

CLASS IX: CHAPTER – 8 **QUADRILATERALS**

1. The bisectors of angles of a parallelogram form a :
(a) trapezium (b) rectangle (c) rhombus (d) kite
2. The angles of a quadrilaterals are in the ratio $3 : 4 : 5 : 6$. The respective angles of the quadrilaterals are
(a) $60^\circ, 80^\circ, 100^\circ, 120^\circ$ (b) $120^\circ, 100^\circ, 80^\circ, 60^\circ$
(c) $120^\circ, 60^\circ, 80^\circ, 100^\circ$ (d) $80^\circ, 100^\circ, 120^\circ, 60^\circ$.
3. If diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a:
(a) parallelogram (b) square (c) rhombus (d) trapezium
4. If in rectangle ABCD, diagonal AC bisects $\angle A$ as well $\angle C$, then ABCD is a:
(a) parallelogram (b) square (c) rhombus (d) trapezium
5. The line segment joining the midpoints of two sides of a triangle is parallel to the third side and _____ of it.
(a) half (b) one third (c) one fourth (d) equal
6. Line segment joining the mid points of the opposite sides of a quadrilateral _____ each other.
(a) trisect (b) bisect (c) coincide (d) none of these.
7. Three angles of a quadrilateral are $75^\circ, 90^\circ$ and 75° . The fourth angle is
(a) 90° (b) 95° (c) 105° (d) 120°
8. A diagonal of a rectangle is inclined to one side of the rectangle at 25° . The acute angle between the diagonals is
(a) 55° (b) 50° (c) 40° (d) 25°
9. ABCD is a rhombus such that $\angle ACB = 40^\circ$, then $\angle ADB =$
(a) 45° (b) 50° (c) 40° (d) 60°
10. The quadrilateral formed by joining the midpoints of the sides of a quadrilateral PQRS, taken in order, is a rectangle, if
(a) PQRS is a rectangle (b) PQRS is an parallelogram
(c) diagonals of PQRS are perpendicular (d) diagonals of PQRS are equal.
11. The quadrilateral formed by joining the midpoints of the sides of a quadrilateral PQRS, taken in order, is a rhombus, if
(a) PQRS is a rhombus (b) PQRS is an parallelogram
(c) diagonals of PQRS are perpendicular (d) diagonals of PQRS are equal.
12. If angles A, B, C and D of the quadrilateral ABCD, taken in order are in the ratio $3:7:6:4$, then ABCD is a
(a) parallelogram (b) kite (c) rhombus (d) trapezium

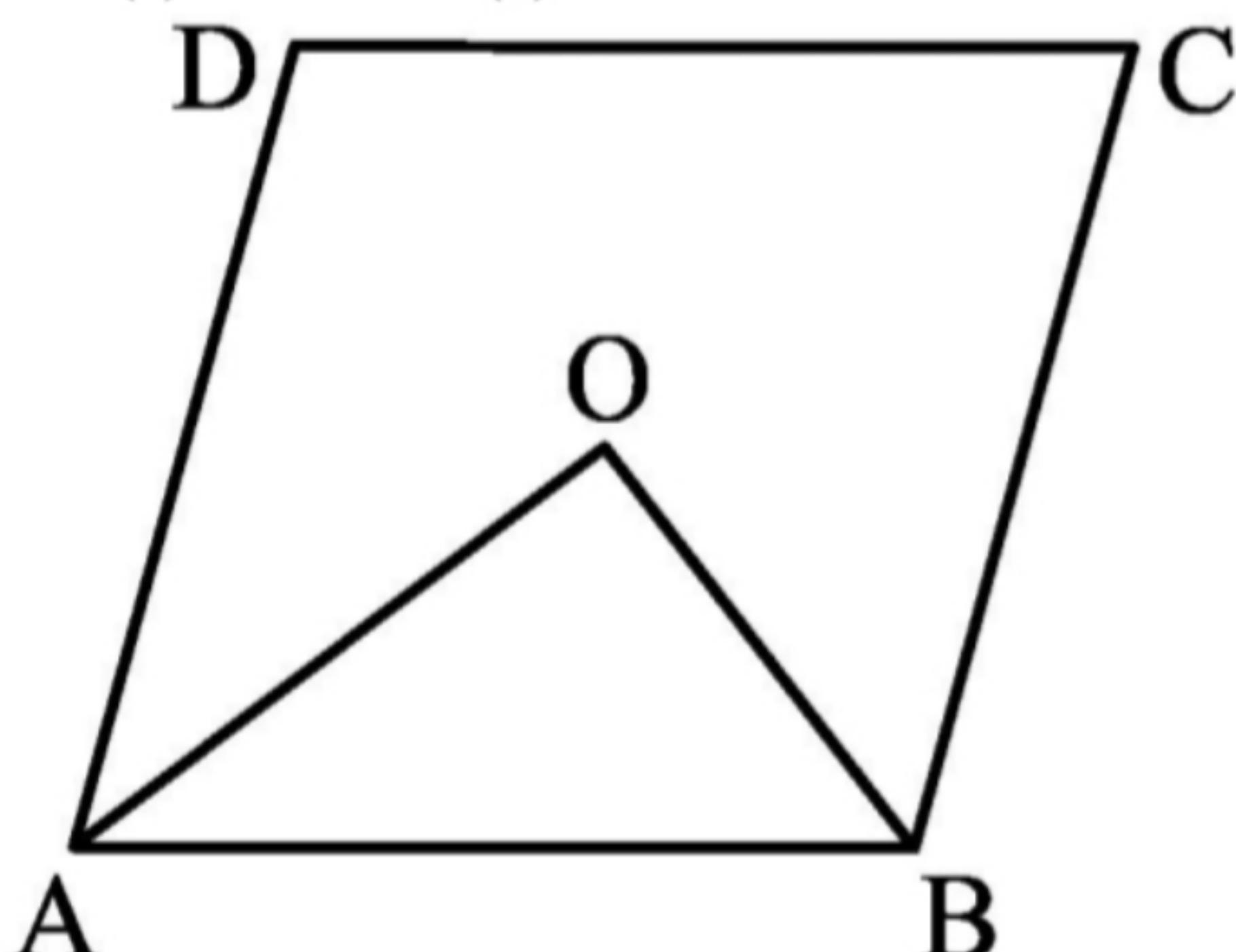
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1. If bisectors of $\angle A$ and $\angle B$ of a quadrilateral ABCD intersect each other at P, of $\angle B$ and $\angle C$ at Q, of $\angle C$ and $\angle D$ at R and of $\angle D$ and $\angle A$ at S, then PQRS is a
 - (a) parallelogram
 - (b) rectangle
 - (c) rhombus
 - (d) quadrilateral whose opposite angles are supplementary.
2. If APB and CQD are two parallel lines then bisectors of the angles APQ, BPQ, CQP and PQD form a
 - (a) parallelogram
 - (b) square
 - (c) rhombus
 - (d) rectangle
3. The figure obtained by joining the midpoints of the sides of a rhombus, taken in order is a
 - (a) parallelogram
 - (b) square
 - (c) rhombus
 - (d) rectangle
4. D and E are the midpoints of the sides AB and AC of $\triangle ABC$ and O is any point on side BC. O is joined to A. If P and Q are the midpoints of OB and OC respectively, then DEQP is a
 - (a) parallelogram
 - (b) square
 - (c) rhombus
 - (d) rectangle
5. The quadrilateral formed by joining the midpoints of the sides of a quadrilateral PQRS, taken in order, is a square only if
 - (a) PQRS is a rhombus
 - (b) diagonals of PQRS are equal and perpendicular
 - (c) diagonals of PQRS are perpendicular
 - (d) diagonals of PQRS are equal.
6. The diagonals AC and BD of a parallelogram ABCD intersect each other at the point O. If $\angle DAC = 32^\circ$ and $\angle AOB = 70^\circ$, then $\angle DBC$ is equal to
 - (a) 24°
 - (b) 86°
 - (c) 38°
 - (d) 32°
7. Which of the following is not true for a parallelogram?
 - (a) opposite sides are equal
 - (b) opposite angles are bisected by the diagonals
 - (c) opposite angles are equal
 - (d) diagonals bisect each other.
8. D and E are the midpoints of the sides AB and AC of $\triangle ABC$. DE is produced to F. To prove that CF is equal and parallel to DA, we need an additional information which is
 - (a) $\angle DAE = \angle EFC$
 - (b) AE = EF
 - (c) DE = EF
 - (d) $\angle ADE = \angle ECF$
9. The bisectors of any two adjacent angles of a parallelogram intersect at
 - (a) 45°
 - (b) 30°
 - (c) 90°
 - (d) 60°
10. The bisectors of the angles of a parallelogram enclose a
 - (a) parallelogram
 - (b) square
 - (c) rhombus
 - (d) rectangle
11. ABCD is a parallelogram and E and F are the centroid of triangle ABD and BCD respectively, then EF =
 - (a) AE
 - (b) BE
 - (c) CE
 - (d) DE
12. ABCD is a parallelogram, M is the midpoint of BD and BM bisects $\angle B$, then $\angle AMB =$
 - (a) 45°
 - (b) 75°
 - (c) 90°
 - (d) 60°

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1. Given four points A, B, C, D such that three points A, B, C are collinear. By joining these points in order, we get
(a) a straight line (b) a triangle (c) quadrilateral (d) none of these
2. In quadrilateral ABCD, AB = BC and CD = DA, then the quadrilateral is a
(a) parallelogram (b) rhombus (c) kite (d) trapezium
3. Given a triangular prism, then what can we conclude about the lateral faces.
(a) faces are rectangular (b) faces are parallelogram
(c) faces are trapeziums (d) square
4. The bisectors of the angles of parallelogram enclose a
(a) parallelogram (b) rhombus (c) rectangle (d) square
5. Which if the following quadrilateral a rhombus?
(a) diagonals bisect each other (b) all the four sides are equal
(c) diagonals bisect opposite angles (d) one angle between the diagonals is 60° .
6. Consecutive angles of parallelogram are
(a) equal (b) supplementary (c) complementary (d) none of these
7. Given a rectangle ABCD and P, Q, R, S midpoints of AB, BC, CD and DA respectively. Length of diagonal of rectangle is 8 cm, the quadrilateral PQRS is
(a) parallelogram with adjacent sides 4 cm (b) rectangle with adjacent sides 4 cm
(c) rhombus with side 4 cm (d) square with side 4 cm
8. In parallelogram ABCD, bisectors of angles A and C intersect each other at O. The value of $\angle AOB$ is:
(a) 30° (b) 60° (c) 90° (d) 120°



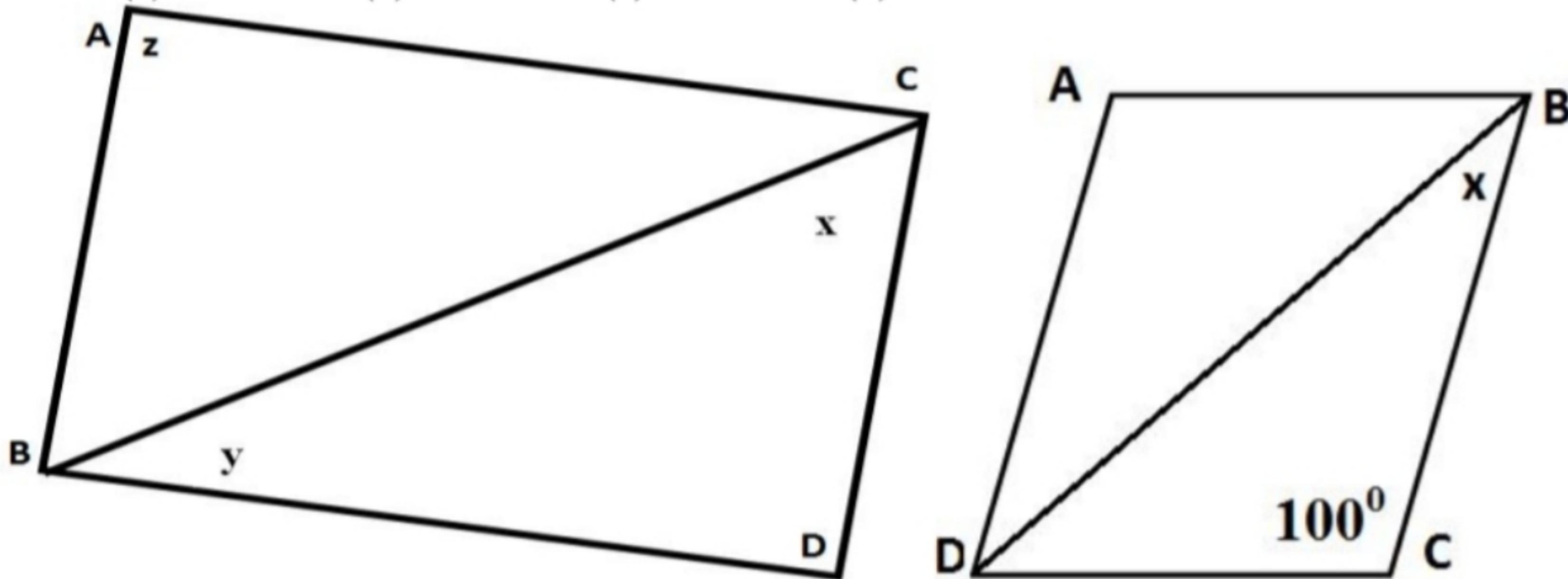
9. If an angle of a parallelogram is two-third of its adjacent angle, the smallest angle of the parallelogram is
(a) 108° (b) 54° (c) 72° (d) 81°

10. If the degree measures of the angles of quadrilateral are $4x$, $7x$, $9x$ and $10x$, what is the sum of the measures of the smallest angle and largest angle?

- (a) 140^0 (b) 150^0 (c) 168^0 (d) 180^0

11. In the given figure ABCD is a parallelogram, what is the sum of the angle x , y and z ?

- (a) 140^0 (b) 150^0 (c) 168^0 (d) 180^0

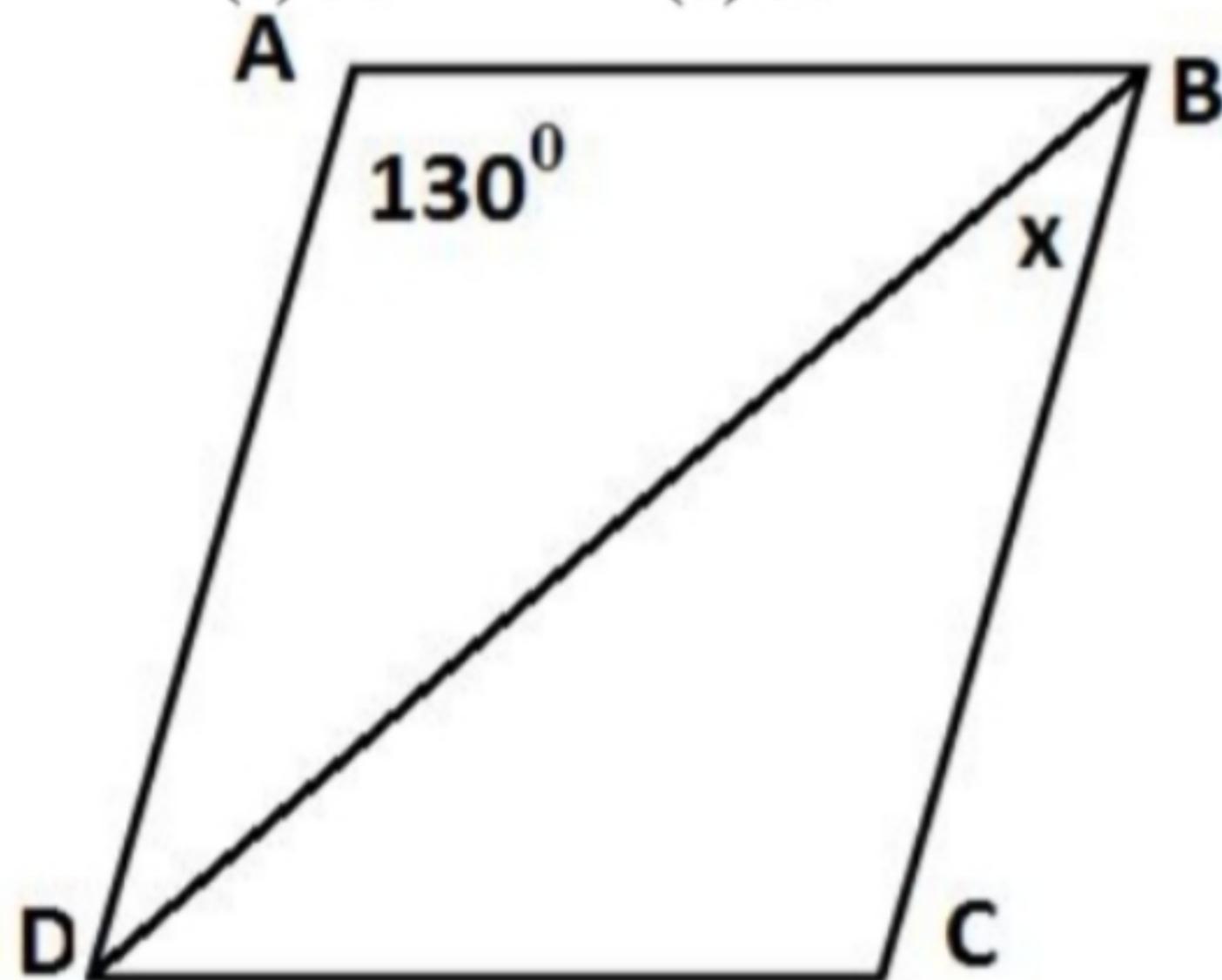


12. In the above figure ABCD is a rhombus, then the value of x is

- (a) 40^0 (b) 50^0 (c) 60^0 (d) 80^0

13. In the below figure ABCD is a rhombus, then the value of x is

- (a) 20^0 (b) 25^0 (c) 30^0 (d) 50^0



14. ABCD is a parallelogram and $AB = 12\text{cm}$, $AD = 8\text{ cm}$ then perimeter of parallelogram ABCD is

- (a) 20 cm (b) 40 cm (c) 60 cm (d) 80 cm

15. In parallelogram CARS, $m\angle C = 5x - 20$ and $m\angle A = 3x + 40$. Find the value of x .

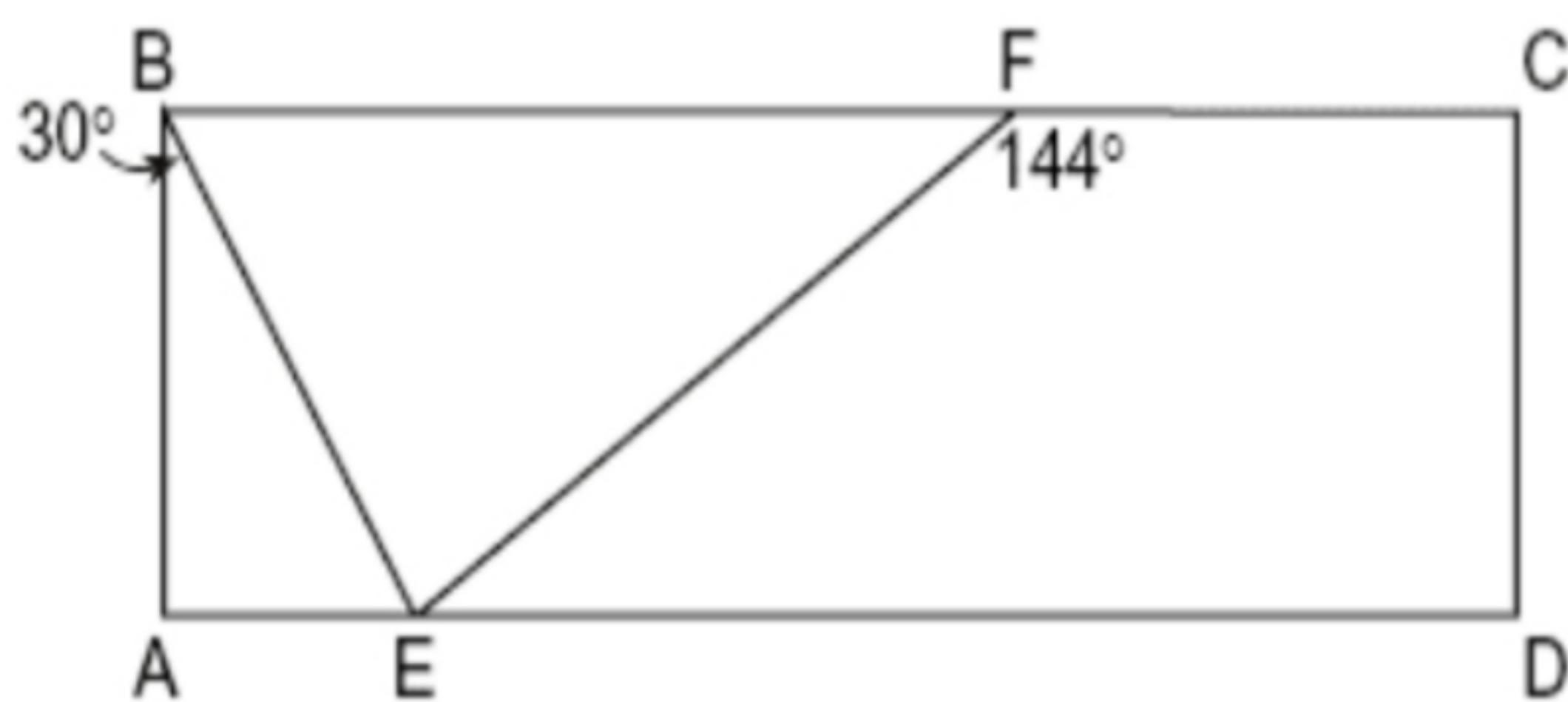
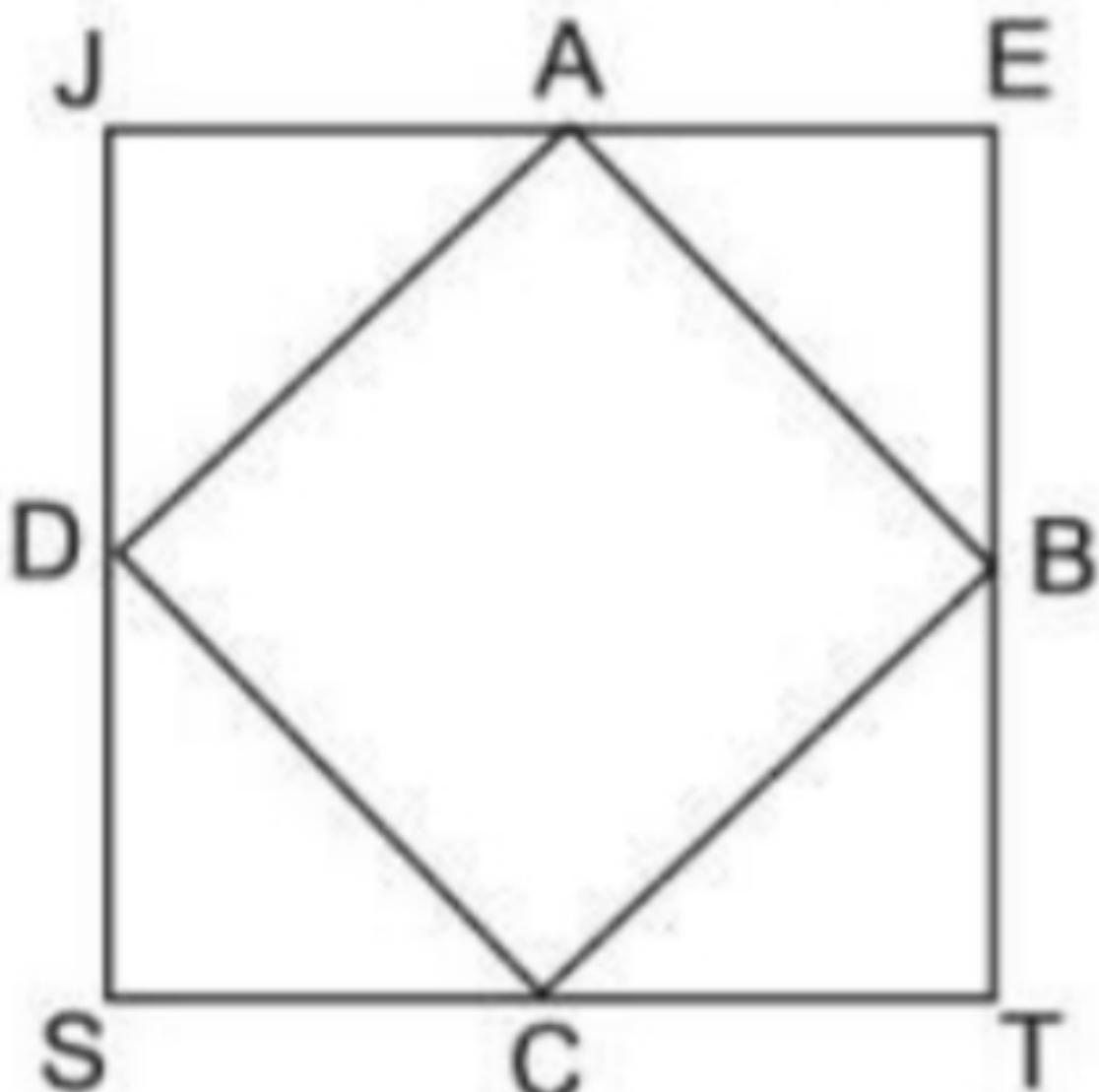
- (a) 15 (b) 20 (c) 30 (d) 130



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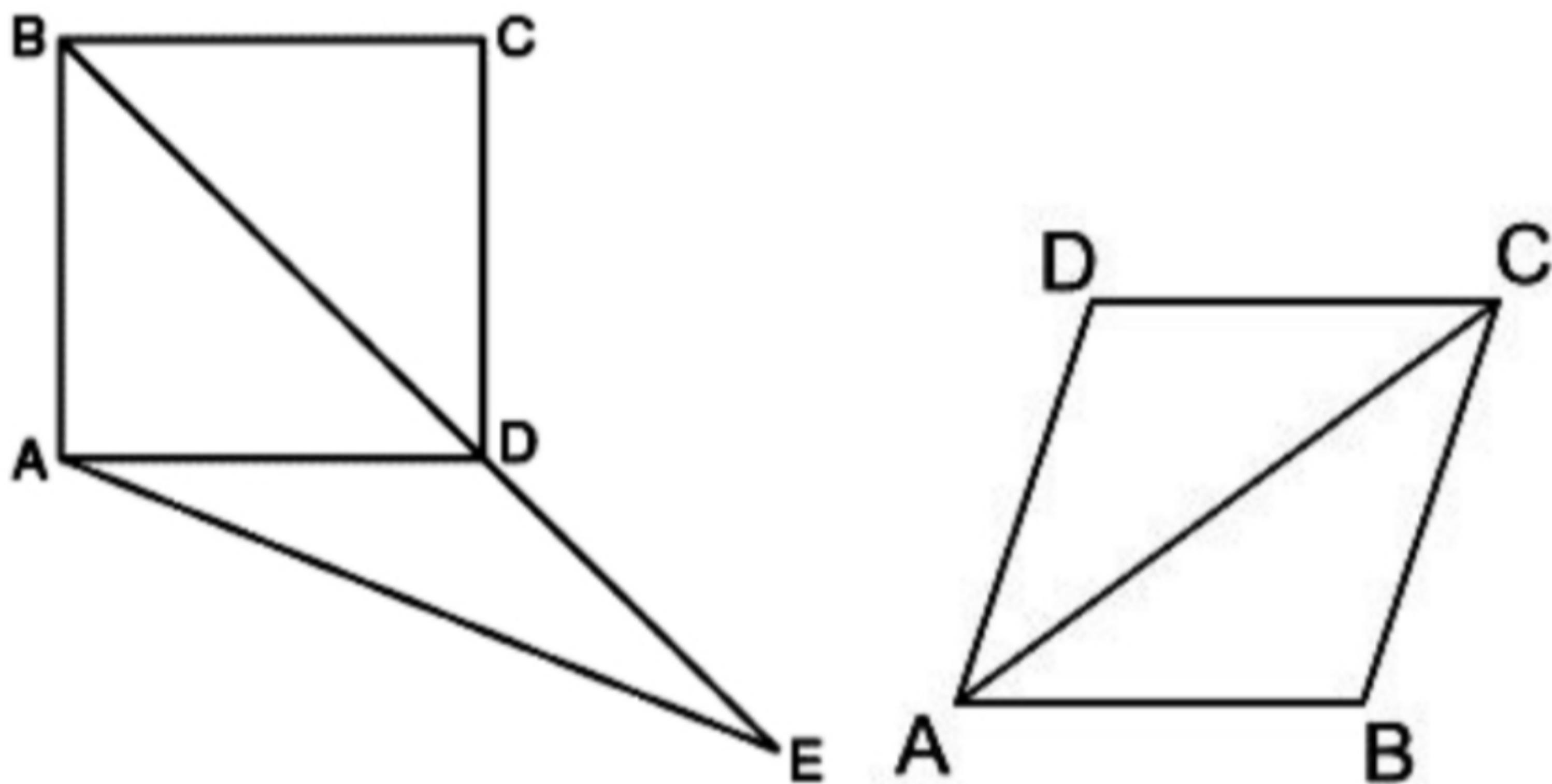
1. If two consecutive sides of a rhombus are represented by $3x - 6$ and $x + 14$, then the perimeter of the rhombus is
(a) 10 (b) 24 (c) 70 (d) 96

2. Points A , B , C , and D are midpoints of the sides of square $JETS$. If the area of $JETS$ is 36, the area of $ABCD$ is
(a) $9\sqrt{2}$ (b) $18\sqrt{2}$ (c) 9 (d) 18



3. In the accompanying above diagram of rectangle $ABCD$, $m\angle ABE = 30$ and $m\angle CFE = 144$. Find $m\angle BEF$.
(a) 36° (b) 60° (c) 84° (d) 90°
4. A quadrilateral must be a parallelogram if one pair of opposite sides is
(a) congruent, only. (b) parallel and the other pair of opposite sides is congruent.
(c) congruent and parallel. (d) parallel only
5. The perimeter of a rhombus is 60. If the length of its longer diagonal measures 24, the length of the shorter diagonal is
(a) 20 (b) 18 (c) 15 (d) 9
6. Find the perimeter of a rhombus whose diagonals measure 12 and 16.
(a) 10 (b) 20 (c) 40 (d) 80
7. Which statement is true about all parallelograms?
(a) The diagonals are congruent.
(b) The area is the product of two adjacent sides.
(c) The opposite angles are congruent.
(d) The diagonals are perpendicular to each other.
8. Which property is true for all trapezoids?
(a) Only two opposite sides are parallel.
(b) Consecutive angles are supplementary.
(c) The base angles are congruent.
(d) All angles are equal.

9. In the diagram at the right, $ABCD$ is a square, diagonal BD is extended through D to E . $AD = DE$ and AE is drawn as given in figure. What is $m\angle DAE$?
- (a) 22.5 (b) 45.0 (c) 112.5 (d) 135.0



10. In the above right sided diagram of rhombus $ABCD$, $m\angle CAB = 35^\circ$. Find $m\angle CDA$.
- (a) 35° (b) 70° (c) 110° (d) 140°
11. In rectangle $DATE$, diagonals DT and AE intersect at S . If $AE = 40$ and $ST = x + 5$, find the value of x .
- (a) 10 (b) 18 (c) 15 (d) 20

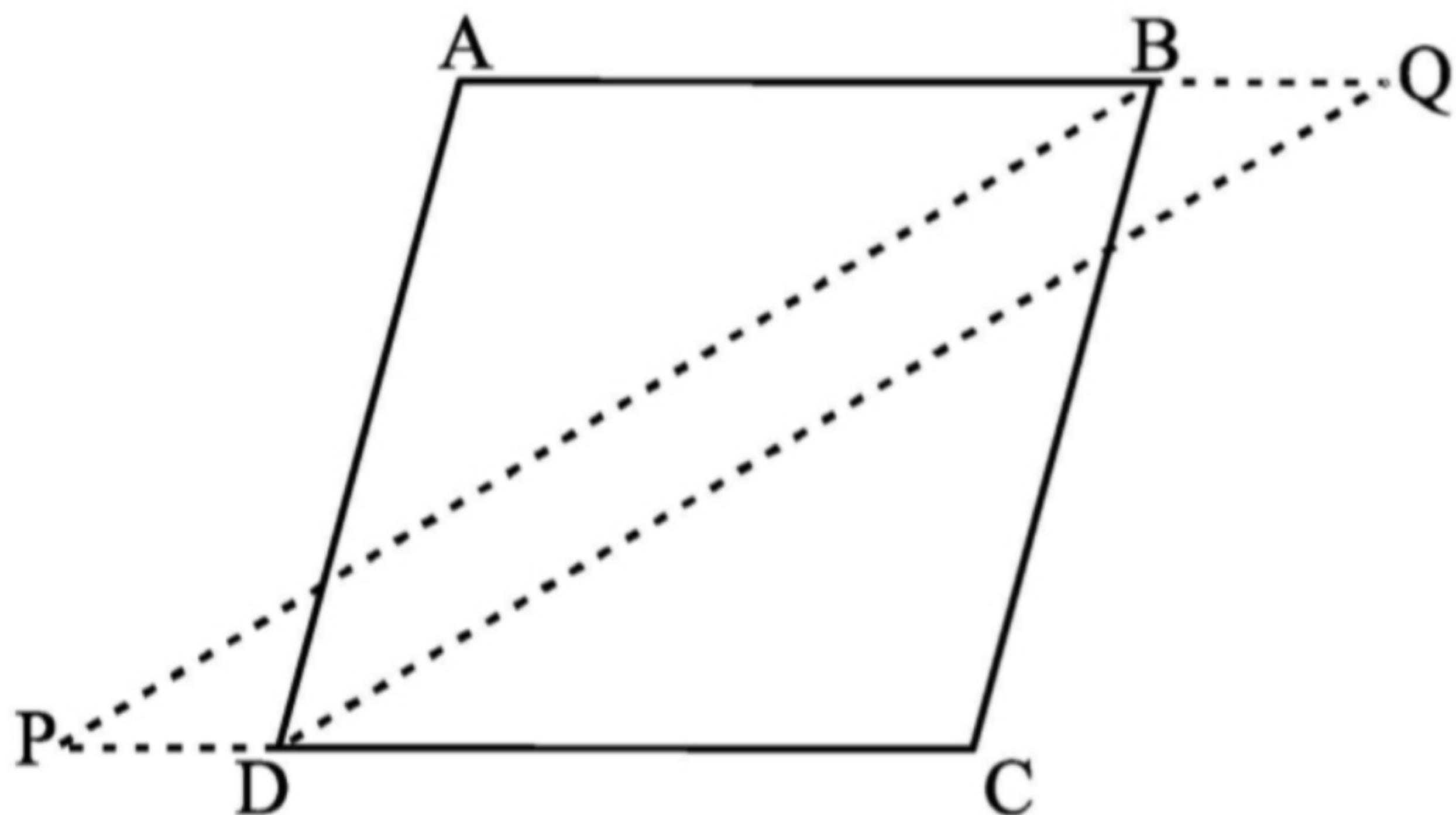
12. A parallelogram must be a rectangle if its diagonals
- (a) bisect each other.
(b) bisect the angles to which they are drawn.
(c) are perpendicular to each other.
(d) are congruent.
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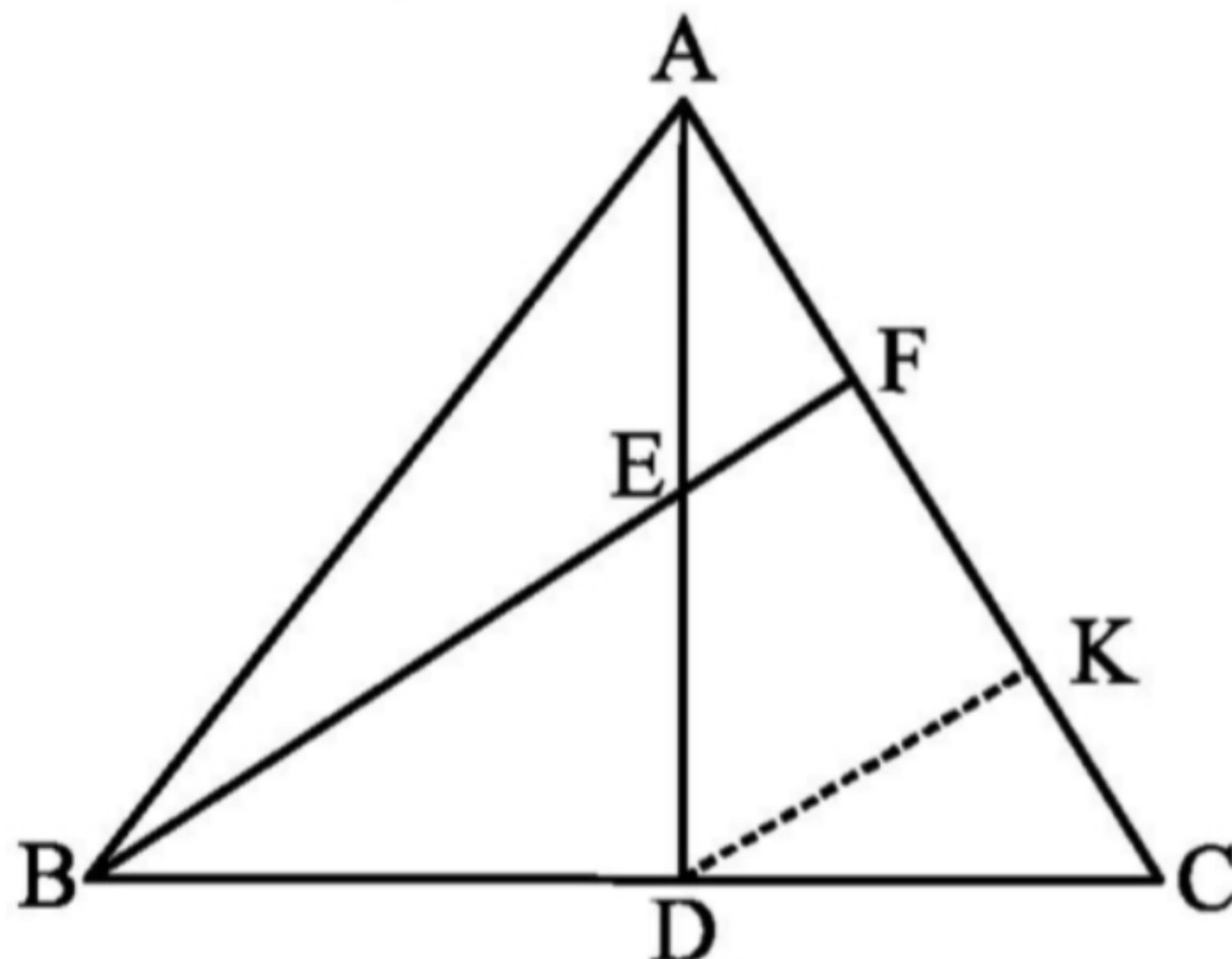
1. Three angles of a quadrilateral are 75° , 90° and 75° . The fourth angle is
(A) 90° (B) 95° (C) 105° (D) 120°
2. A diagonal of a rectangle is inclined to one side of the rectangle at 25° . The acute angle between the diagonals is
(A) 55° (B) 50° (C) 40° (D) 25°
3. ABCD is a rhombus such that $\angle ACB = 40^\circ$. Then $\angle ADB$ is
(A) 40° (B) 45° (C) 50° (D) 60°
4. The quadrilateral formed by joining the mid-points of the sides of a quadrilateral PQRS, taken in order, is a rectangle, if
(A) PQRS is a rectangle
(B) PQRS is a parallelogram
(C) diagonals of PQRS are perpendicular
(D) diagonals of PQRS are equal.
5. The quadrilateral formed by joining the mid-points of the sides of a quadrilateral PQRS, taken in order, is a rhombus, if
(A) PQRS is a rhombus
(B) PQRS is a parallelogram
(C) diagonals of PQRS are perpendicular
(D) diagonals of PQRS are equal.
6. If angles A, B, C and D of the quadrilateral ABCD, taken in order, are in the ratio 3:7:6:4, then ABCD is a
(A) rhombus (B) parallelogram
(C) trapezium (D) kite
7. 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) rhombus (C) parallelogram
(D) quadrilateral whose opposite angles are supplementary
8. If APB and CQD are two parallel lines, then the bisectors of the angles APQ, BPQ, CQP and PQD form
(A) a square (B) a rhombus
(C) a rectangle (D) any other parallelogram
9. The figure obtained by joining the mid-points of the sides of a rhombus, taken in order, is
(A) a rhombus (B) a rectangle
(C) a square (D) any parallelogram

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1. In the below figure, bisectors of $\angle B$ and $\angle D$ of quadrilateral ABCD meet CD and produced at P and Q respectively. Prove that $\angle P + \angle Q = \frac{1}{2} (\angle ABC + \angle ADC)$

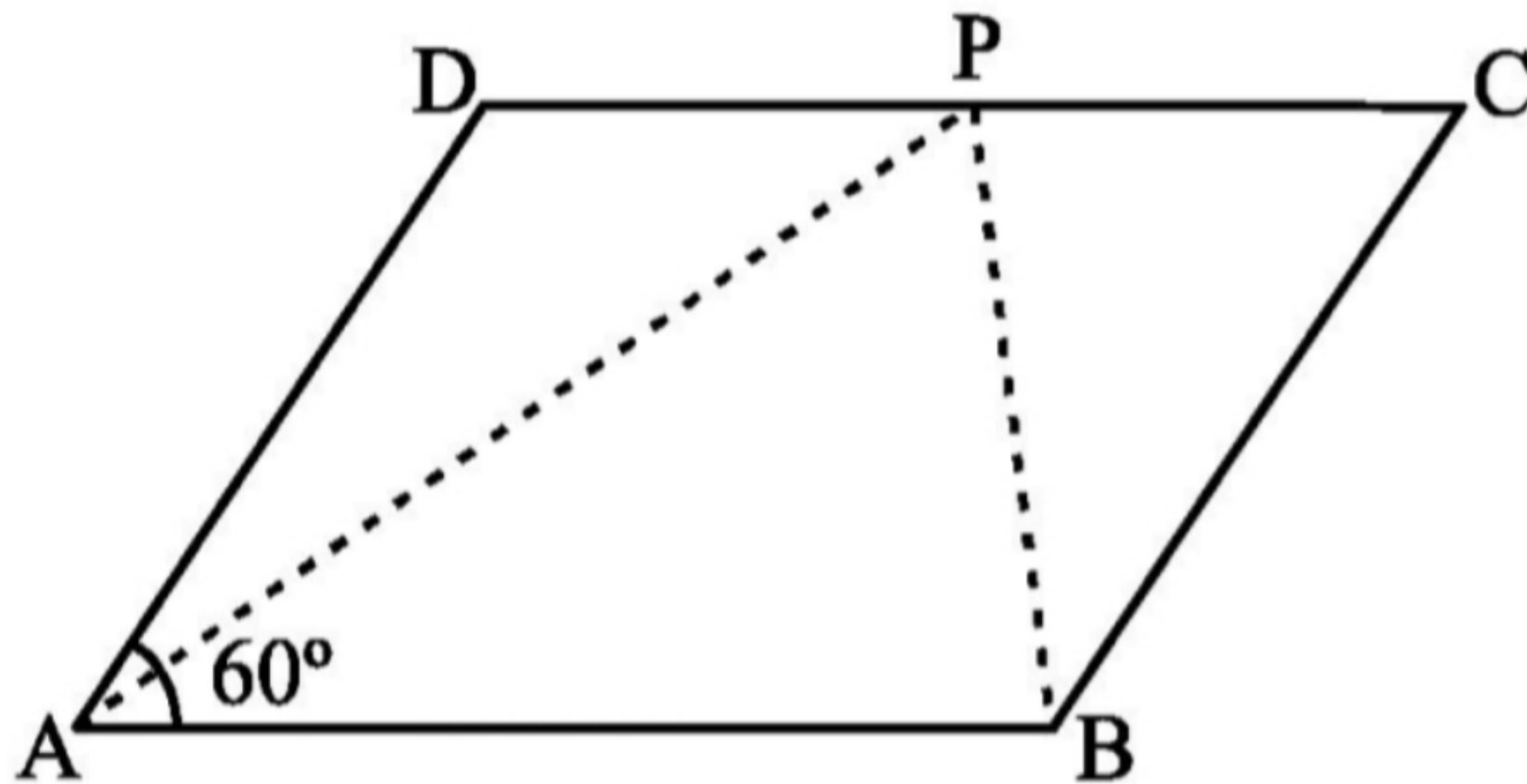


2. In $\triangle ABC$, AD is the median through A and E is the midpoint of AD. BE produced meets AC such that $BF \parallel DK$. Prove that $AF = \frac{1}{3} AC$

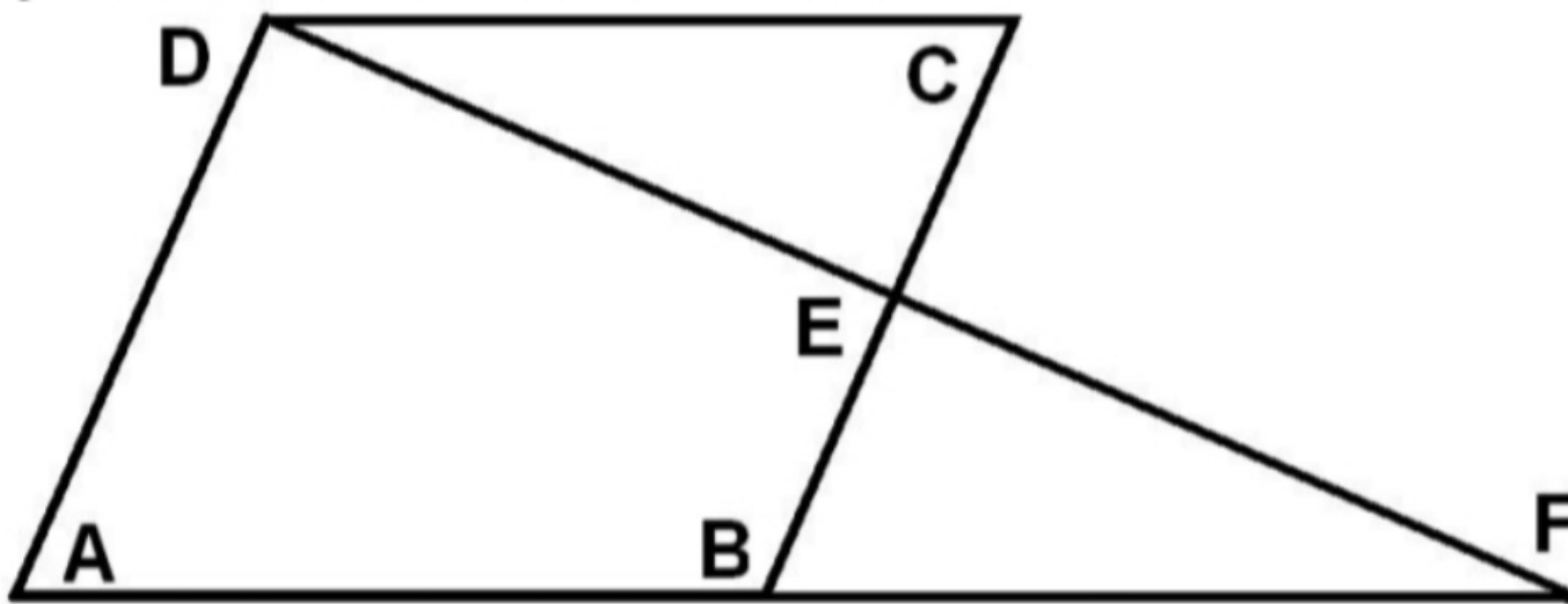


3. In a parallelogram, the bisectors of any two consecutive angles intersect at right angle. Prove
4. In a quadrilateral ABCD, AO and BO are the bisectors of $\angle A$ and $\angle B$ respectively. Prove
 $\angle AOB = \frac{1}{2}(\angle C + \angle D)$
5. ABCD is a square E, F, G, H are points on AB, BC, CD and DA respectively such that $AE = CG = DH = BF$. Prove that EFGH is a square.
6. ABCD is a parallelogram. If its diagonals are equal, then find the value of $\angle ABC$.

7. In the below figure, ABCD is a parallelogram and $\angle DAB = 60^\circ$. If the bisector AP and BP of angles A and B respectively meet P on CD. Prove that P is the midpoint of CD.



8. In the below given figure, ABCD is a parallelogram and E is the midpoint of side BC, DE and AB when produced meet at F. Prove that $AF = 2AB$.

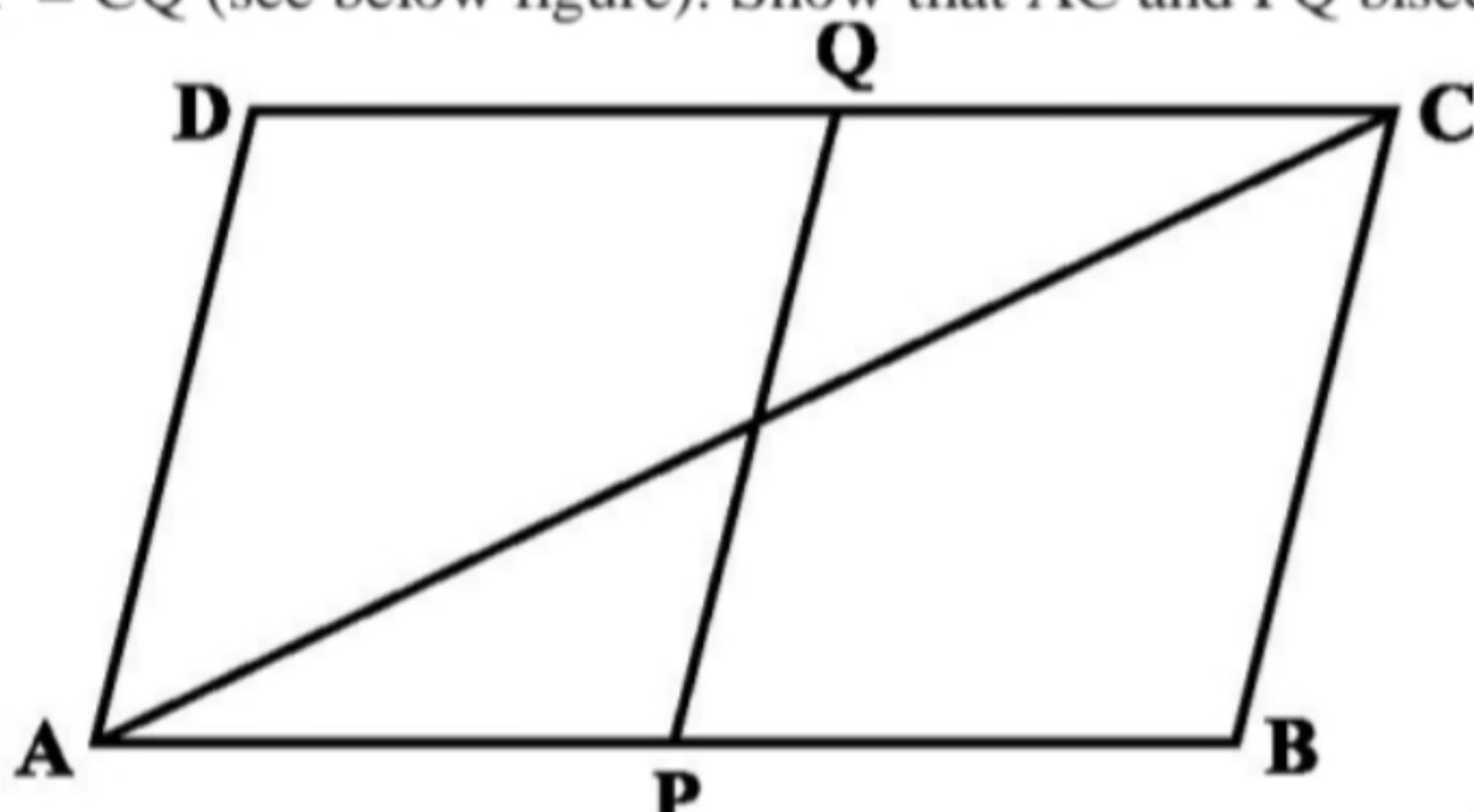


9. $\triangle ABC$ is right angle at B and P is the midpoint of AC and Q is any point on AB. Prove that (i) $PQ \perp AB$ (ii) Q is the midpoint of AB (iii) $PA = \frac{1}{2} AC$
10. The diagonals of a parallelogram ABCD intersect at O. A line through O intersects AB at X and DC at Y. Prove that $OX = OY$.
11. ABCD is a parallelogram. AB is produced to E so that $BE = AB$. Prove that ED bisects BC.
12. If ABCD is a quadrilateral in which $AB \parallel CD$ and $AD = BC$, prove that $\angle A = \angle B$.
13. Diagonals AC and BD of a parallelogram ABCD intersect each other at O. If $OA = 3$ cm and $OD = 2$ cm, determine the lengths of AC and BD.
14. In quadrilateral ABCD, $\angle A + \angle D = 180^\circ$. What special name can be given to this quadrilateral?
15. All the angles of a quadrilateral are equal. What special name is given to this quadrilateral?
16. In $\triangle ABC$, $AB = 5$ cm, $BC = 8$ cm and $CA = 7$ cm. If D and E are respectively the mid-points of AB and BC, determine the length of DE.
17. Diagonals of a quadrilateral ABCD bisect each other. If $\angle A = 35^\circ$, determine $\angle B$.

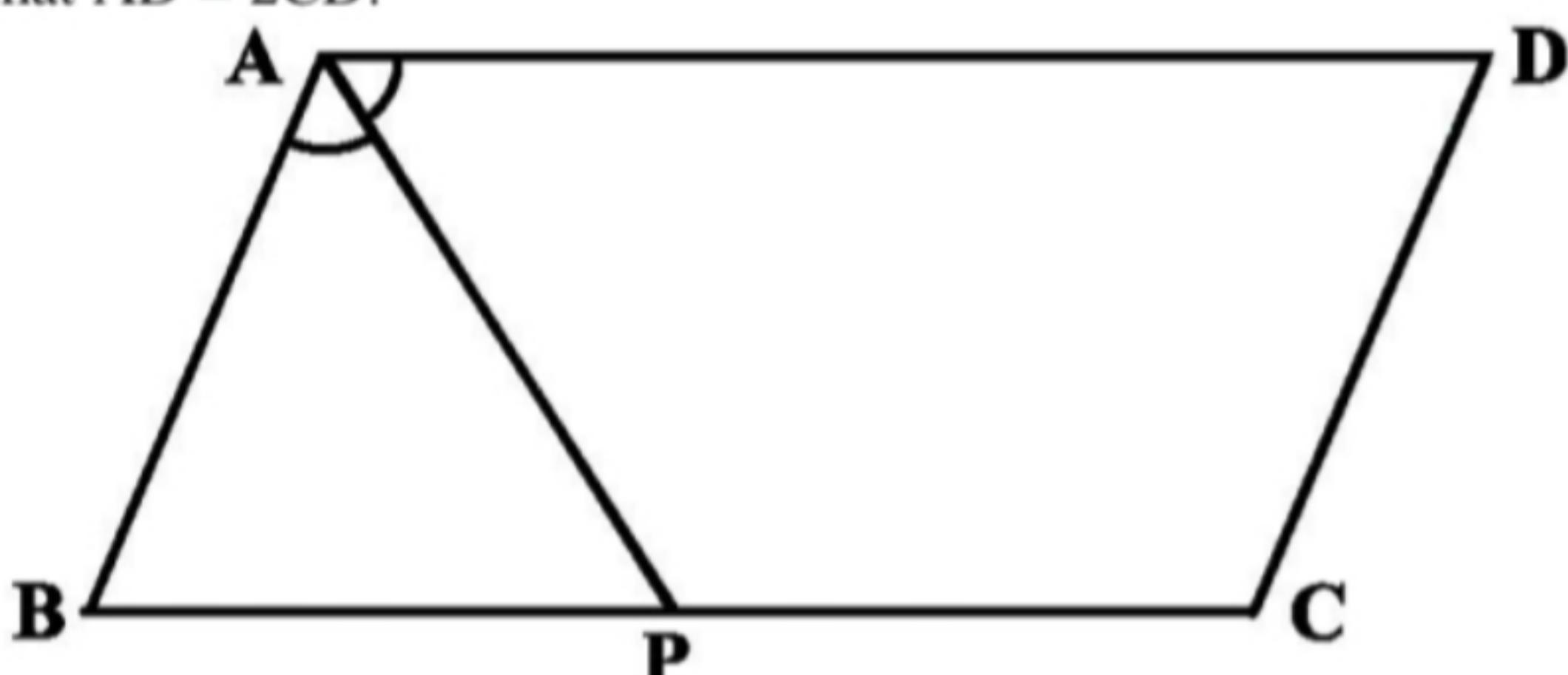
- 18.** Opposite angles of a quadrilateral ABCD are equal. If $AB = 4$ cm, determine CD.
- 19.** In the below figure, it is given that BDEF and FDCE are parallelograms. Can you say that $BD = CD$? Why or why not?
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- 20.** In the above right sided figure, ABCD and AEFG are two parallelograms. If $\angle C = 55^\circ$, determine $\angle F$.
- 21.** Angles of a quadrilateral are in the ratio $3 : 4 : 4 : 7$. Find all the angles of the quadrilateral.
- 22.** In the below figure, X and Y are respectively the mid-points of the opposite sides AD and BC of a parallelogram ABCD. Also, BX and DY intersect AC at P and Q, respectively. Show that $AP = PQ = QC$.
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- 23.** One angle of a quadrilateral is of 108° and the remaining three angles are equal. Find each of the three equal angles.
- 24.** ABCD is a trapezium in which $AB \parallel DC$ and $\angle A = \angle B = 45^\circ$. Find angles C and D of the trapezium.
- 25.** The angle between two altitudes of a parallelogram through the vertex of an obtuse angle of the parallelogram is 60° . Find the angles of the parallelogram.
- 26.** ABCD is a rhombus in which altitude from D to side AB bisects AB. Find the angles of the rhombus.
- 27.** E and F are points on diagonal AC of a parallelogram ABCD such that $AE = CF$. Show that BFDE is a parallelogram.
- 28.** ABCD is a parallelogram and $\angle DAB = 60^\circ$. If the bisectors AP and BP of angles A and B respectively, meet at P on CD, prove that P is the midpoint of CD.
- 29.** ABCD is a parallelogram. AM and BN are respectively, the perpendiculars from A and B to DC and CD produced. Prove that $AM = BN$.

- 30.** ABCD is a parallelogram. L and M are points on AB and DC respectively and $AL = CM$. Prove that LM and BD bisect each other.

- 31.** Points P and Q have been taken on opposite sides AB and CD, respectively of a parallelogram ABCD such that $AP = CQ$ (see below figure). Show that AC and PQ bisect each other.



- 32.** In the below figure, P is the mid-point of side BC of a parallelogram ABCD such that $\angle BAP = \angle DAP$. Prove that $AD = 2CD$.



- 33.** D, E and F are the mid-points of the sides BC, CA and AB, respectively of an equilateral triangle ABC. Show that $\triangle DEF$ is also an equilateral triangle.

- 34.** E is the mid-point of the side AD of the trapezium ABCD with $AB \parallel DC$. A line through E drawn parallel to AB intersect BC at F. Show that F is the mid-point of BC.

- 35.** PQ and RS are two equal and parallel line-segments. Any point M not lying on PQ or RS is joined to Q and S and lines through P parallel to QM and through R parallel to SM meet at N. Prove that line segments MN and PQ are equal and parallel to each other.

- 36.** Prove that “*If the diagonals of a quadrilateral bisect each other, then it is a parallelogram*”.

- 37.** Prove that “*A quadrilateral is a parallelogram if a pair of opposite sides is equal and parallel*”.

- 38.** Prove that “*A quadrilateral is a parallelogram if its opposite angles are equal*”.

- 39.** Show that the diagonals of a rhombus are perpendicular to each other.

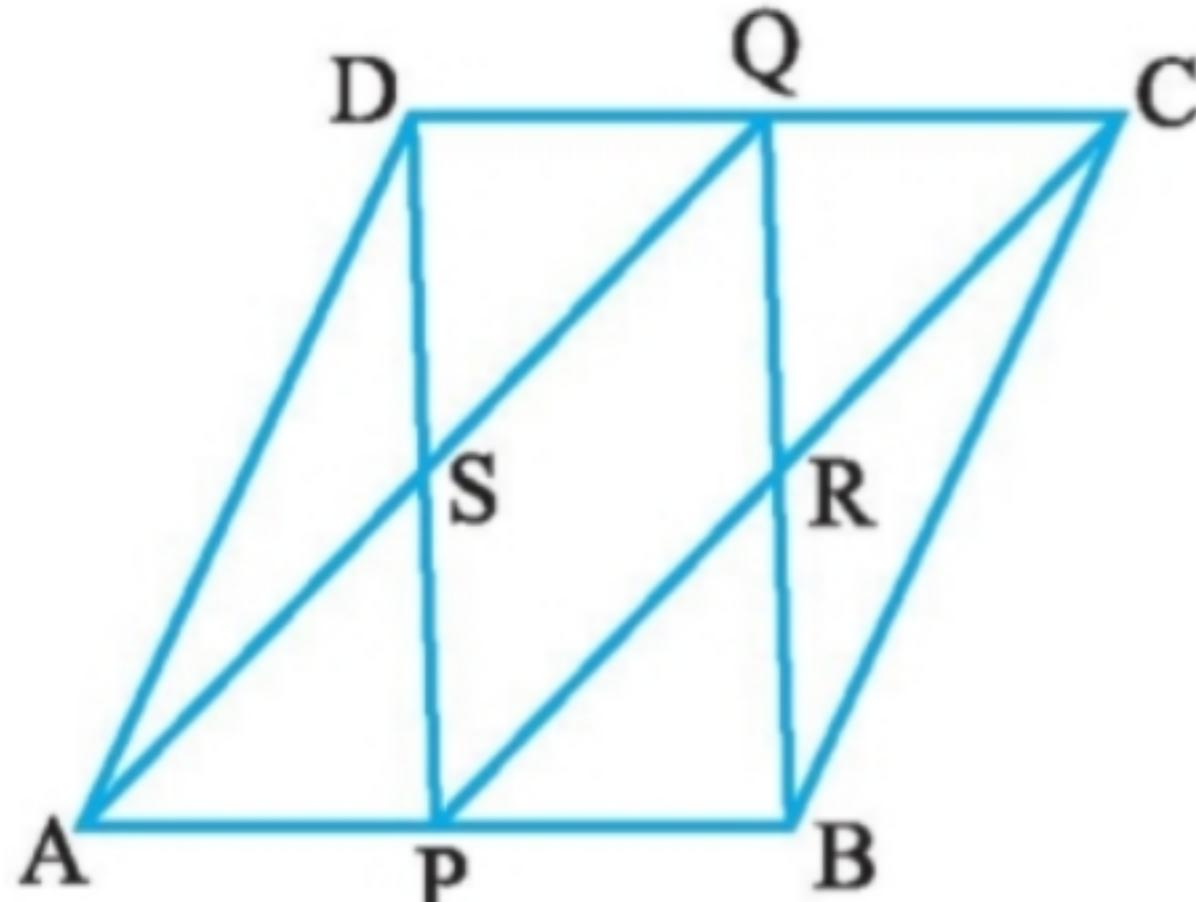
- 40.** Two parallel lines l and m are intersected by a transversal p . Show that the quadrilateral formed by the bisectors of interior angles is a rectangle.

- 41.** Show that the bisectors of angles of a parallelogram form a rectangle.

- 42.** If the diagonals of a parallelogram are equal, then show that it is a rectangle.

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

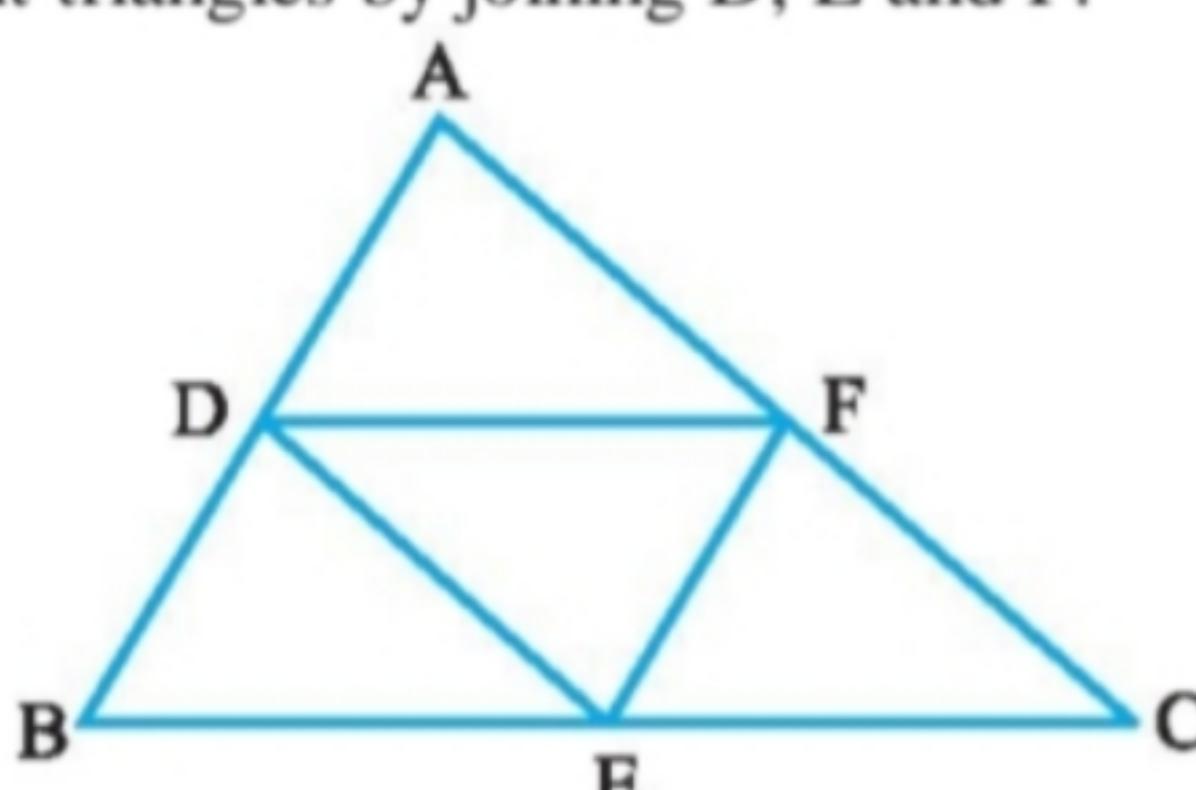
- 44.** Show that the diagonals of a square are equal and bisect each other at right angles.
- 45.** Show that if the diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a square.
- 46.** In the adjoining figure, ABCD is a parallelogram in which P and Q are mid-points of opposite sides AB and CD. If AQ intersects DP at S and BQ intersects CP at R, show that:
- APCQ is a parallelogram.
 - DPBQ is a parallelogram.
 - PSQR is a parallelogram.



- 47.** The angles of quadrilateral are in the ratio $3 : 5 : 9 : 13$. Find all the angles of the quadrilateral.
- 48.** Prove that “*The line segment joining the mid-points of two sides of a triangle is parallel to the third side and half of it*”.
- 49.** Prove that “*The line drawn through the mid-point of one side of a triangle, parallel to another side bisects the third side*”.
- 50.** Show that if the diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a square.
- 51.** ABCD is a rhombus and P, Q, R and S are the mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rectangle.

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

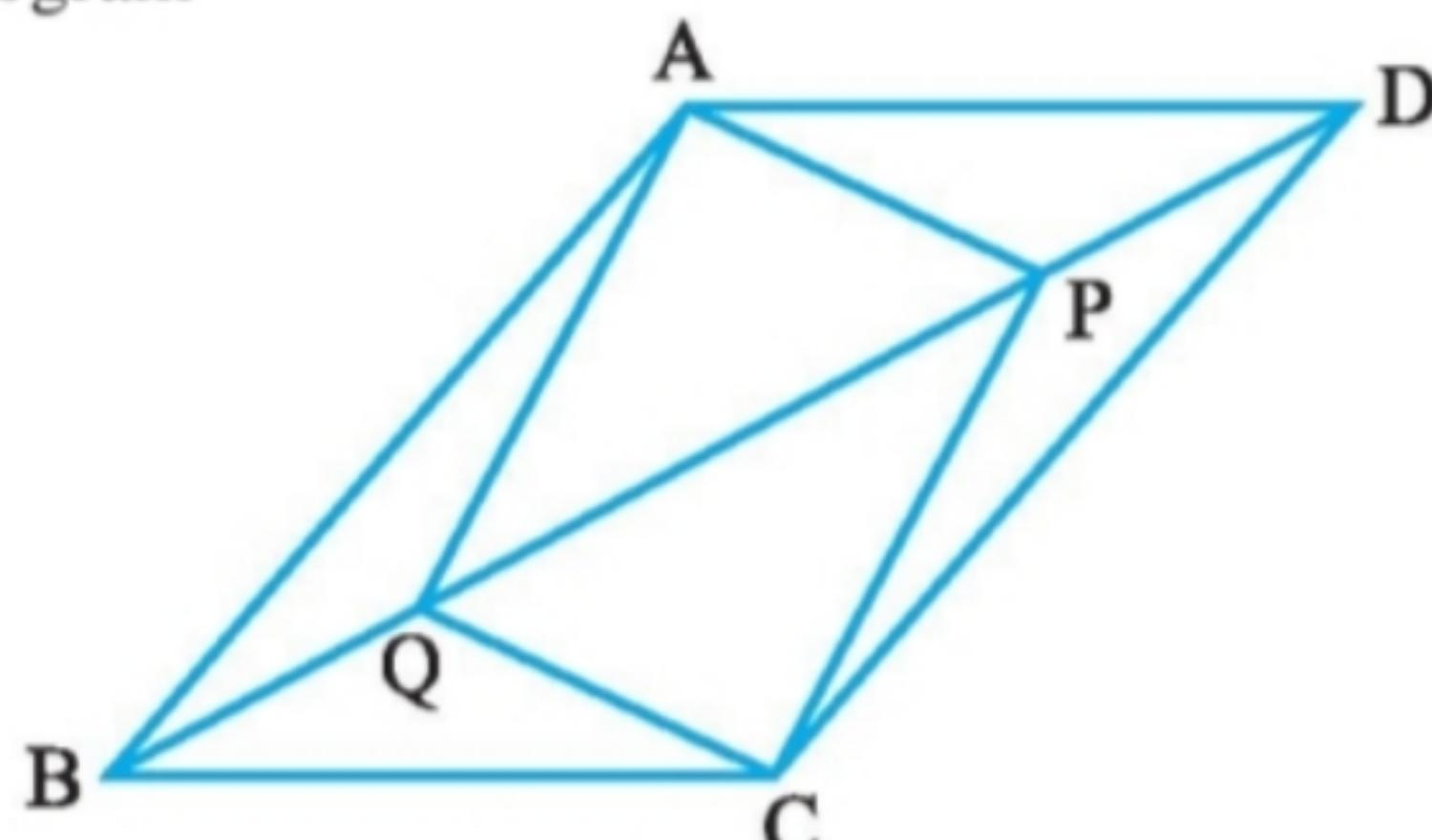
- 53.** In $\triangle ABC$, D, E and F are respectively the mid-points of sides AB, BC and CA. Show that $\triangle ABC$ is divided into four congruent triangles by joining D, E and F.



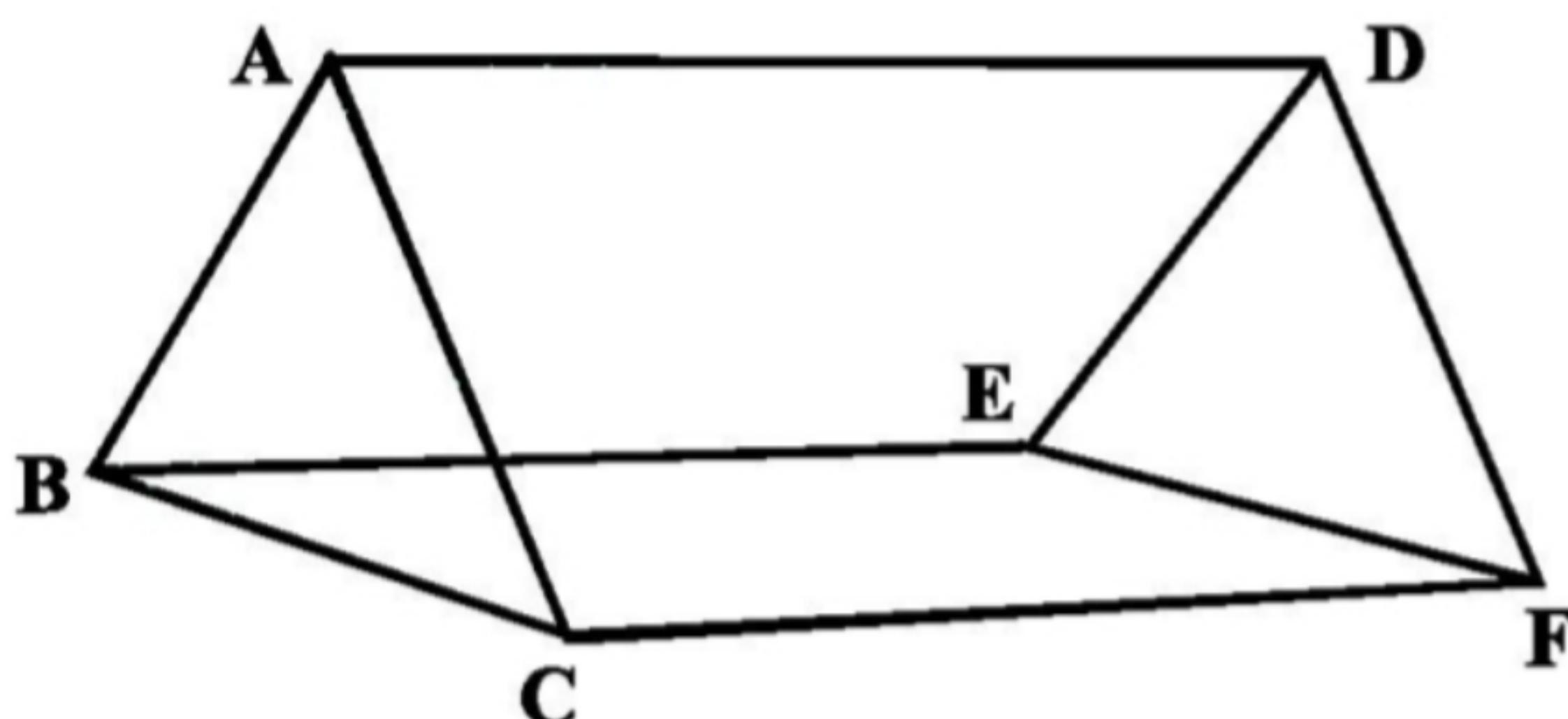
- 54.** Prove that the quadrilateral formed by joining the mid-points of the sides of a quadrilateral, in order, is a parallelogram.

55. l , m and n are three parallel lines intersected by transversals p and q such that l , m and n cut off equal intercepts AB and BC on p . Show that l , m and n cut off equal intercepts DE and EF on q .

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



57. In the below figure, $AB \parallel DE$, $AB = DE$, $AC \parallel DF$ and $AC = DF$. Prove that $BC \parallel EF$ and $BC = EF$.



58. A square is inscribed in an isosceles right triangle so that the square and the triangle have one angle common. Show that the vertex of the square opposite the vertex of the common angle bisects the hypotenuse.

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

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

61. E and F are respectively the mid-points of the non-parallel sides AD and BC of a trapezium ABCD. Prove that $EF \parallel AB$ and $EF = \frac{1}{2}(AB + CD)$

62. Prove that the quadrilateral formed by the bisectors of the angles of a parallelogram is a rectangle.

63. P and Q are points on opposite sides AD and BC of a parallelogram ABCD such that PQ passes through the point of intersection O of its diagonals AC and BD. Show that PQ is bisected at O.

64. ABCD is a rectangle in which diagonal BD bisects $\angle B$. Show that ABCD is a square.

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