal area.

[Watch Video Solution](#)

11. In the adjoining figure, D, E, F are the midpoints of the sides BC, CA and AB respectively, of $\triangle ABC$. Show that

$\angle EDF = \angle A$, $\angle DEF = \angle B$ and $\angle DFE = \angle C$.



[Watch Video Solution](#)

12. Show that the quadrilateral formed by joining the mid-points of the consecutive sides of a rectangle is a rhombus.

[Watch Video Solution](#)

13. prove using vectors: The quadrilateral obtained by joining mid-points of adjacent sides a rectangle is a rhombus.



Watch Video Solution

14. Show that the quadrilateral, formed by joining the mid-points of the sides of a square, is also a square.



Watch Video Solution

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



Watch Video Solution

16. The diagonals of a quadrilateral $ABCD$ are equal. Prove that the quadrilateral formed by joining the midpoints of its sides is a rhombus.



[Watch Video Solution](#)

17. The diagonals of a quadrilateral $ABCD$ are perpendicular. Show that the quadrilateral, formed by joining the mid-points of its sides, is a rectangle.



[Watch Video Solution](#)

18. The midpoints of the sides AB, BC, CD and DA of a quadrilateral $ABCD$ are joined to form a quadrilateral. If $AC = BD$ and $AC \perp BD$ then prove that the quadrilateral formed is a square.



Watch Video Solution

Multiple Choice Questions Mcq

1. Three angles of a quadrilateral are 80° , 95° and 112° . Its fourth angle is

A. 78°

B. 73°

C. 85°

D. 100°

Answer: B



Watch Video Solution

2. The angles of a quadrilateral are in the ratio 3:4:5:6. The largest of these angles is

A. 45°

B. 60°

C. 36°

D. 48°

Answer: B



[Watch Video Solution](#)

3. ABCD is a rhombus such that

$\angle ACB = 50^\circ$. Then. $\angle ADB = ?$

A. 50°

B. 40°

C. 65°

D. 130°

Answer: B



Watch Video Solution

4. In which of the following figures are the diagonals equal ?

A. Parallelogram

B. Rhombus

C. Trapezium

D. Rectangle

Answer: D

 [Watch Video Solution](#)

5. Prove that; If the diagonals of a quadrilateral bisect each other at right angles, then it is a rhombus.

A. trapezium

B. parallelogram

C. rectangle

D. rhombus

Answer: D

 [Watch Video Solution](#)

6. The lengths of the diagonals of a rhombus are 12 cm and 16 cm.

Find the each side of rhombus

A. 10 cm

B. 12 cm

C. 9 cm

D. 8 cm

Answer: A



Watch Video Solution

7. Each side of a rhombus is 10cm. If one of its diagonals is 16cm find the length of the other diagonal.

A. 13 cm

B. 12 cm

C. $2\sqrt{39}$ cm

D. 6 cm

Answer: B



Watch Video Solution

8. A diagonal of a rectangle is inclined to one side of the rectangle at 35° . The acute angle between the diagonals is

A. 55°

B. 70°

C. 45°

D. 50°

Answer: B



Watch Video Solution

9. If ABCD is a parallelogram with two adjacent angles $\angle A = \angle B$ then the parallelogram is a

- A. rhombus
- B. trapezium
- C. rectangle
- D. none of these

Answer: C



[Watch Video Solution](#)

10. In a quadrilateral ABCD, AO and BO are the bisectors of $\angle A$ and $\angle B$ respectively, $\angle C = 70^\circ$ and $\angle D = 30^\circ$. Then, $\angle AOB = ?$

A. 50°

B. 130°

C. 80°

D. 100°

Answer: A



Watch Video Solution

11. The bisectors of any two adjacent angles of a parallelogram intersect at:

A. 30°

B. 45°

C. 90°

D. 100°

Answer: C



Watch Video Solution

12. The bisectors of the angle of a parallelogram enclose a
parallelogram (b) rhombus rectangle (d) square

A. rhombus

B. square

C. rectangle

D. parallelogram

Answer: C



Watch Video Solution

13. If bisectors of $\angle A$ and $\angle B$ of a quadrilateral ABCD intersect each other at P, of $\angle B$ and $\angle C$ at Q, of $\angle C$ and $\angle D$ at R and of $\angle D$ and $\angle A$ at S then PQRS is a

- A. rectangle
- B. parallelogram
- C. rhombus
- D. quadrilateral whose opposite angles are supplementary

Answer: D

 [Watch Video Solution](#)

14. The figure formed by joining the mid-points of the adjacent sides of a quadrilateral is a parallelogram (b) rectangle (c) square

(d) rhombus

A. rhombus

B. square

C. rectangle

D. parallelogram

Answer: D



[Watch Video Solution](#)

15. Show that the quadrilateral, formed by joining the mid-points of the sides of a square is also a square.

A. rhombus

B. square

C. rectangle

D. parallelogram

Answer: B



[Watch Video Solution](#)

16. The figure formed by joining the mid-point of the adjacent sides of a parallelogram is a rectangle (b) parallelogram (c) rhombus (d) square

A. rhombus

B. square

C. rectangle

D. parallelogram

Answer: D



[Watch Video Solution](#)

17. The figure obtained by joining the mid-points of the adjacent sides of a rectangle of sides 8 cm and 6 cm, is

- A. rhombus
- B. square
- C. rectangle
- D. parallelogram

Answer: A



[Watch Video Solution](#)

18. The figure formed by joining the mid-points of the adjacent sides of a rhombus is

- A. rhombus
- B. square
- C. rectangle
- D. parallelogram

Answer: C



Watch Video Solution

19. The quadrilateral formed by joining the midpoints of the sides of a quadrilateral ABCD, taken in order, is a rectangle, if

- A. ABCD is a parallelogram
- B. ABCD is a rectangle
- C. diagonals of ABCD are equal
- D. diagonals of ABCD are perpendicular to each other

Answer: B



Watch Video Solution

20. The quadrilateral formed by joining the midpoints of the sides of a quadrilateral ABCD, taken in order, is a rhombus, if

- A. ABCD is a parallelogram
- B. ABCD is a rectangle
- C. diagonals of ABCD are equal
- D. diagonals of ABCD are perpendicular to each other

Answer: C



Watch Video Solution

21. The figure formed by joining the mid-points of the sides of a quadrilateral ABCD, taken in order, is a square only, if

- A. ABCD is a rhombus
- B. diagonals of ABCD are equal
- C. diagonals of ABCD are perpendicular
- D. diagonals of ABCD are equal and perpendicular

Answer: C



[Watch Video Solution](#)

22. If an angle of a parallelogram is two-third of its adjacent angle, find that angle of the parallelogram.

- A. 108°

B. 54°

C. 62°

D. 81°

Answer: A



Watch Video Solution

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

A. 68°

B. 102°

C. 122°

D. 136°

Answer: A



Watch Video Solution

24. If $\angle A$, $\angle B$, $\angle C$ and $\angle D$ of a quadrilateral ABCD, taken in order, are in the ratio 3: 7: 6: 4 then ABCD is a

A. rhombus

B. kite

C. Trapezium

D. parallelogram

Answer: C



Watch Video Solution

25. Which of the following is not true for a parallelogram ?

- A. Opposite sides are equal.
- B. Opposite angles are equal.
- C. Opposite angles are bisected by the diagonals.
- D. Diagonals bisect each other.

Answer: C



[Watch Video Solution](#)

26. If APB and CQD are two parallel lines then the bisectors of

$\angle APQ$, $\angle BPQ$, $\angle CQP$ and $\angle PQD$ enclose a

- A. square
- B. rhombus

C. rectangle

D. kite

Answer: C



Watch Video Solution

27. If area of a parallelogram with sides l and b is A and that of a rectangle with sides l and b is B then

A. $A > B$

B. $A = B$

C. $A < B$

D. $A \geq B$

Answer: A



Watch Video Solution

28. P is any point on the side BC of a $\triangle ABC$. P is joined to A. If D and E are the midpoints of the sides AB and AC respectively and M and N are the midpoints of BP and CP respectively then quadrilateral DENM is

- A. a trapezium
- B. a parallelogram
- C. a rectangle
- D. a rhombus

Answer: A

29. The parallel sides of a trapezium are a and b respectively. The line joining the midpoints of its non-parallel sides will be

A. $\frac{1}{2}(a - b)$

B. $\frac{1}{2}(a + b)$

C. $\frac{2ab}{(a + b)}$

D. \sqrt{ab}

Answer: B



Watch Video Solution

30. Two parallelograms are on equal bases and between the same parallels.

The ratio of their areas is

A. 1 : 2

B. 2 : 1

C. 1 : 3

D. 1 : 1

Answer: A



[Watch Video Solution](#)

31. Three statements are given below:

I. In a \parallel gm, the angle bisectors of two adjacent angles enclose a right angle.

II. The angle bisectors of a \parallel gm form a rectangle.

III. The triangle formed by joining the midpoints of the sides of an isosceles triangle is not necessarily an isosceles triangle.

Which is true?

A. I only

B. II only

C. I and II

D. II and III

Answer: C



Watch Video Solution

32. Three statements are given below:

I. In a rectangle ABCD, the diagonal AC bisects $\angle A$ as well as $\angle C$.

II. In a square ABCD, the diagonal AC bisects $\angle A$ as well as $\angle C$.

III. In a rhombus ABCD, the diagonal AC bisects $\angle A$ as well as $\angle C$.

Which is true?

A. I only

B. II and III

C. I and III

D. I and II

Answer: B



[Watch Video Solution](#)

33. In a quadrilateral PQRS, opposite angles are equal. If $SR = 2$ cm and $PR = 5$ cm then determine PQ.



[Watch Video Solution](#)

34. Diagonals of a parallelogram are perpendicular to each other. Is this statement true? Give reason for your answer.



[Watch Video Solution](#)

35. What special name can be given to a quadrilateral PQRS If $\angle P + \angle S = 180^\circ$?



[Watch Video Solution](#)

36. All the angles of a quadrilateral can be acute. Is this statement true? Give reasons for your answer.



[Watch Video Solution](#)

37. All the angles of a quadrilateral can be right angles. Is this statement true? Give reasons for your answer.



[Watch Video Solution](#)

38. All the angles of a quadrilateral can be obtuse. Is this statement true? Give reasons for your answer.



Watch Video Solution

39. Can we form a quadrilateral whose angles are 70° , 115° , 60° and 120° ? Give reasons for your answer.

A. Yes

B. No

C. Can not determine

D. None of these

Answer: B



Watch Video Solution

40. What special name can be given to a quadrilateral whose all angles are equal?

- A. Parallelogram
- B. Rectangle
- C. Trapezium
- D. kite

Answer: B



[Watch Video Solution](#)

41. If D and E are respectively the midpoints of the sides AB and BC of $\triangle ABC$ in which $AB = 7.2$ cm, $BC = 9.8$ cm and $AC = 3.6$ cm then determine the length of DE.



Watch Video Solution

42. In a quadrilateral PQRS, the diagonals PR and QS bisect each other. If $\angle Q = 56^\circ$, determine $\angle R$.



Watch Video Solution

43. Is quadrilateral $ABCD$ a ||gm?

I. Diagonals AC and BD bisect each other.

II. Diagonals AC and BD are equal.

A. if the question can be answered by one of the given statements alone and not by the other,

B. if the question can be answered by either statement alone,

C. if the question can be answered by both the statements together but not by any one of the two,

D. if the question cannot be answered by using both the statements together.

Answer: A

 [Watch Video Solution](#)

44. Is quadrilateral ABCD a rhombus ?

I. Quadrilateral ABCD is a \parallel gm.

II. Diagonals AC and BD are perpendicular to each other.

A. if the question can be answered by one of the given statements alone and not by the other,

B. if the question can be answered by either statement alone,

C. if the question can be answered by both the statements together but not by any one of the two,

D. if the question cannot be answered by using both the statements together.

Answer: C



Watch Video Solution

45. Is $\parallel\text{gm}$ ABCD a square?

I. Diagonals of $\parallel\text{gm}$ ABCD are equal.

II. Diagonals of $\parallel\text{gm}$ ABCD intersect at right angles.

A. if the question can be answered by one of the given statements alone and not by the other,

B. if the question can be answered by either statement alone,

C. if the question can be answered by both the statements together but not by any one of the two,

D. if the question cannot be answered by using both the statements together.

Answer: C

 [Watch Video Solution](#)

46. Is quadrilateral ABCD a parallelogram?

I. Its opposite sides are equal.

II. Its opposite angles are equal.

The correct answer is : (a) /(b)/(c)/(d).

A. if the question can be answered by one of the given statements alone and not by the other,

- B. if the question can be answered by either statement alone,
- C. if the question can be answered by both the statements together but not by any one of the two,
- D. if the question cannot be answered by using both the statements together.

Answer: B



[Watch Video Solution](#)

47. Assertion (A) : If three angles of a quadrilateral are 130° , 70° and 60° then the fourth angle is 100°

Reason(R) : The sum of all the angle of a quadrilateral is 360°

The correct answer is : (a) /(b)/(c)/(d).

- A. Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A) .
- B. Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A).
- C. Assertion (A) is true and Reason (R) is false.
- D. Assertion (A) is false and Reason (R) is true.

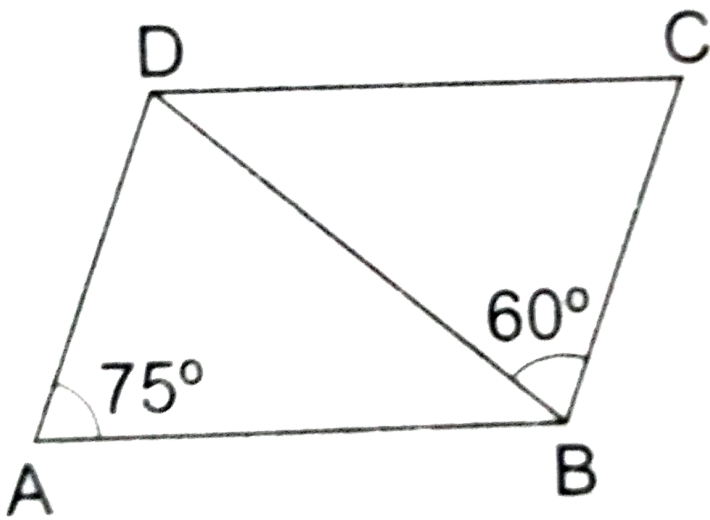
Answer: D



[Watch Video Solution](#)

Multiple Choice Questions Mcq

1. In the adjoining figure, ABCD is a parallelogram in which $\angle BAD = 75^\circ$ and $\angle CBD = 60^\circ$. Then, $\angle BDC = ?$



A. 60°

B. 75°

C. 45°

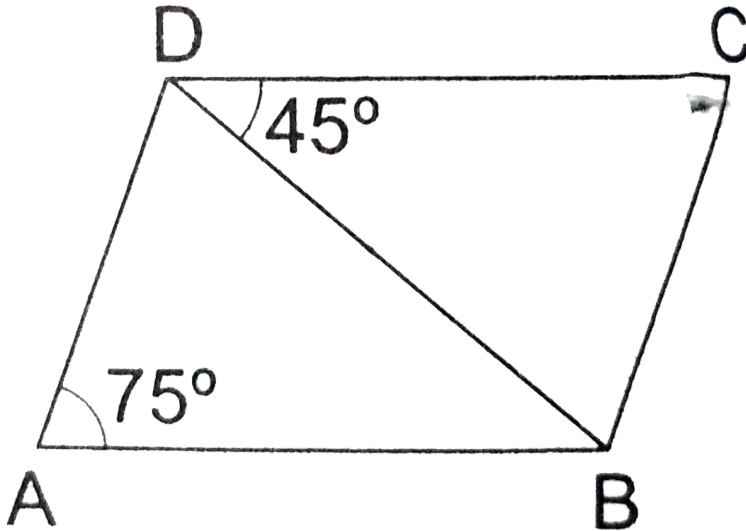
D. 50°

Answer: C



Watch Video Solution

2. In the given figure, ABCD is a parallelogram in which $\angle BDC = 45^\circ$ and $\angle BAD = 75^\circ$. Then, $\angle CBD = ?$

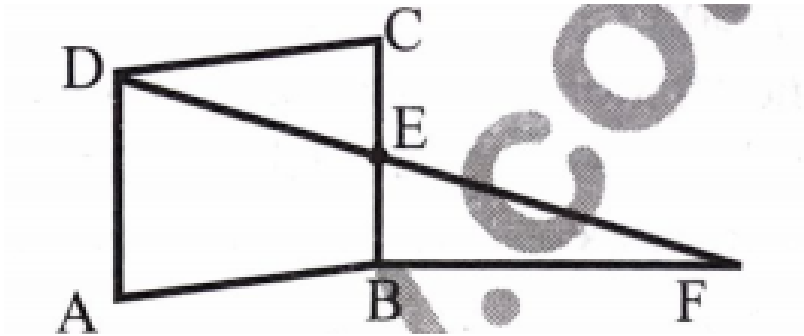


- A. 45°
- B. 55°
- C. 60°
- D. 75°

Answer: C

3. In the given figure, ABCD is a ||gm and E is the mid-point of BC.

Also, DE and AB when produced meet at F. Then.



A. $AF = \frac{3}{2}AB$

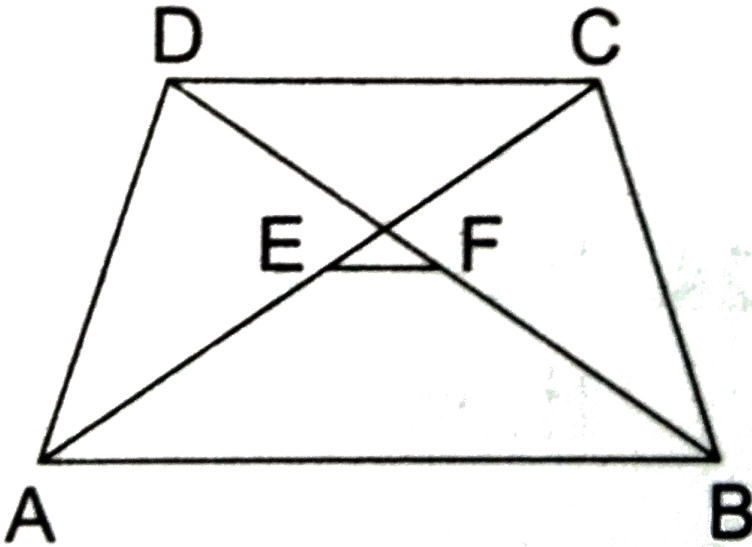
B. $AF = 2AB$

C. $AF = 3AB$

D. $AF^2 = 2AB^2$

Answer: B

4. In a trapezium ABCD, E and F be the midpoints of the diagonals AC and BD respectively. Then, EF = ?

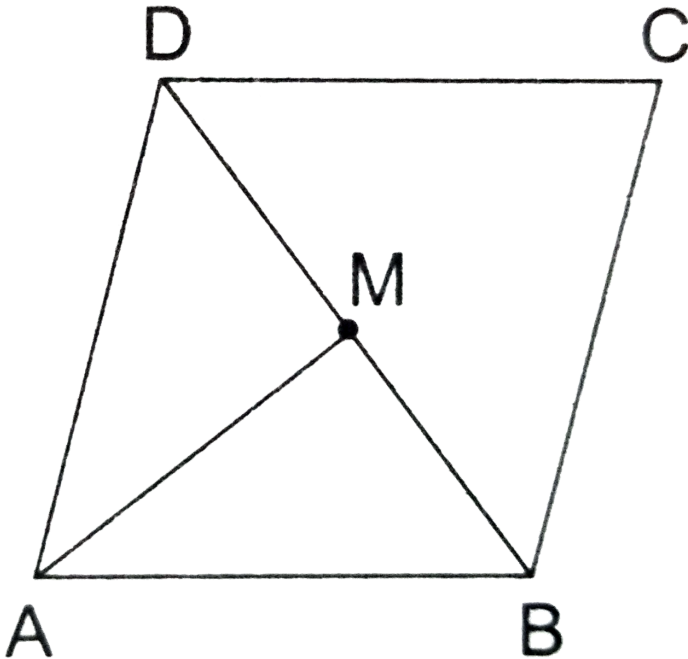


- A. $\frac{1}{2}AB$
- B. $\frac{1}{2}CD$
- C. $\frac{1}{2}(AB + CD)$
- D. $\frac{1}{2}(AB - CD)$

Answer: D

 Watch Video Solution

5. In the given figure, ABCD is a parallelogram, M is the midpoint of BD and BD bisects $\angle B$ as well as $\angle D$. Then, $\angle AMB = ?$



A. 45°

B. 60°

C. 90°

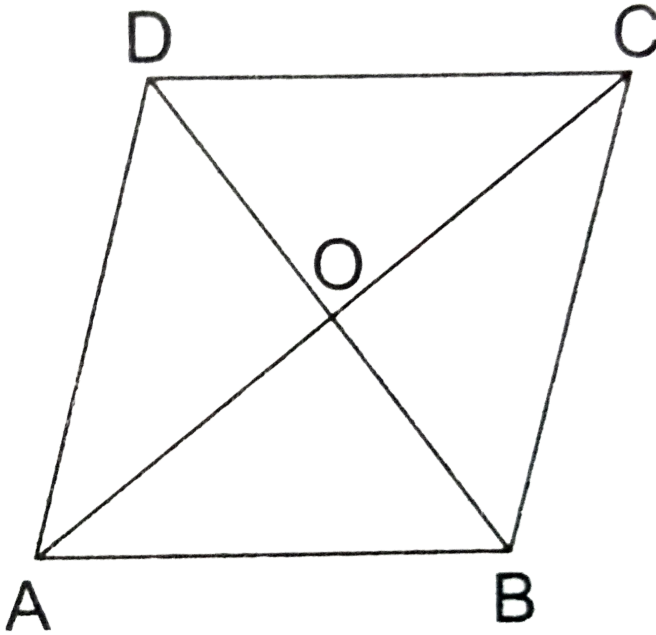
D. 30°

Answer: C



Watch Video Solution

6. In the given figure, ABCD is a rhombus. Then,



A. $AC^2 + BD^2 = AB^2$

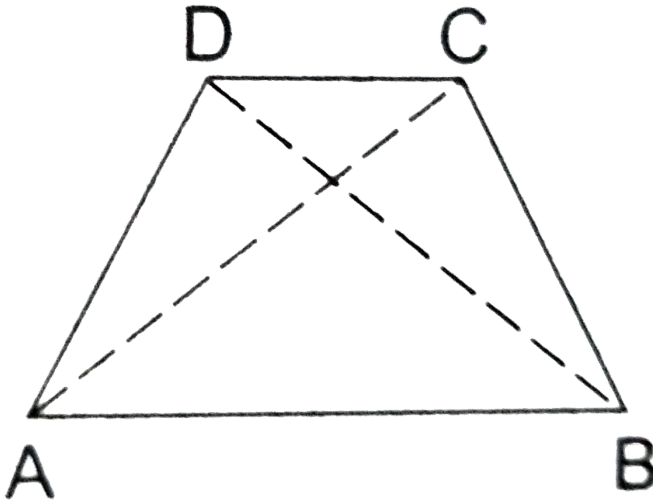
B. $AC^2 + BD^2 = 2AB^2$

C. $AC^2 + BD^2 = 4AB^2$

D. $2(AC^2 + BD^2) = 3AB^2$

Answer: C

7. In a trapezium ABCD, if $AB \parallel CD$ then $(AC^2 + BD^2) = ?$

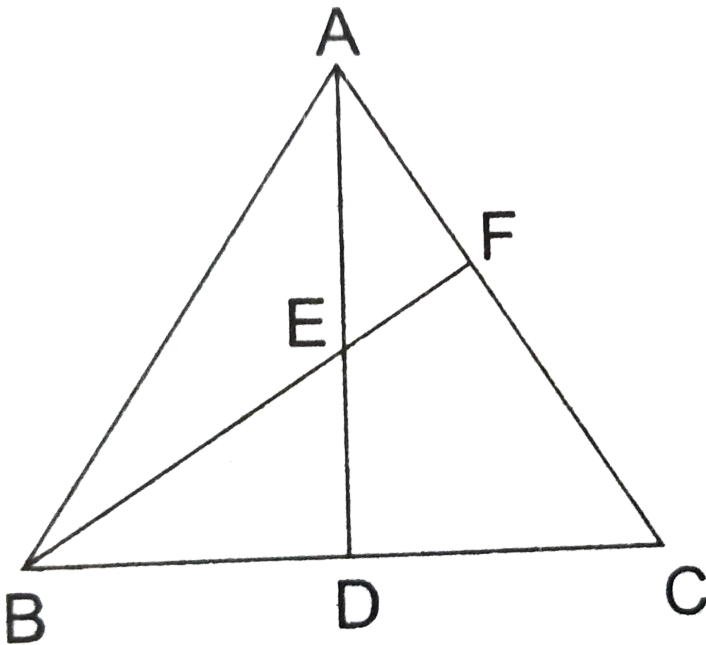


- A. $BC^2 + AD^2 + 2BC \cdot AD$
- B. $AB^2 + CD^2 + 2AB \cdot CD$
- C. $AB^2 + CD^2 + 2AD \cdot BC$
- D. $BC^2 + AD^2 + 2AB \cdot CD$

Answer: D

 Watch Video Solution

8. In the given figure, AD is a median of $\triangle ABC$ and E is the midpoint of AD . If BE is joined and produced to meet AC in F then $AF = ?$



A. $\frac{1}{2}AC$

B. $\frac{1}{3}AC$

C. $\frac{2}{3}AC$

D. $\frac{3}{4}AC$

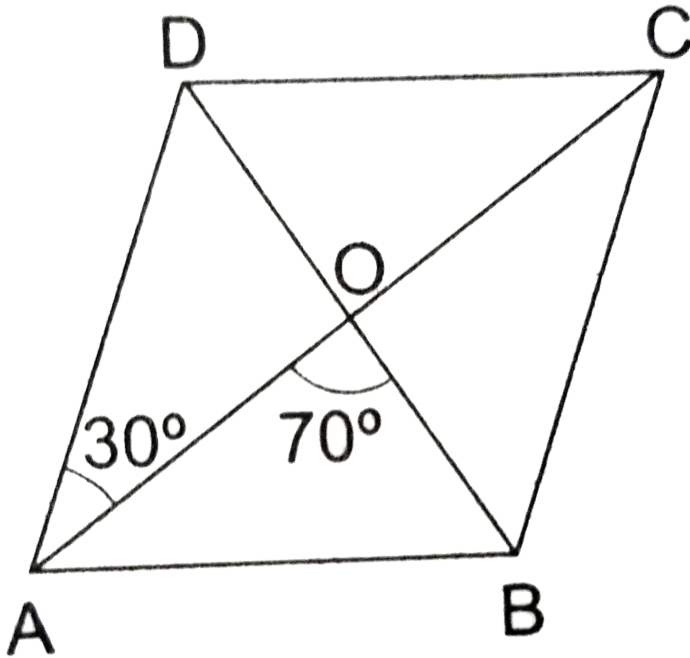
Answer: B



Watch Video Solution

9. The diagonals AC and BD of a parallelogram ABCD intersect each other at the point O such that

$\angle DAC = 30^\circ$ and $\angle AOB = 70^\circ$, Then, $\angle DBC = ?$

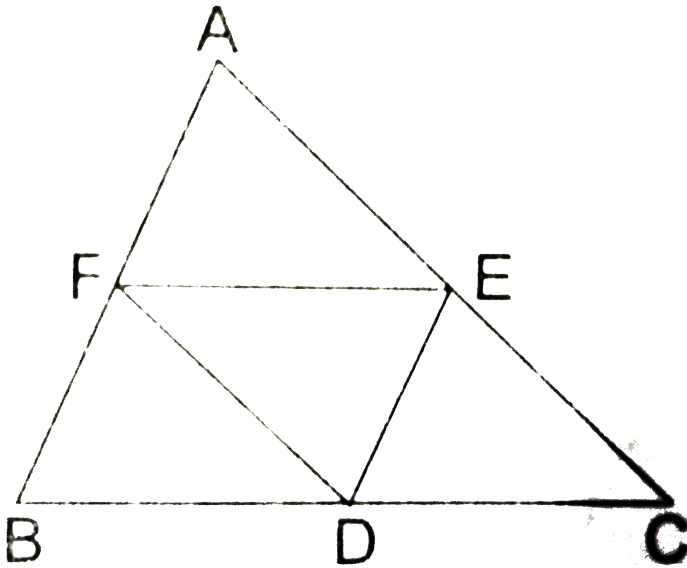


- A. 40°
- B. 35°
- C. 45°
- D. 50°

Answer: D

Short Answer Questions

1. In the adjoining figure, BDEF and AFDE are parallelograms. Is $AF = FB$? Why or why not?



Assertion And Reason Type Mcq

Assertion (A)	Reason (R)
<p>1. $ABCD$ is a quadrilateral in which P, Q, R and S are the midpoints of AB, BC, CD and DA respectively. Then, $PQRS$ is a parallelogram.</p>	<p>The line segment joining the midpoints of any two sides of a triangle is parallel to the third side and equal to half of it.</p>

The correct answer is : (a)/(b)/(c)/(d).

- A. Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A) .
- B. Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A).
- C. Assertion (A) is true and Reason (R) is false.
- D. Assertion (A) is false and Reason (R) is true.

Answer: A



Watch Video Solution

Assertion (A)	Reason (R)
In a rhombus $ABCD$, the diagonal AC bisects $\angle A$ as well as $\angle C$.	The diagonals of a rhombus bisect each other at right angles.

2.

The correct answer is : (a) /(b)/(c)/(d).

- A. Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A) .
- B. Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A).
- C. Assertion (A) is true and Reason (R) is false.
- D. Assertion (A) is false and Reason (R) is true.

Answer: B



Watch Video Solution

Assertion (A)	Reason (R)
Every parallelogram is a rectangle.	The angle bisectors of parallelogram form a rectangle.

3.

The correct answer is : (a)/(b)/(c)/(d).

- A. Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A) .
- B. Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A).
- C. Assertion (A) is true and Reason (R) is false.
- D. Assertion (A) is false and Reason (R) is true.

Answer: D



Watch Video Solution

Assertion (A)	Reason (R)
The diagonals of a \parallel gm bisect each other.	If the diagonals of a \parallel gm are equal and intersect at right angles then the parallelogram is a square.

4.

The correct answer is : (a)/(b)/(c)/(d).

- A. Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A) .
- B. Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A).
- C. Assertion (A) is true and Reason (R) is false.
- D. Assertion (A) is false and Reason (R) is true.

Answer: D

 [Watch Video Solution](#)

1. Match the following columns:

Column I	Column II
(a) Angle bisectors of a parallelogram form a	(p) parallelogram
(b) The quadrilateral formed by joining the midpoints of the pairs of adjacent sides of a square is a	(q) rectangle
(c) The quadrilateral formed by joining the midpoints of the pairs of adjacent sides of a rectangle is a	(r) square
(d) The figure formed by joining the midpoints of the pairs of adjacent sides of a quadrilateral is a	(s) rhombus

The correct answer is :

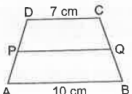
(a) -, (b) -, (c) -, (d) -



[Watch Video Solution](#)

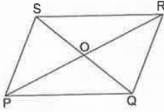
2. Match the following columns:

Column I	Column II
(a) In the given figure, $ABCD$ is a trapezium in which $AB = 10$ cm and $CD = 7$ cm. If P and Q are the midpoints of AD and BC respectively then $PQ =$	(p) equal



(p) equal

- (b) In the given figure, PQRS is a \parallel gm whose diagonals intersect at O. If $PR = 13$ cm, then $QR =$



- (c) The diagonals of a square are (r) 8.5 cm
(d) The diagonals of a rhombus (s) 6.5 cm
bisect each other

(q) at right angles

The correct answer is:

- (a) —....., (b) —....., (c) —....., (d) —.....



Watch Video Solution