



gradeup

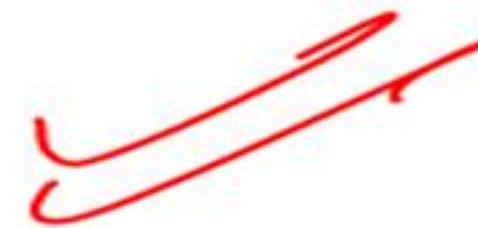
Sahi Prep Hai Toh Life Set Hai

QUADRILATERAL

Part-3

Agenda

*



Isosceles Trapezium }

+

Kite

(20-22) min

**

Practice Question

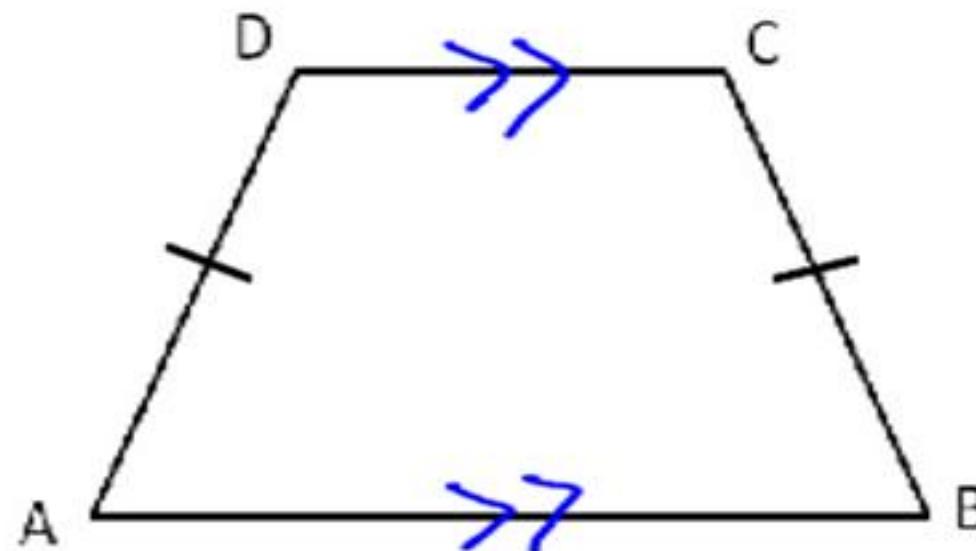
(12-15)



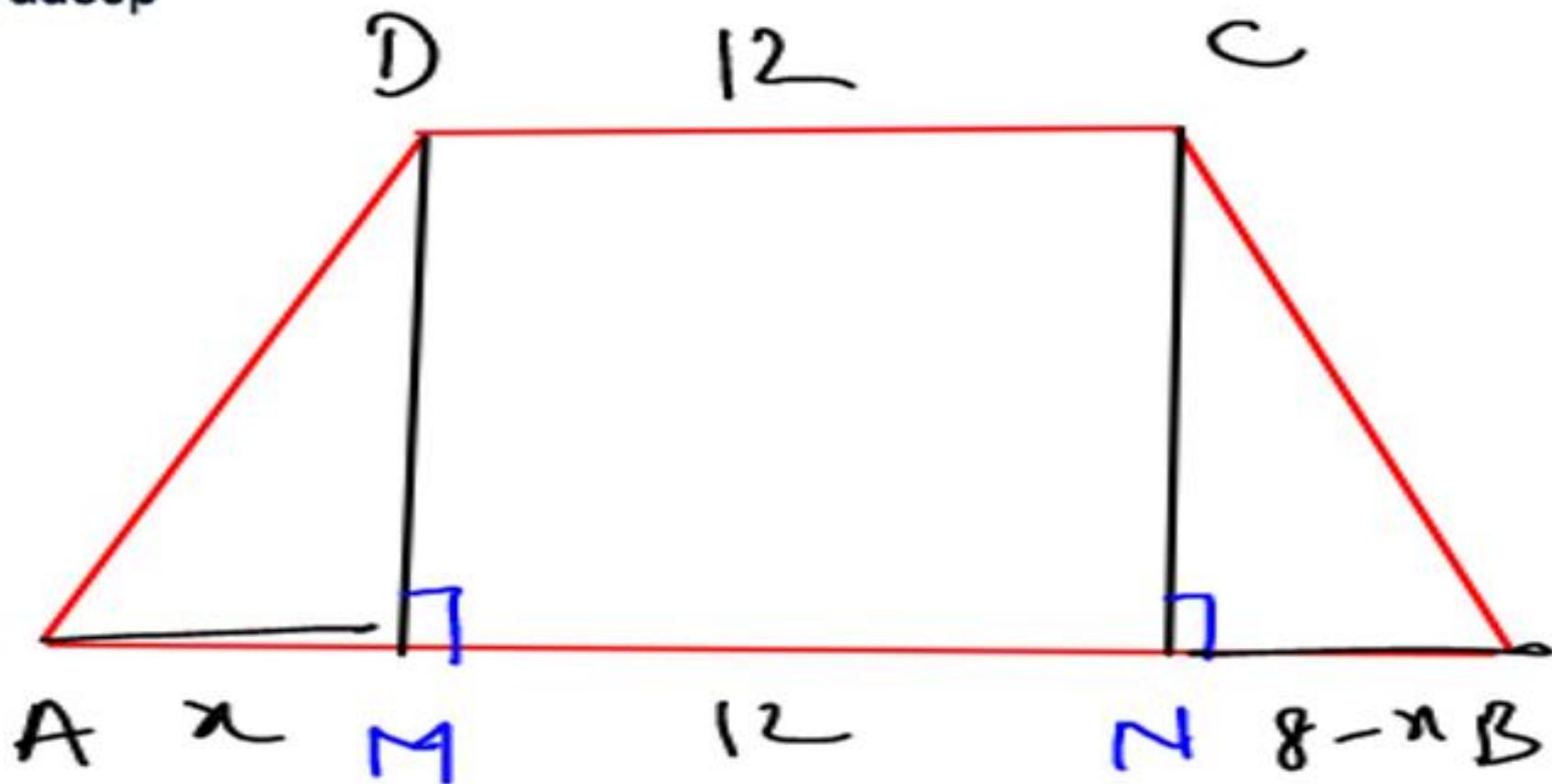
(70-75) min

ISOSCELES TRAPEZIUM

Def: A trapezium in which non-parallel sides are equal.



$$AD = BC$$



$ABCD$ is

a Trapezium

If: $AB = 20 \text{ cm}$

$CD = 12 \text{ cm}$

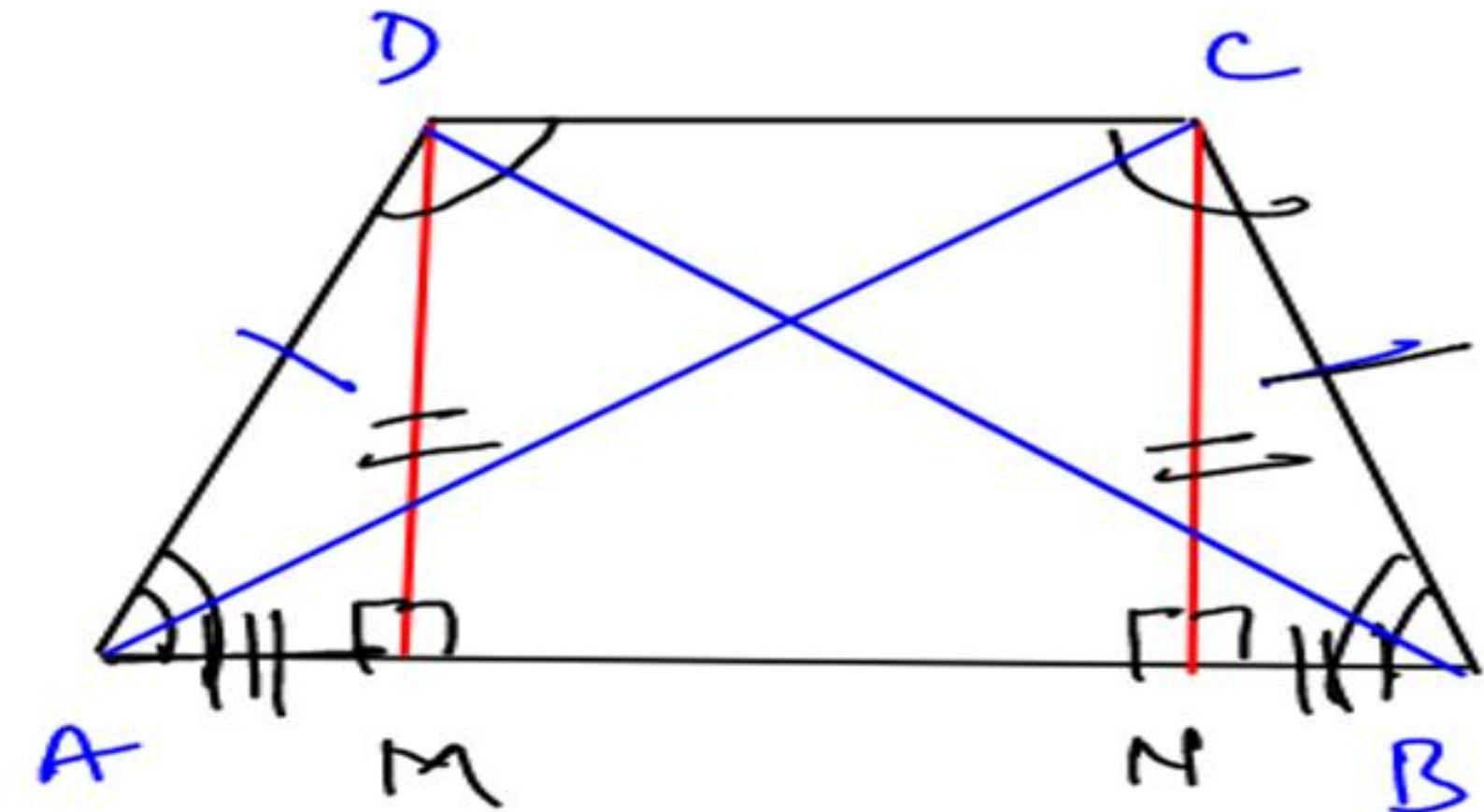
$\underline{BN = ??}$

A) $BN = 4$

B) $BN > 4$

C) $BN < 4$

D) Can't be determined



If $ABCD$ is an Isosceles Trapezium

Def: $\frac{(i)}{=} \boxed{AD = BC}$

$\Delta ADM \sim \Delta BCN$

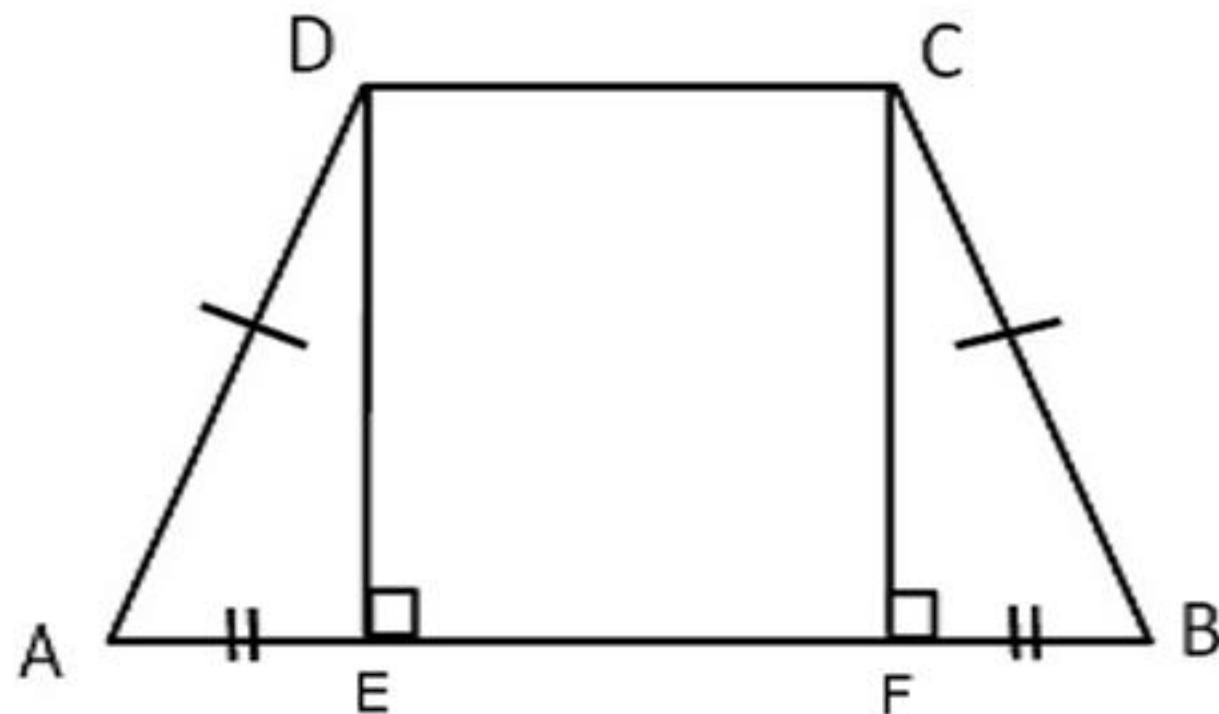
$$(i.) \angle A = \angle B$$

$$\angle C = \angle D$$

$$(ii) AC = BD$$

$$(iii) \overline{AM} = \overline{BN}$$

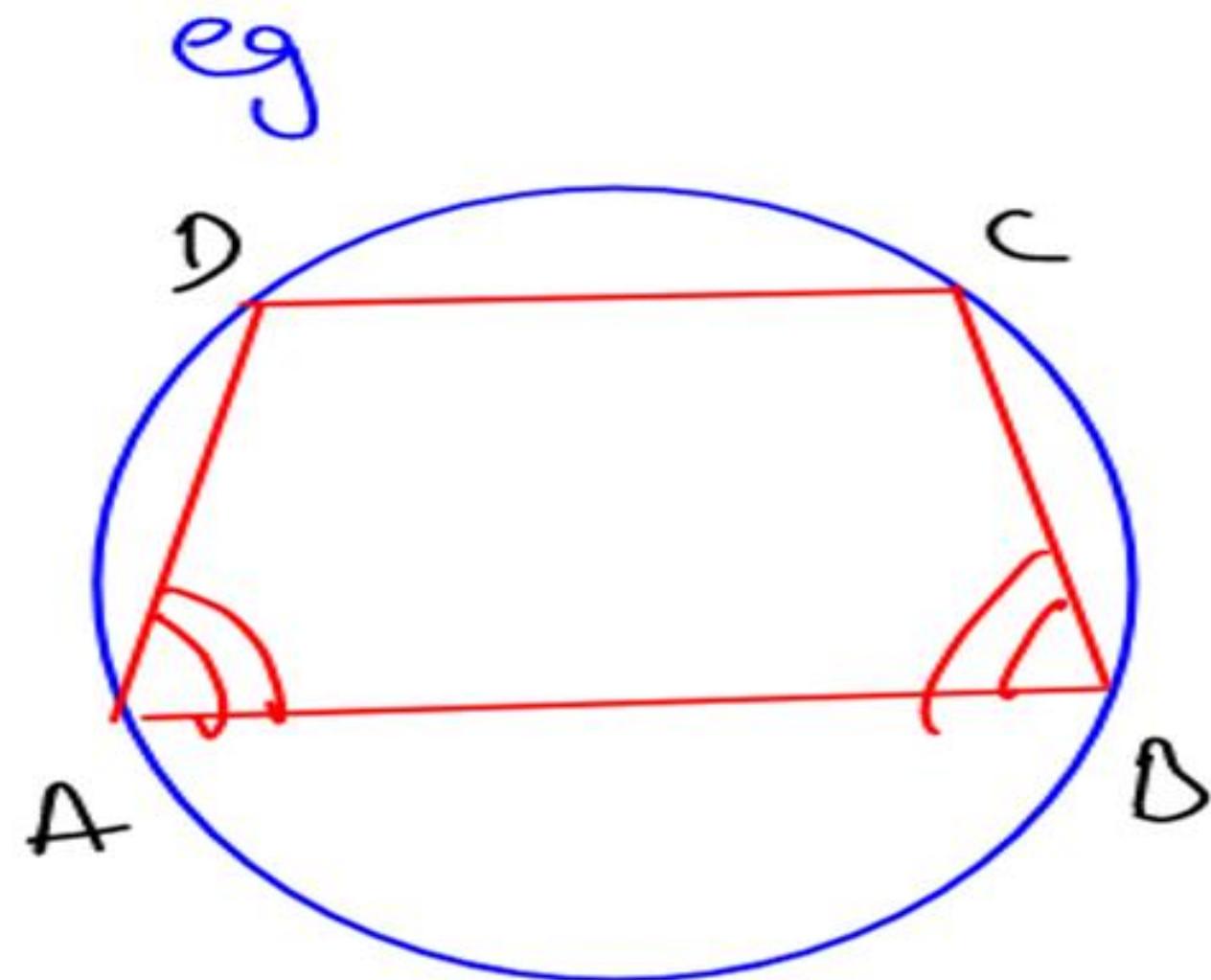
$$\Delta ADM \cong \Delta BCN$$



In Isosceles trapezium where $AB \parallel CD$

- (1) $AD = BC$
- (2) $AE = BF$
- (3) $AC = BD$
- (4) $\angle D = \angle C$
- (5) $\angle A = \angle B$

$$\angle A + \angle D = \angle B + \angle C = 180^\circ$$



If ABCD is
a Trapezium

$$\angle A = 72^\circ$$

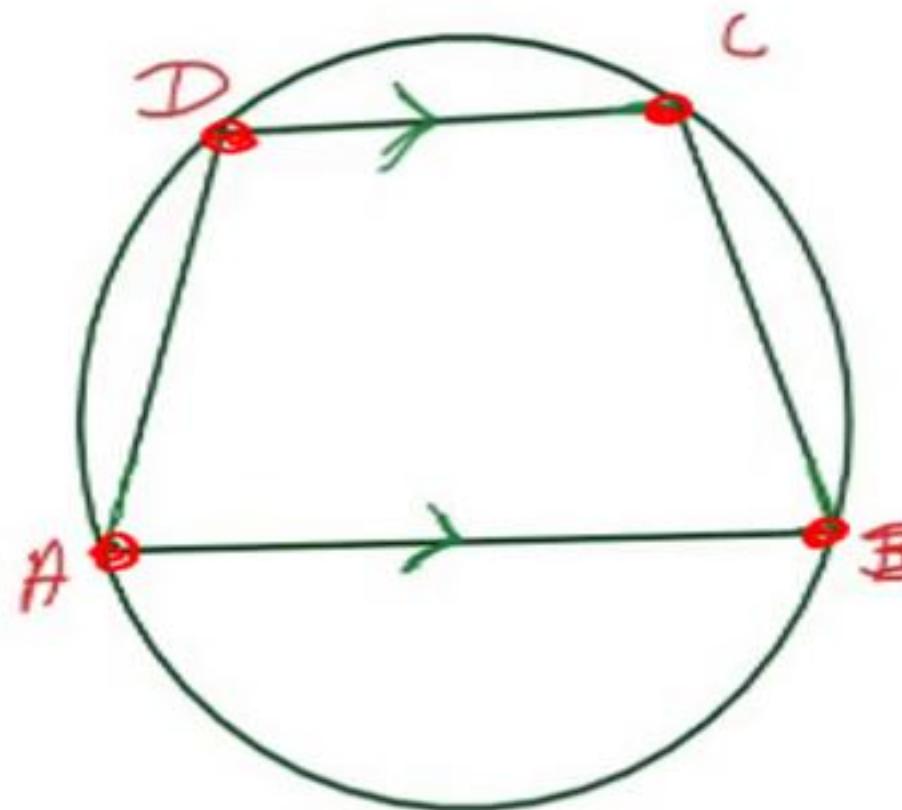
$$\angle B = ??$$

$$\rightarrow 72^\circ$$

✓

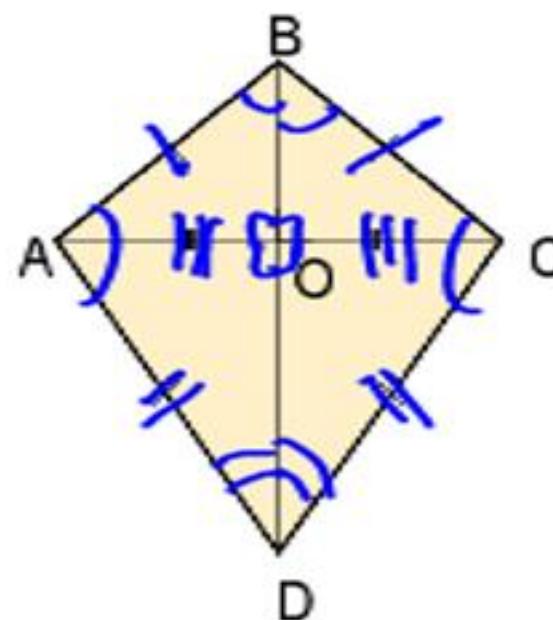
Cyclic trapezium is always an Isosceles Trapezium.

v.AK



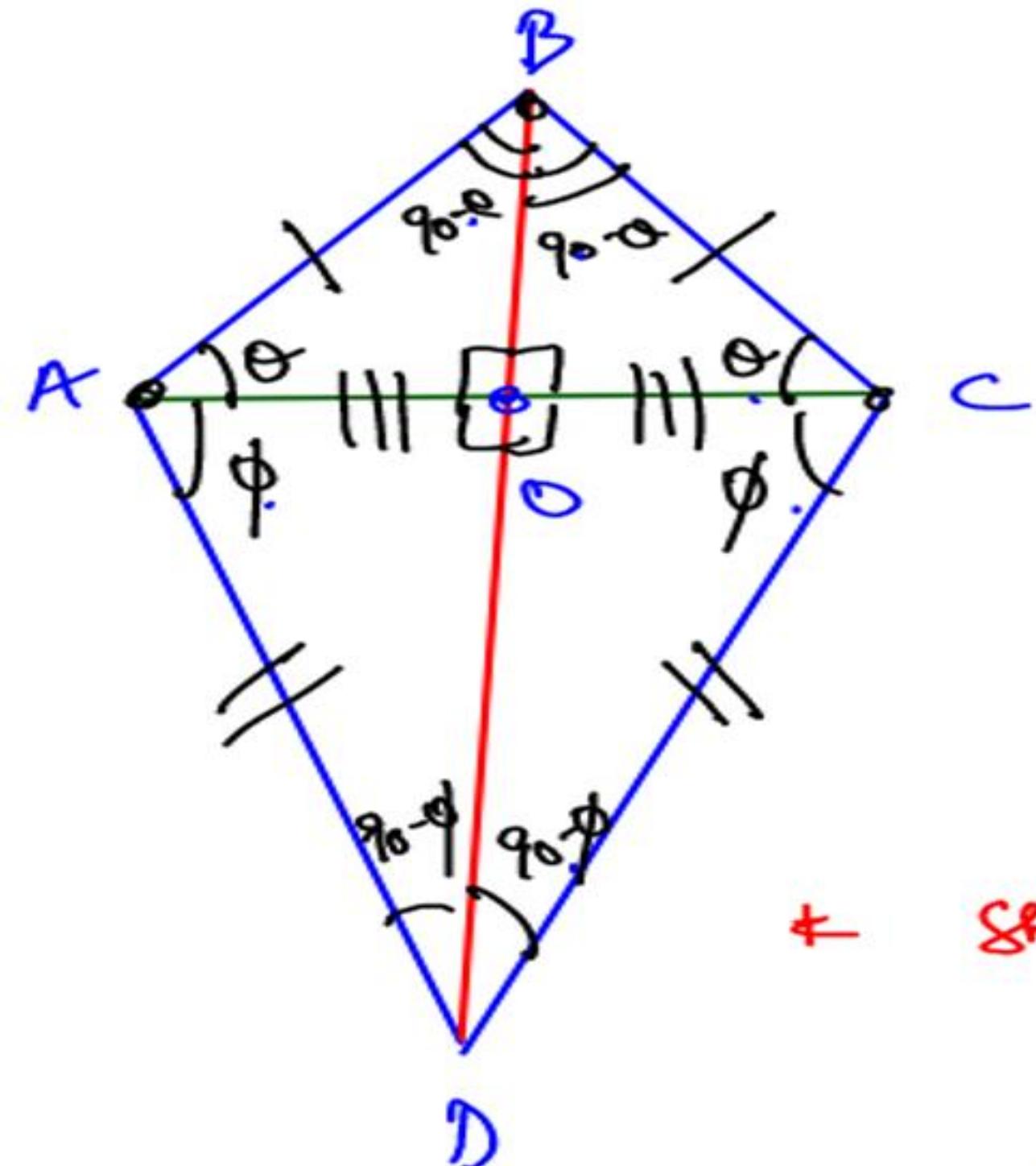
KITE

Kite is a quadrilateral in which two pairs of adjacent sides are of equal length and the diagonals intersect each other at right angles.



- (1) $AB = BC$
 $AD = CD$
- (2) $\angle AOB = \angle BOC = \angle COD = \angle DOA = 90^\circ$
- (3) $AO = OC$ (The longer diagonal bisects the shorter diagonal.)
- (4) $\angle A = \angle C$

Area of Kite = $\frac{1}{2} D_1 D_2$



(i)

$$AB = BC$$

$$AD = DC$$

(i.) $\angle AOB = \angle BOC = \angle COD = \angle DOA$
 $= 90^\circ$

(ii.)

$$AO = CO$$

* shorter diagonal is bisected by longer diagonal

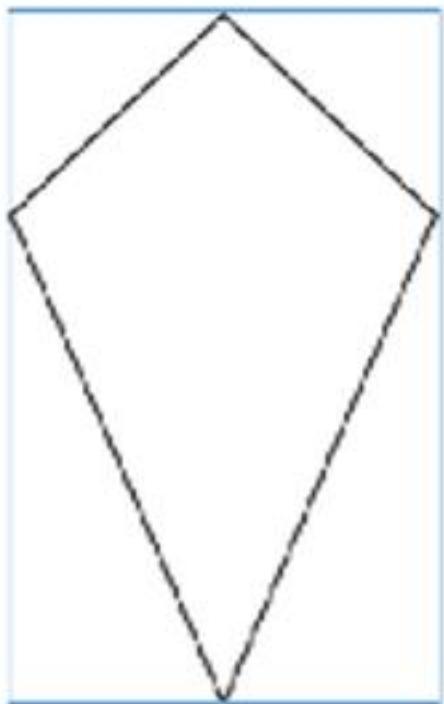
(iii)

$$\angle A = \angle C \Rightarrow BD \text{ is}$$

Angle Bisector



Eg. The area of the rectangle is 80 cm², what is the area of the kite?



$$\text{lb} \longrightarrow$$

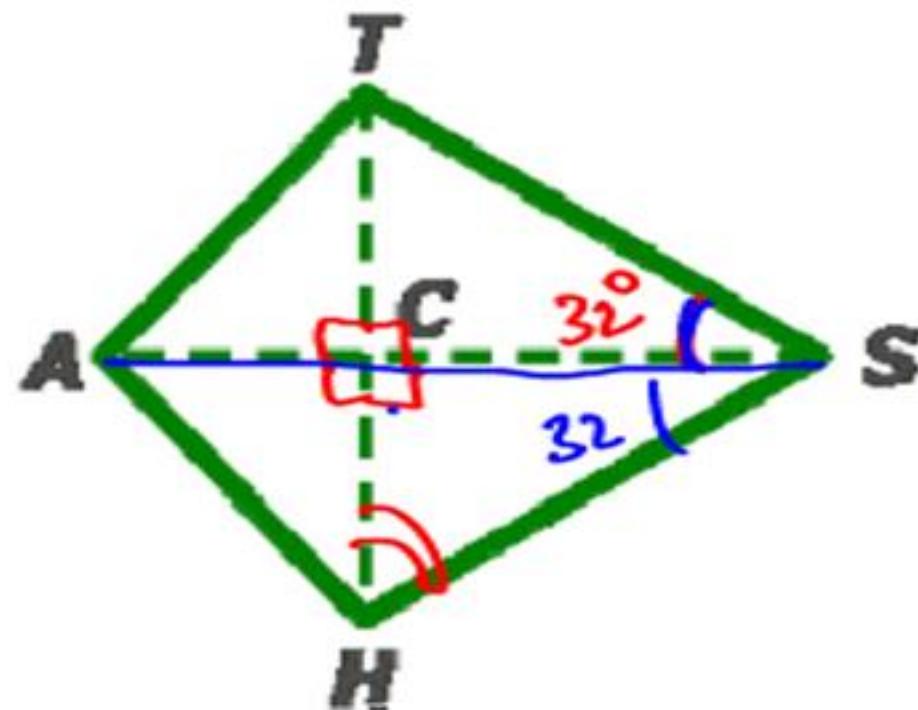
$$l \cdot b = 80 \text{ cm}^2$$

Area of kite = $\frac{1}{2} D_1 D_2$

$$\frac{1}{2} l \cdot b$$

$$\begin{aligned}\frac{1}{2} \cdot 80 \\ = 40 \text{ cm}^2\end{aligned}$$

Eg. HATS is a kite with diagonals that intersect at C. $\angle TSC = 32^\circ$.
Find $\angle SHC$.



$$90 + 32 + \angle SHC = 180$$

$$\angle SHC = \underline{\underline{58^\circ}}$$

PRACTICE QUESTIONS



Q1. In quadrilateral ABCD, producing side BA and DC at E and F and $\angle ABC = x^\circ$, $\angle ADC = y^\circ$, $\angle BCF = a^\circ$, $\angle DAE = b^\circ$ then $x + y = ?$

- (a) $a + b$
- (b) $2a + b$
- (c) $2b + a$
- (d) $a + 3b$

Ans. (a)

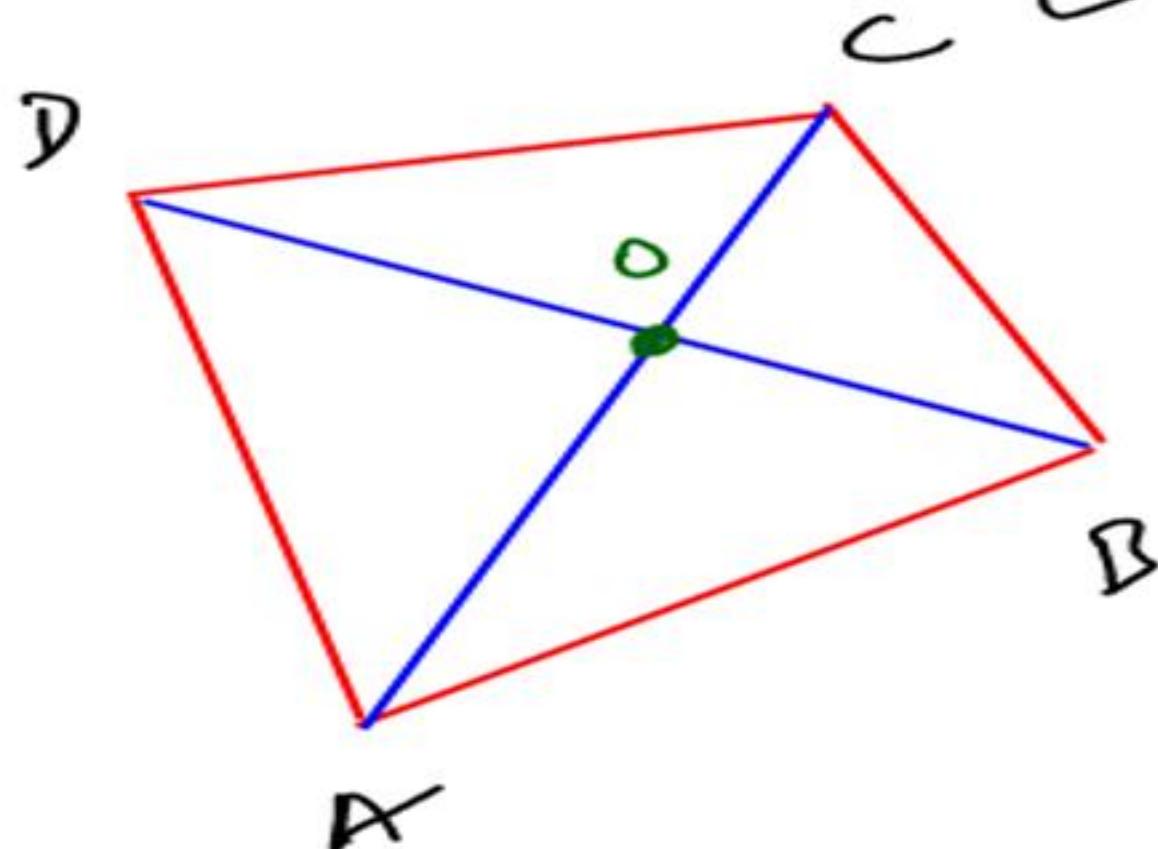
Q2.

ABCD is a quadrilateral in which AC and BD are diagonals and diagonals intersect at O, then : $AB + BC + CD + DA > 2(AC + BD)$

- (a) $> 2(AC + BD)$
 (c) $< 2(AC + BD)$

- (b) $> AC + BD$
 (d) Both b & c

P7Q9 SSC
Time \rightarrow 90sec



$\triangle ABC$

$$AB + BC > AC \quad \text{--- (1)}$$

$\triangle BCD$

$$BC + CD > BD \quad \text{--- (2)}$$

$\triangle CDA$

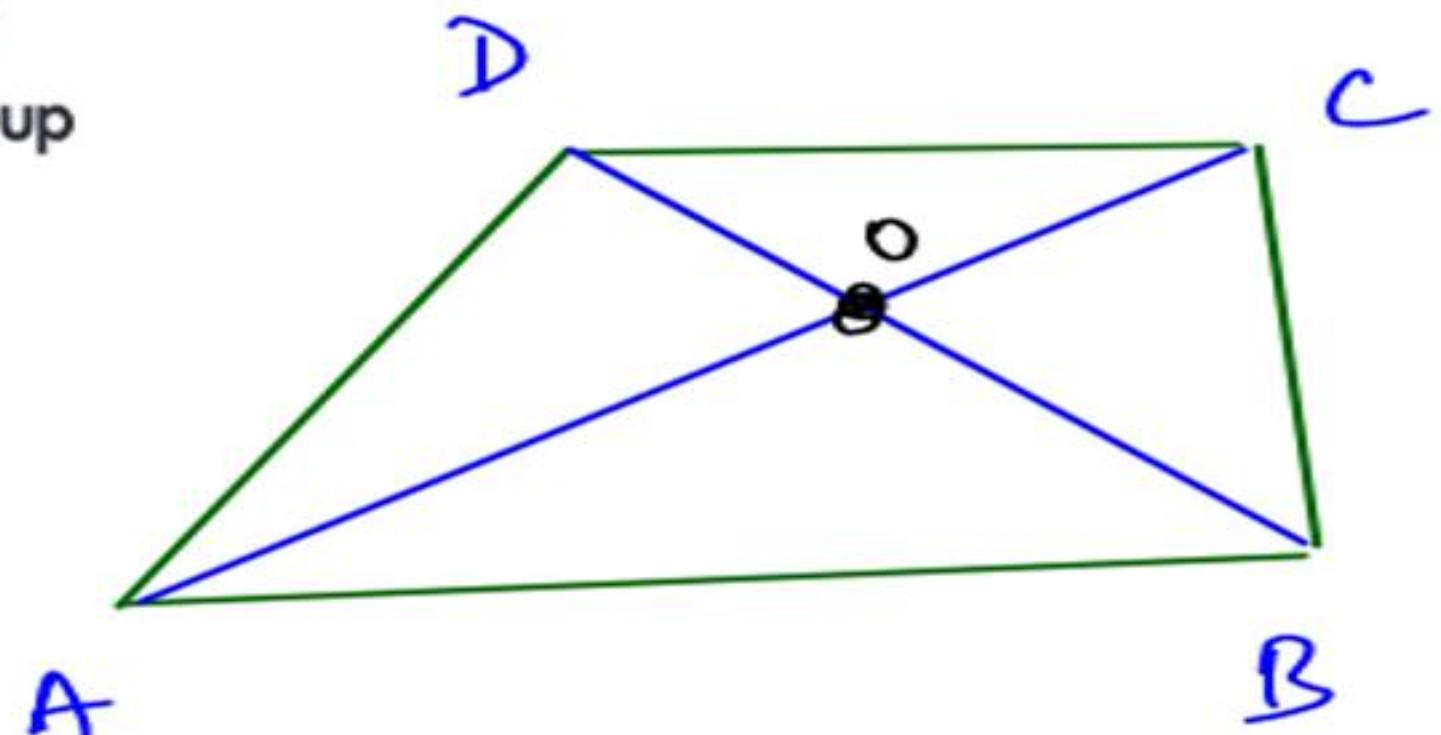
$$CD + DA > CA \quad \text{--- (3)}$$

$\triangle DAB$

$$DA + AB > DB \quad \text{--- (4)}$$

$$\cancel{(AB + BC + CD + DA)} > \cancel{(AC + BD)}$$

$$AB + BC + CD + DA > AC + BD$$


 $\triangle AOB$

$$\underline{AO} + \underline{BO} ? AB$$

 $\triangle BOC$

$$\underline{BO} + \underline{CO} ? BC$$

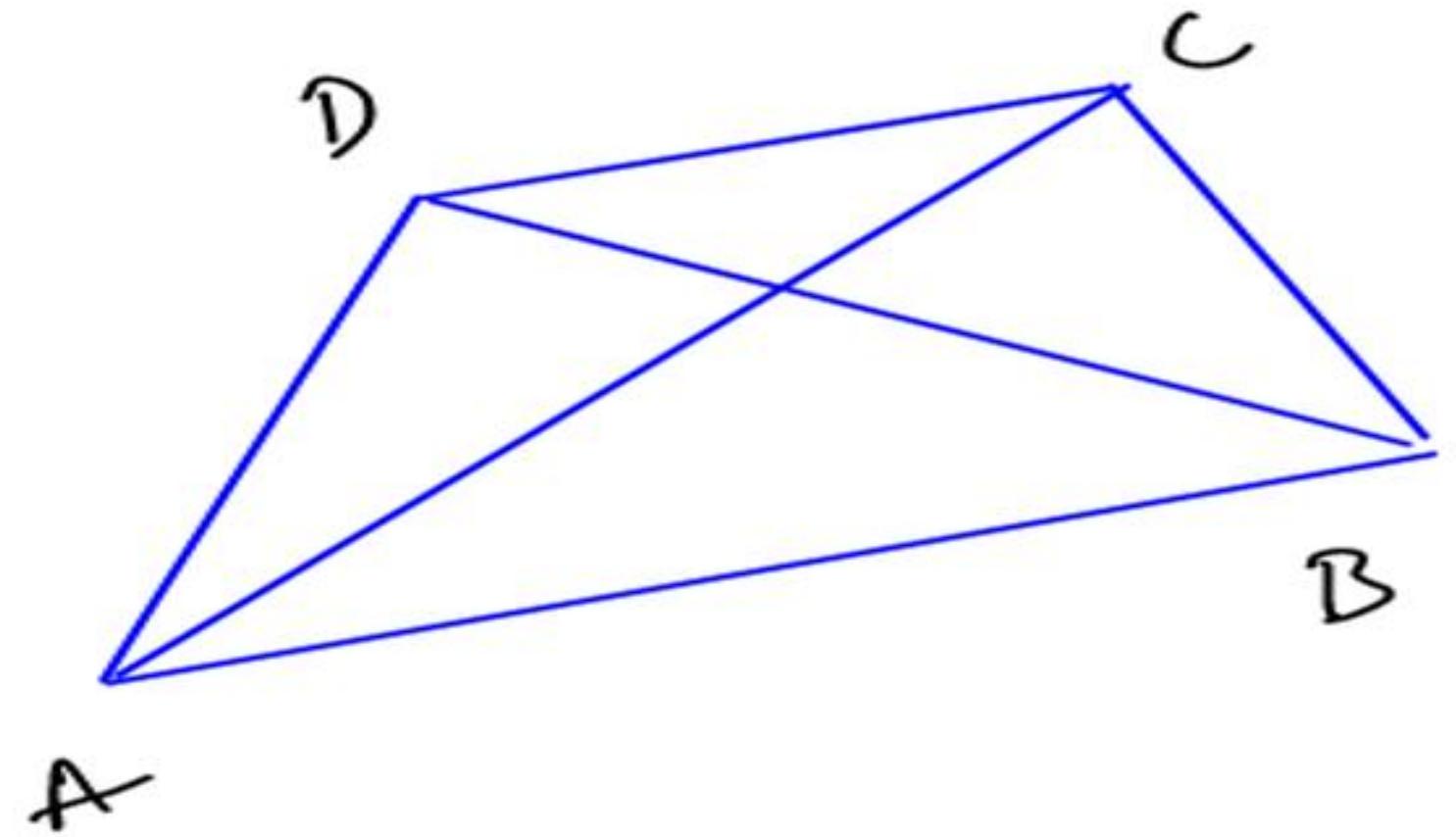
 $\triangle COD$

$$\underline{CO} + \underline{DO} ? CD$$

 $\triangle DOA$

$$\underline{DO} + \underline{AO} ? AD$$

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

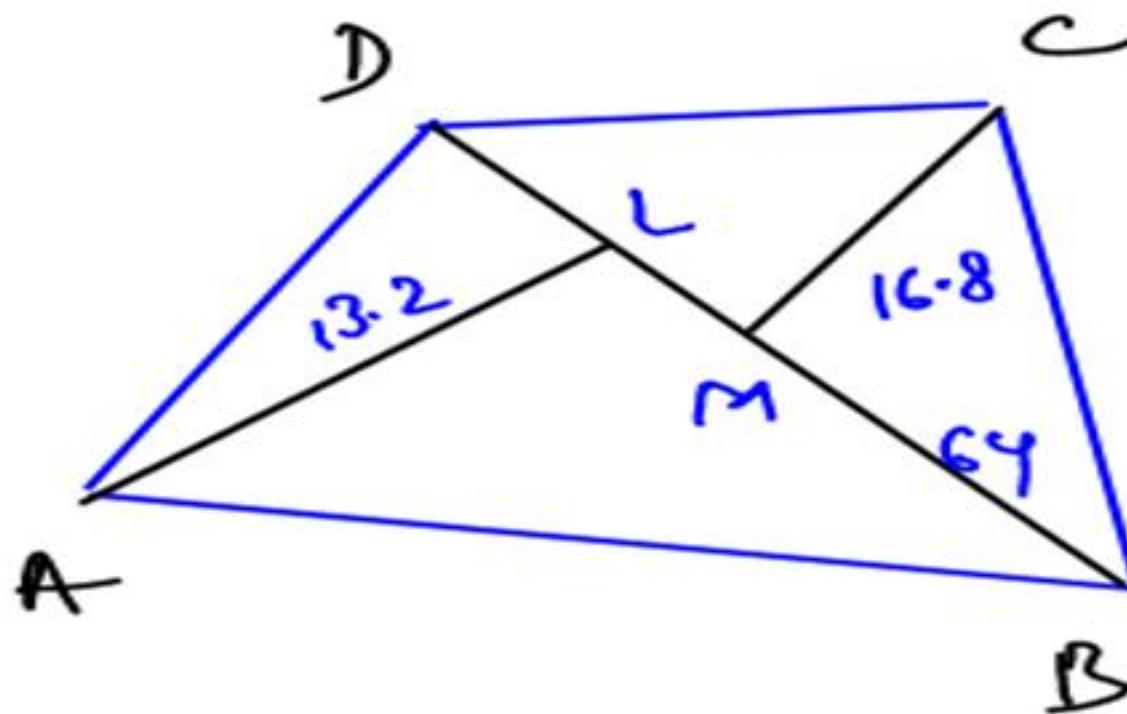


for Any Quad

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

Ans. (d)

Q3. ABCD is a quadrilateral in which diagonal $BD = 64$ cm, $AL \perp BD$ and $CM \perp BD$, $AL = 13.2$ cm and $CM = 16.8$ cm, Find the area of ABCD (in cm^2)?



$$\begin{aligned}
 \text{Area of quad} &= \frac{1}{2} \times 64 \times [13.2 + 16.8] \\
 &= 32 \times 30 \\
 &\underline{\qquad\qquad\qquad} \\
 &= 960 \text{ cm}^2
 \end{aligned}$$

Ans. (d)



- Q4.** The ratio of angles of a quadrilateral in order is $1 : 2 : 3 : 4$ then the quadrilateral is :
- (a) Parallelogram
 - (b) Rectangle
 - (c) Rhombus
 - (d) Trapezium

Ans. (d)

Q5. ABCD is quadrilateral in which AB is greatest side and CD is smallest side then-

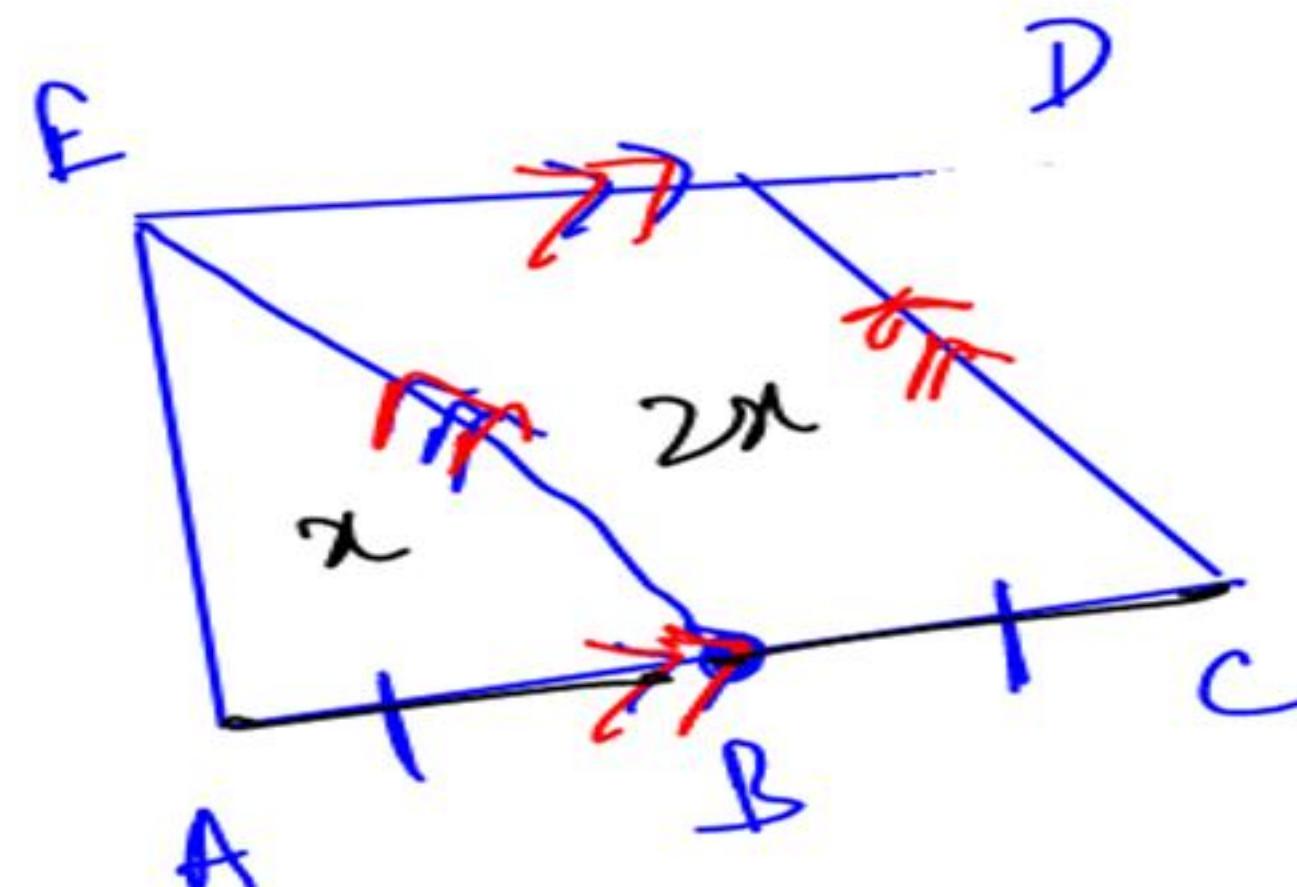
- (a) $\angle C > \angle A, \angle D > \angle B$ (b) $\angle C > \angle B, \angle A > \angle D$
- (c) $\angle C > \angle D, \angle A > \angle B$ (d) $\angle C > \angle D, \angle B > \angle A$

Ans. (a)

Q6. Area of a quadrilateral ACDE is 36 cm^2 . If B is the mid point of AC. Find the area ΔABE if $AC \parallel DE$ and $BE \parallel DC$

- (a) 10 cm^2
- (b) 9 cm^2
- (c) 12 cm^2
- (d) Can't be determined

Pyo of ~~SSC~~



$EDCB \rightarrow$ Parallelogram

A_{BE}

$$\frac{\text{area of } \triangle ABE}{\text{area of parallelogram BCDE}} = \frac{1}{2}$$

area of parallelogram BCDE

$$3x \rightarrow 36 \text{ cm}^2$$

$$x \rightarrow 12 \text{ cm}$$

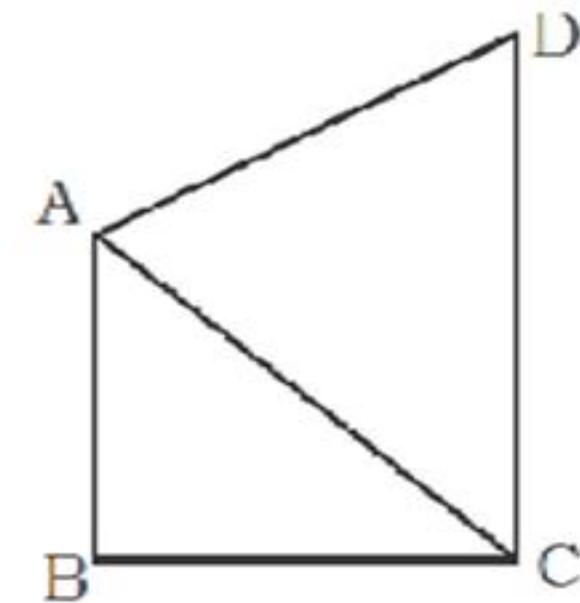
Ans. (c)

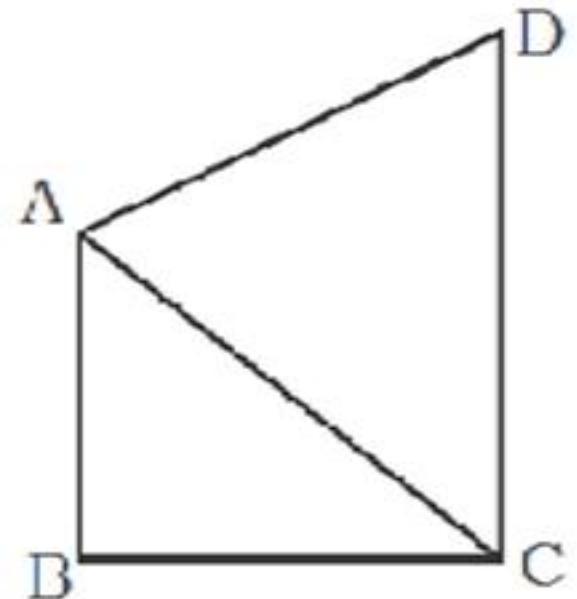


Q7. In the quadrilateral ABCD, $\angle B = 90^\circ$ and $AD^2 = AB^2 + BC^2 + CD^2$, then find the measure of $\angle ACD$

- (a) 45°
- (c) 90°

- (b) 60°
- (d) 30°



Ans. (c)

Q8.

ABCD is a quadrilateral. A line from D parallel to diagonal AC is cut at

V. Amb

P of extended part of line BC. Find $\frac{\text{Area of } \triangle ABP}{\text{Area of } \square ABCD}$

Time 90 sec

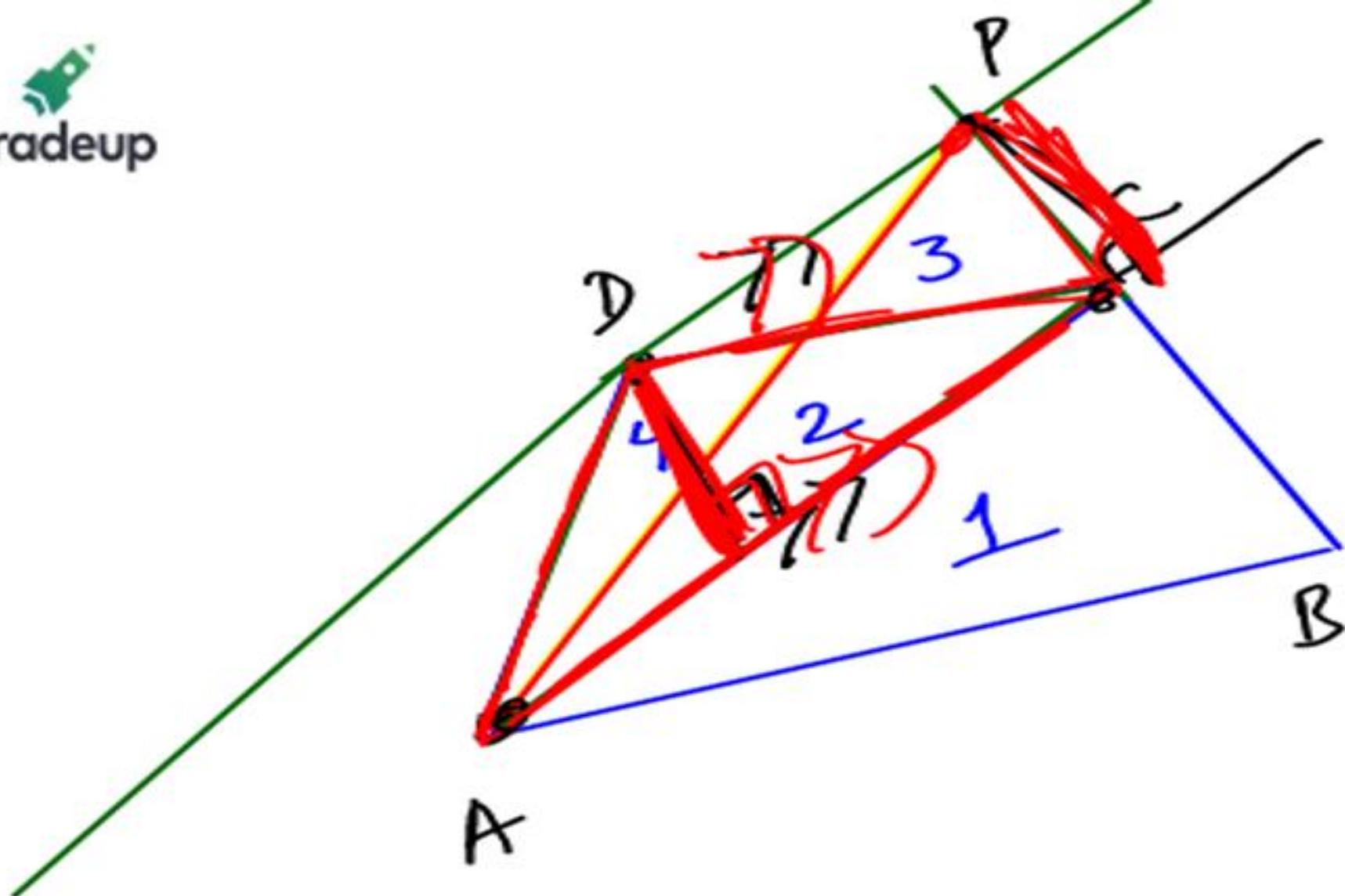
(a) 1

(b) $\frac{1}{2}$

(c) $\frac{2}{1}$ (d)

$\frac{1}{4}$





$\frac{\text{area of } \triangle ABP}{\text{area of quad } ABCD}$

$$\frac{\Delta(1+2+3)}{\Delta(1+2+4)} = \frac{1}{1}$$

$$\triangle ACP \rightarrow \triangle ACD$$

Both are on the same base AC
& b/w same parallel

Ans. (a)

Q9. In a parallelogram ABCD, one side $AB = 24$ cm and second side $AD = 16$ cm. Distance between AB and DC is 10 cm. Therefore, distance between AD and BC will be ?

- (a) 16 cm
- (b) 18 cm
- (c) 15 cm
- (d) 26 cm

Ans. (c)

Q10.

The length of the diagonal BD of the parallelogram ABCD is 18 cm. If P and Q are the centroid of the $\triangle ABC$ and $\triangle ADC$ respectively then the length of the line segment PQ is :

- (a) 4 cm
- (b) 6 cm
- (c) 6 cm
- (d) 12 cm

Ans. (b)

Q11. The adjacent sides of a parallelogram are 12 cm and 8 cm and its one diagonal is 10 cm then other diagonal is :

- (a) 7.68 cm
- (b) 10 cm
- (c) ~~$2\sqrt{79}$~~ cm
- (d) 13 cm

$$D_1^2 + D_2^2 = 2(x^2 + y^2)$$

$$100 + D_2^2 = 2(144 + 64)$$

$$D_2^2 = 316$$

$$D_2 = \sqrt{316} \\ = 2\sqrt{79}$$

Ans. (c)



Q12. Diagonals of a parallelogram are 10 cm and 24 cm respectively. If one of side is 13 cm, then the area of parallelogram is :

- (a) 60 cm^2
- (b) 120 cm^2
- (c) 130 cm^2
- (d) 240 cm^2

Ans. (b)

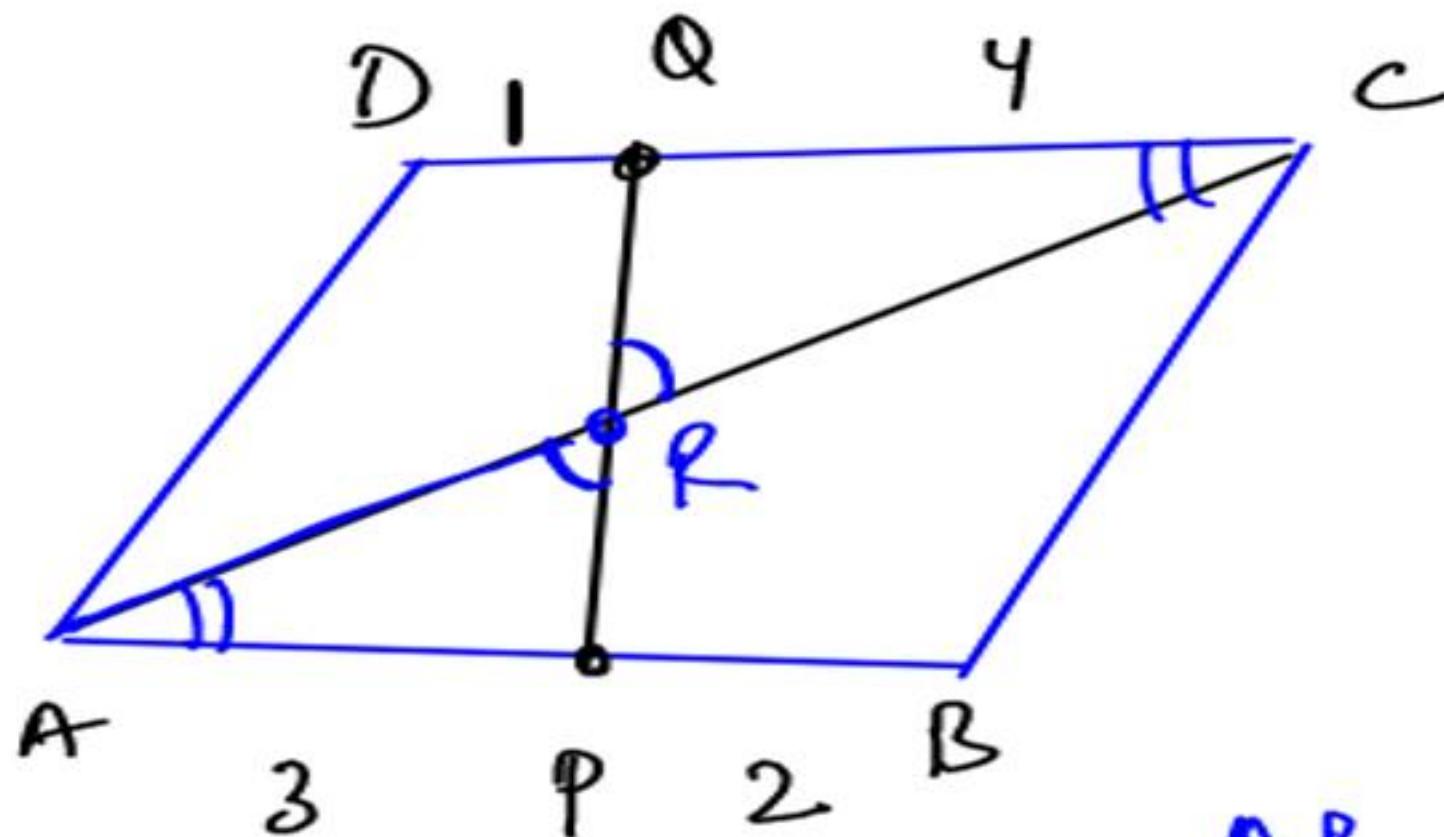
Q13. ABCD is a parallelogram AB is divided at P and CD at Q so that AP : PB = 3 : 2 and CQ : QD = 4 : 1 if PQ meets AC at R then AR =

(a) $\frac{2}{7} AC$

(b) $\frac{3}{7} AC$

(c) $\frac{4}{7} AC$

(d) $\frac{5}{7} AC$



$$\triangle ARP \sim \triangle CRQ$$

$$\frac{AR}{CR}$$

$$= \frac{AP}{CQ}$$

$$= \frac{3}{4}$$

$$\frac{AR}{AC} = \frac{3}{7}$$

$$AR = \frac{3}{7} AC$$

$$\left\{ \begin{array}{l} AR \rightarrow 3 \\ CR \rightarrow 4 \\ AC \rightarrow 7 \end{array} \right.$$

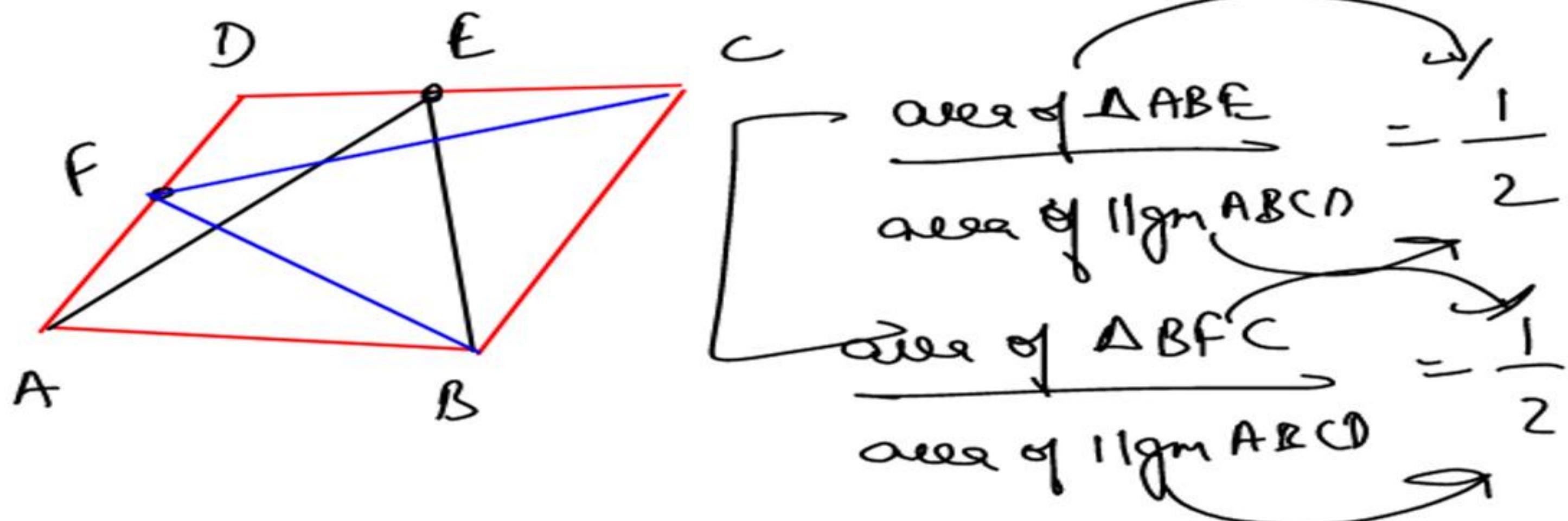
Ans. (b)

Q14. ABCD is a parallelogram. If E and F are two points situated on side DC and AD respectively. A_1 and A_2 are the area of $\triangle AEB$ and $\triangle BFC$, then -

PYQ

gssc

- (a) ~~$A_1 = A_2$~~ (b) $A_1 = 2A_2$ (c) $2A_1 = A_2$ (d) $2A_1 = 3A_2$



Ans. (a)

Q15. ABCD is a parallelogram in which diagonals AC and BD intersect at O. If E, F G and H are the mid points of AO, DO, CO and BO respectively, then the ratio of the perimeter of the quadrilateral EFGH to the perimeter of parallelogram ABCD is :

- (a) 1 : 4
- (b) 2 : 3
- (c) 1 : 2
- (d) 1 : 3

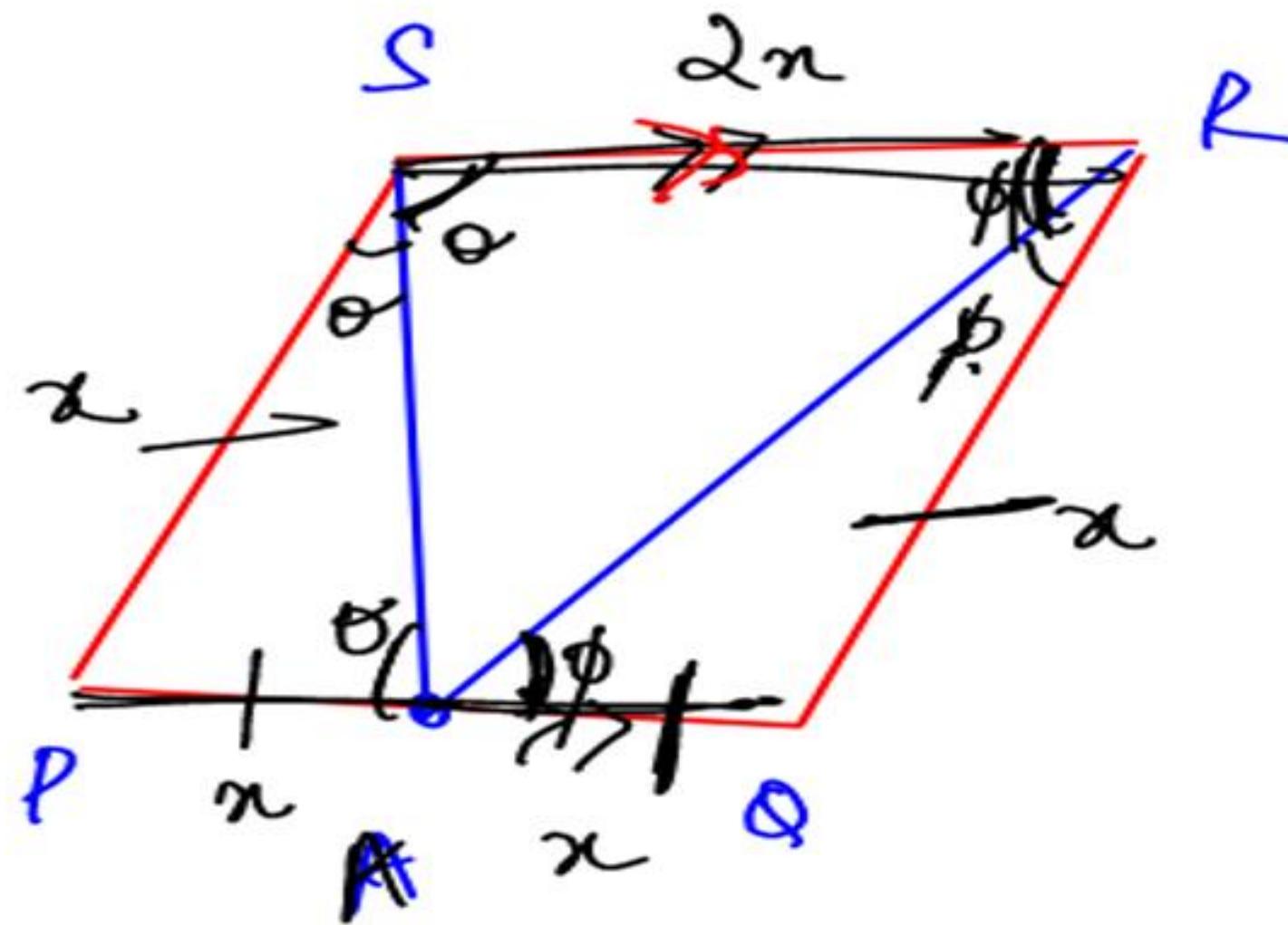
Ans. (c)

Q16. PQRS is a parallelogram. A is point on side PQ. Joining SA and RA such that it bisects $\angle PSR$ and $\angle QRS$, then SR is equal to -

- (A) $2PQ$
- (C) QR

- (B) ~~$2QR$~~
- (D) $4PQ$

Time 90sec



$\triangle RAO$

$$\overline{AO} = \overline{QR}$$

$\triangle PAS$

$$\overline{PS} = \overline{PA}$$

$SR =$

Ans. (b)

Q17. In parallelogram ABCD, the line BE (where E is a point on AD) intersect AC at F then

- (A) $EF \times FB = AE \cdot FC$
- (B) $BF \times FA = EF \cdot FC$
- (C) $AE \cdot FC = BC \cdot AF$
- (D) $AE \cdot AB = BC \cdot FB$

Ans. (b)

Q18.

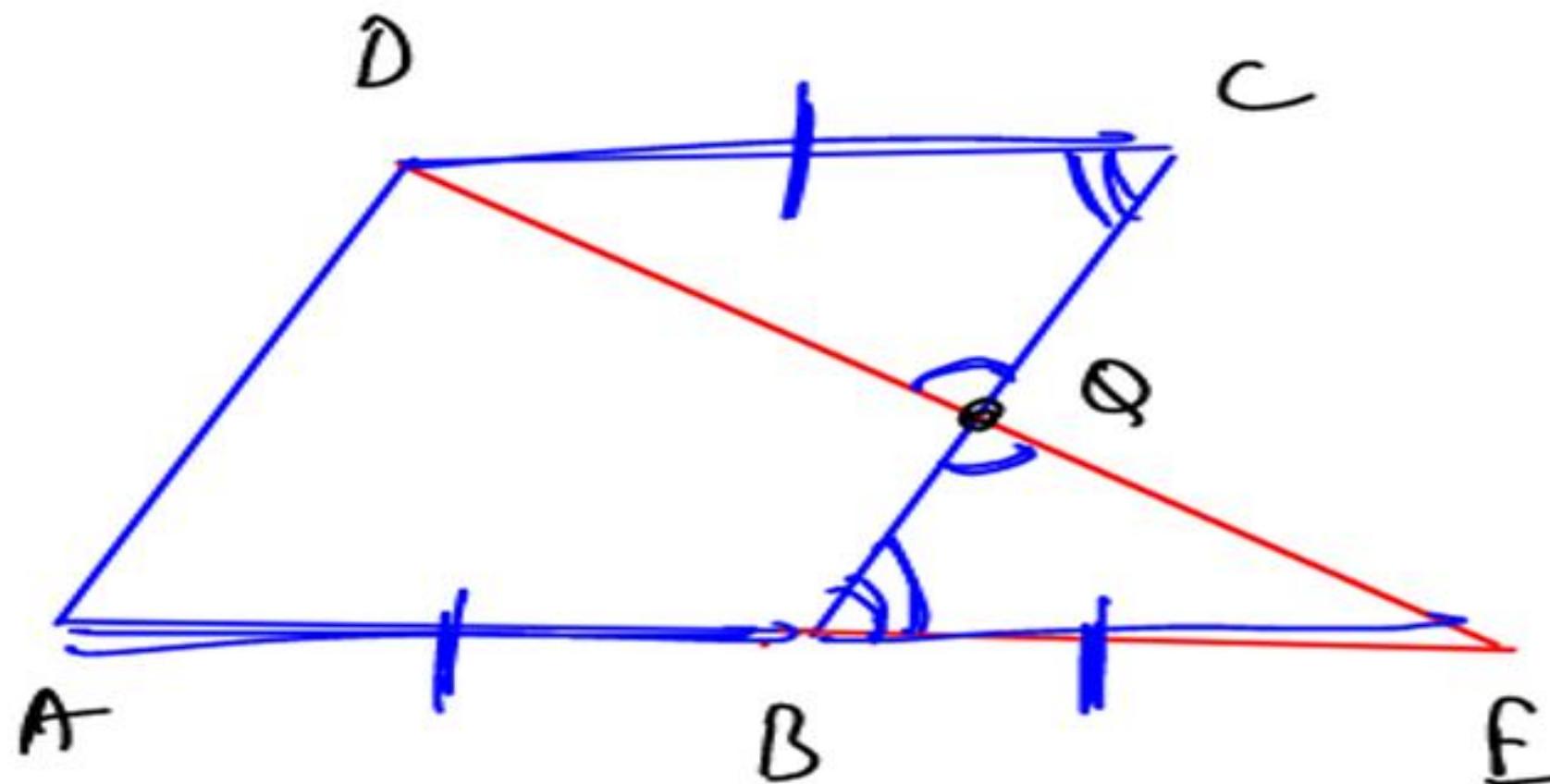
The side AB of a parallelogram ABCD is produced to E in such way that $BE = AB$. DE intersects BC at Q. The point Q divides BC in the ratio.

- (a) 1 : 2
- (c) 2 : 3

- (b) 1 : 1
- (d) 2 : 1

$QB : QC$

= ? : ?



Ist

$\triangle BQE \sim \triangle CQD$

$\triangle BQE \cong \triangle CQD$
[AAS]

$$QB = QC$$

$$\frac{QB}{QC} = \frac{1}{1}$$

Ans. (b)

Q19. ABCD is parallelogram P and Q are the mid-points of sides BC and CD respectively. If the area of ΔABC is 12 cm^2 , then the area of ΔAPQ is :

- (a) 12 cm^2
- (b) 8 cm^2
- (c) 9 cm^2
- (d) 10 cm^2

Ans. (c)

Q20. One of the diagonal of a parallelogram is 17 cm and an angle of the parallelogram is 45° . If height of the parallelogram is 8 cm then area of the parallelogram is :

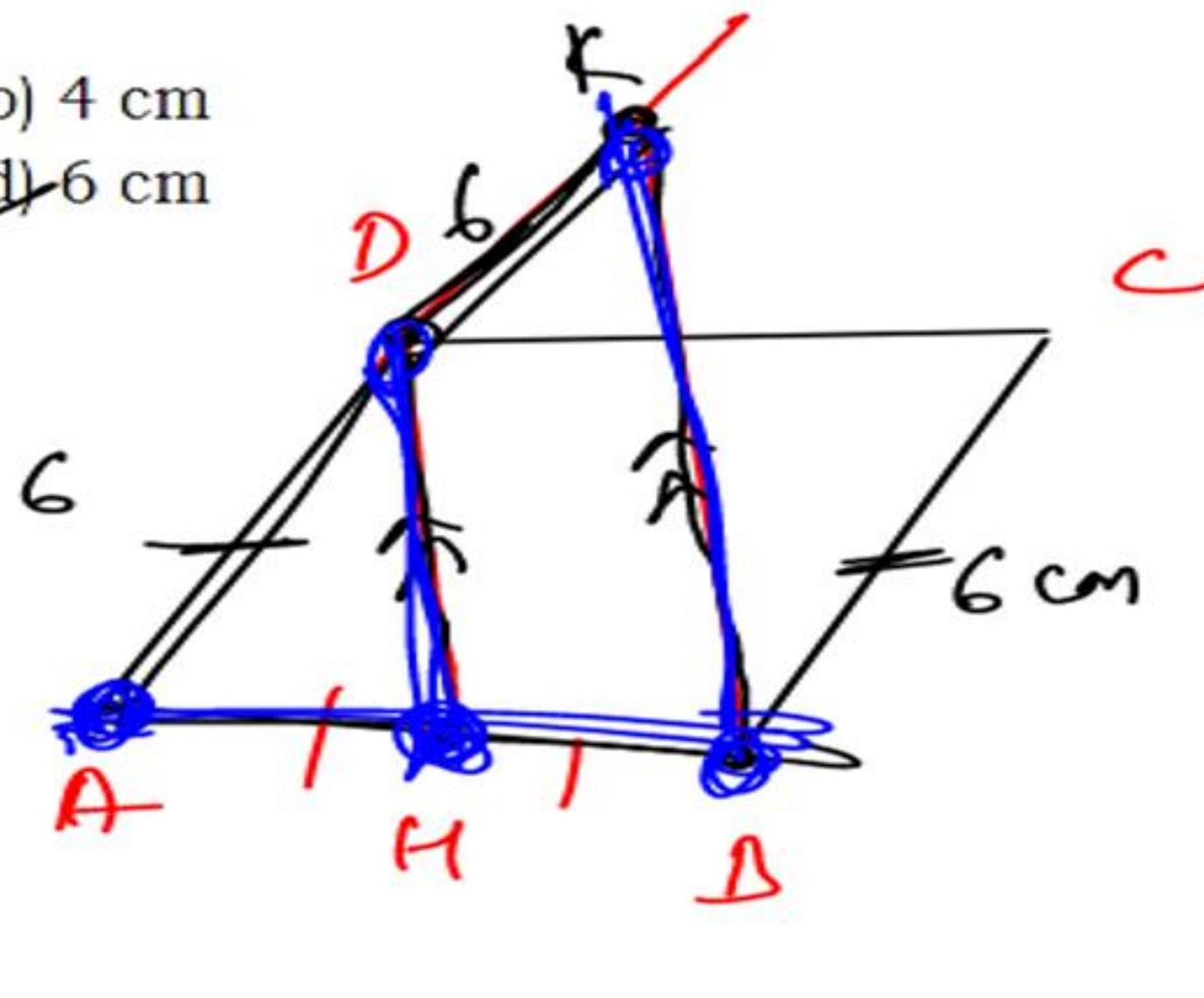
- (a) 184 cm^2
- (b) 88 cm^2
- (c) 92 cm^2
- (d) 104 cm^2

Ans. (a)

Q21. In a parallelogram ABCD, the mid-point of AB is H. The line parallel to DH and passing through B meets extended AD at K. If BC = 6 cm, then DK is-

- (a) 10 cm
(c) 8 cm

- (b) 4 cm
(d) 6 cm

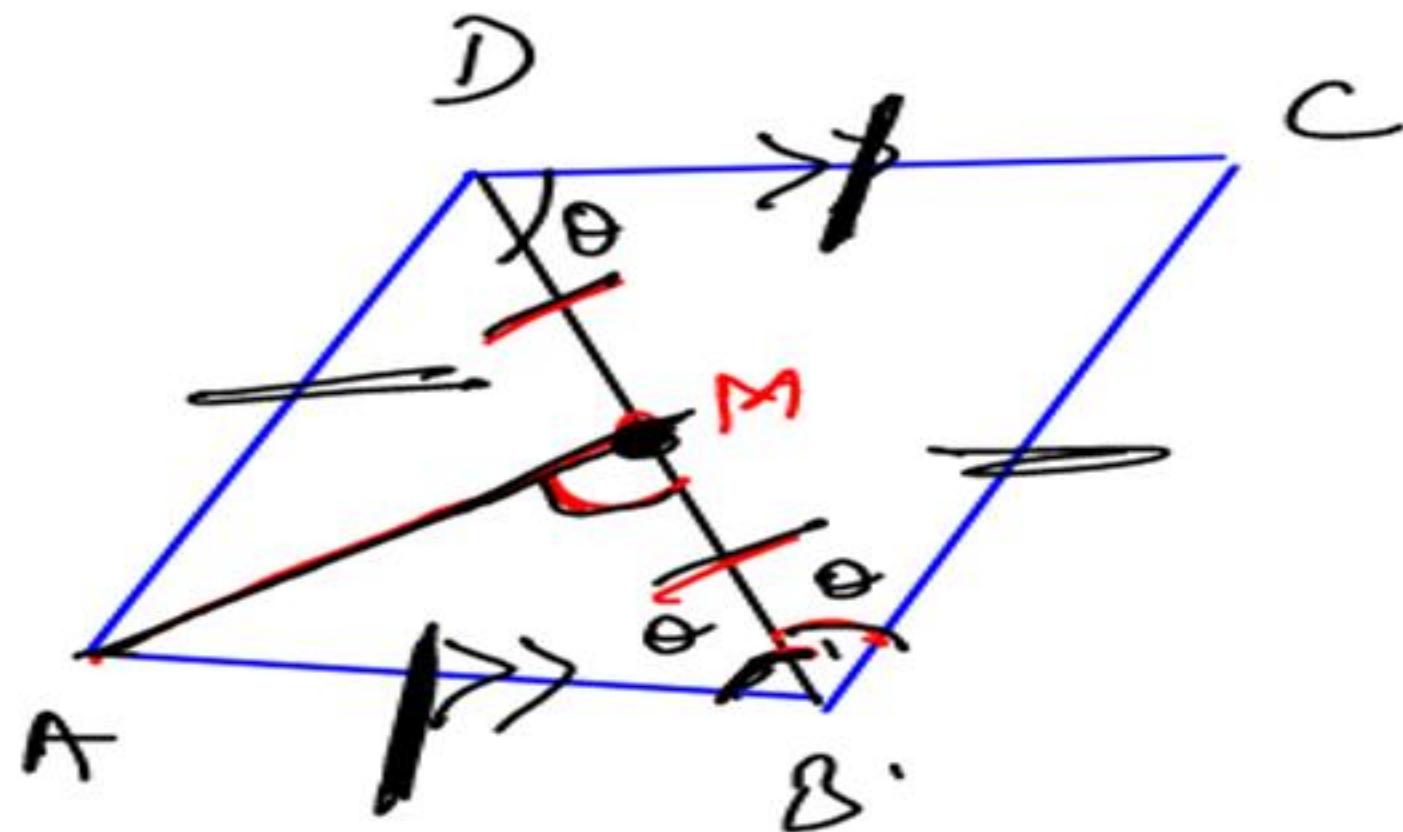


Converse of
mid pt
Theorem

Ans. (d)

Q22.

In a parallelogram ABCD, M is the mid point of BD. BM is the angle bisector of $\angle B$. What is the value of $\angle AMB$?

(a) 30° (b) 45° (c) 60° (d) ~~90°~~ 

Ans. (d)

Q23. ABCD is a parallelogram in which $AB = 10 \text{ cm}$, $AD = 6 \text{ cm}$. Bisector of $\angle A$ meets DC at E and extended BC at F. Therefore, length of CF will be ?

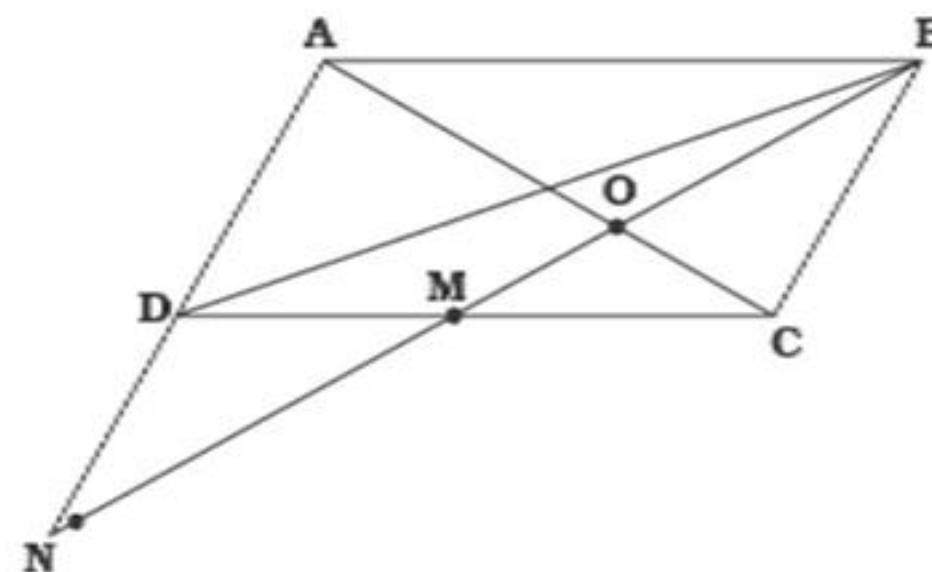
- (A) 4 cm
- (B) 2 cm
- (C) 6 cm
- (D) 8 cm

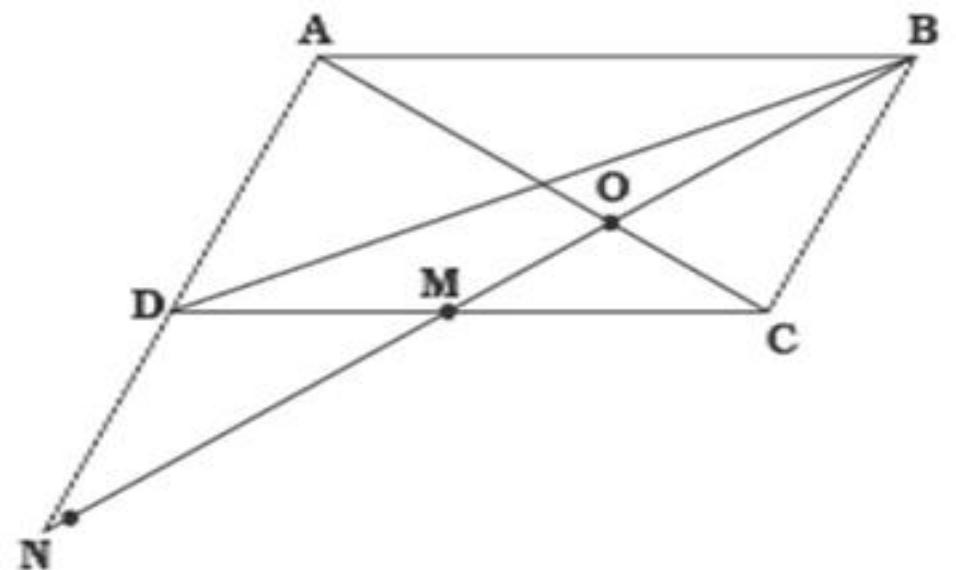
Ans. (a)

Q24. In the figure above, M is the mid-point of the side CD of the parallelogram ABCD. What is ON : OB ?

- (a) 3 : 2
- (c) 3 : 1

- (b) 2 : 1
- (d) 5 : 2

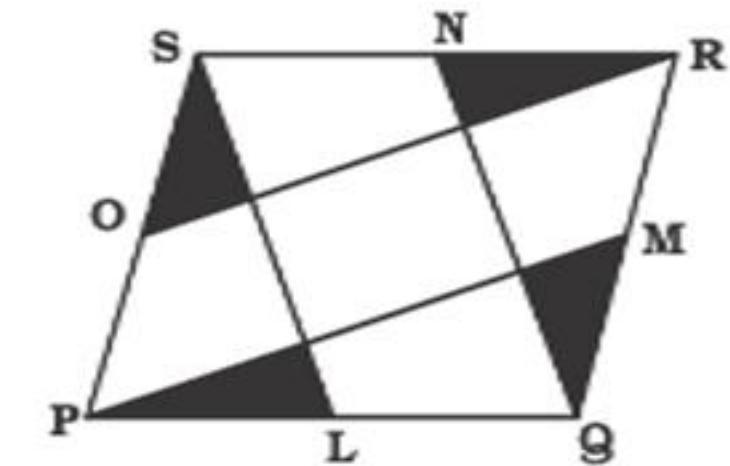


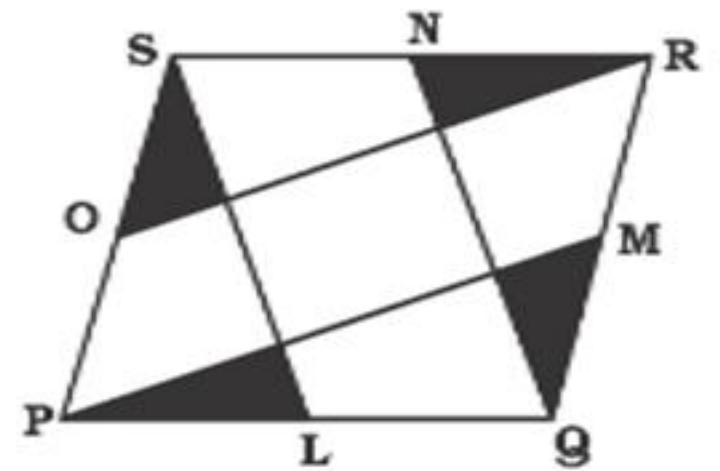
Ans. (b)

Q25. In the parallelogram PQRS, L, M, N and O are mid points of sides PQ, QR, RS and SP respectively. PM, QN, RO and SL are joined. Find the ratio of the area of the darked region to the area the parallelogram PQRS.

- (a) $1/5$
- (c) $4/15$

- (b) $1/4$
- (d) $1/6$



Ans. (a)

**Q26.**

ABCD is a parallelogram in which O is the intersection point of its diagonals. P is a point on DO. If the area of ΔAPB is 24.5 cm^2 , then find the area of ΔBPC .

- (a) 19.5 cm^2
- (b) 49 cm^2
- (c) 24.5 cm^2
- (d) Cannot be determined

Ans. (c)

Q27. If area of parallelogram is A whose sides are a and b and area of rectangle is B whose sides are a and b then -

- (A) $A > B$
- (B) $A = B$
- (C) $A < B$
- (D) $A \geq B$

Ans. (c)

**Q28.**

ABCD is a rectangle in which the ratio of the length of AB and BC is 3 : 2. If P is the mid-point of AB, then the value of $\sin \angle CPB$ is:

(a) $\frac{3}{5}$

(b) $\frac{2}{5}$

(c)

$\frac{3}{4}$

(d) $\frac{4}{5}$

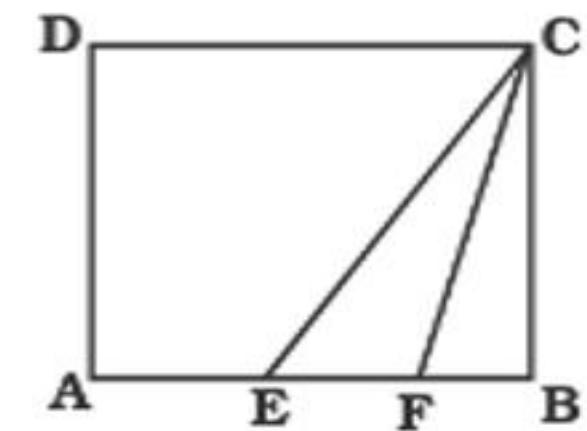
Ans. (d)

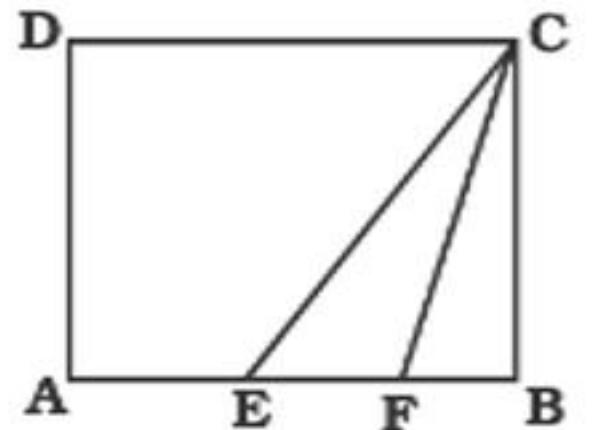


Q29. In the below diagram, ABCD is a rectangle with $AE = 2EF = 3FB$. What is the ratio of the area of the rectangle to that of the triangle CEF?

- (a) 11 : 3
- (c) 11 : 6

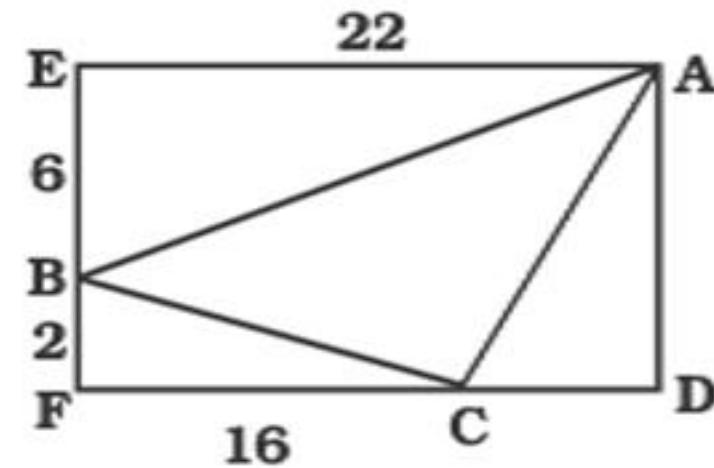
- (b) 22 : 3
- (d) None of these

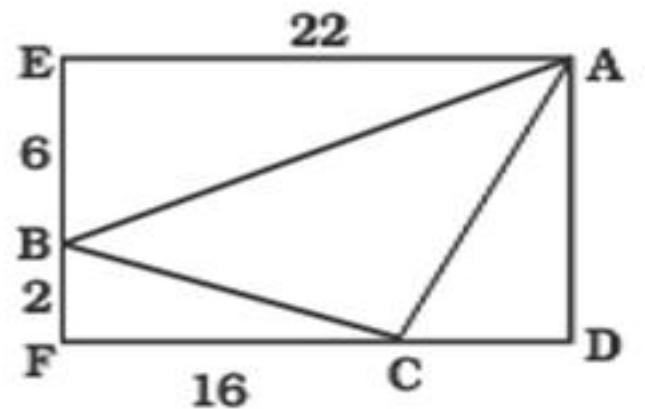


Ans. (b)

Q30. In the given figure. EADF is a rectangle and ABC is a triangle whose vertices lie on the sides of EADF. $AE = 22$, $BE = 6$ $CF = 16$ and $BF = 2$. Find the length of the line joining the mid-points to the side AB and BC

- (a) $4\sqrt{2}$
- (b) 5
- (c) 3.5
- (d) None of these



Ans. (b)

Q31.

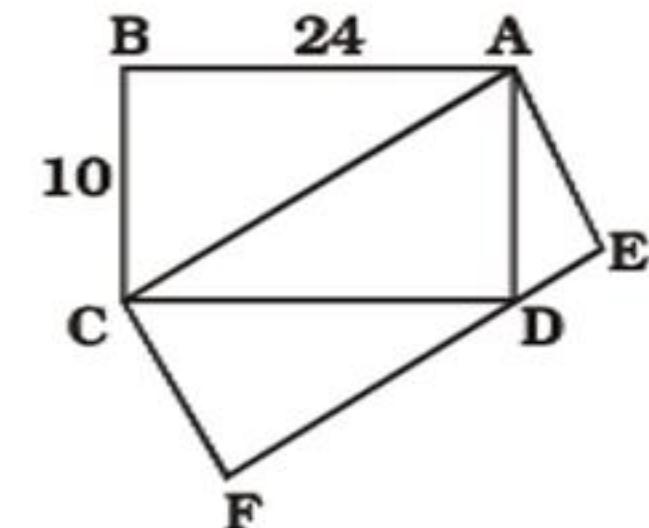
In the given fig., ABCD is a rectangle of dimensions 24 units and 10 units. AEFC is a rectangle drawn in such a way that diagonal AC of the first rectangle is one side and side opposite to it is touching the first rectangle at D as shown in the figure given above. What is the area of $\triangle AED$.

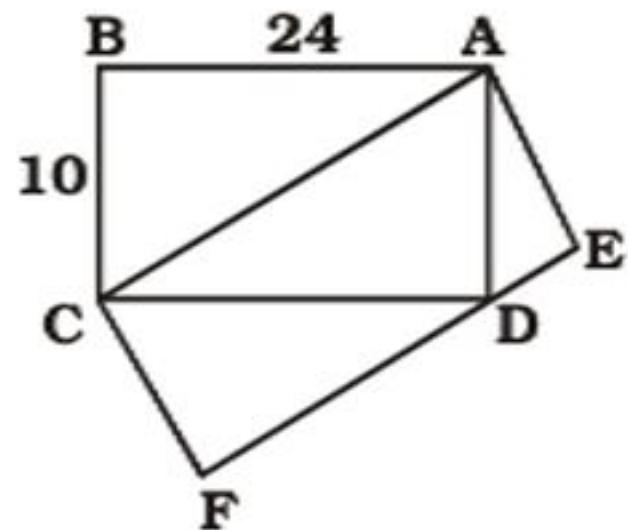
(a) $\frac{3000}{169}$ sq. unit

(c) $\frac{1500}{169}$ sq. unit

(b) $\frac{6000}{169}$ sq. unit

(d) $\frac{2700}{169}$ sq. unit



Ans. (a)

Q32. ABCD is a rectangle, there are two points M and N on side AB and AD such that area of triangles MAN, CDN and MBC are equal. If the length of BM is 2 cm, find the length of AM.

- (a) $2 + \sqrt{5}$ cm
- (b) $1 + \sqrt{5}$ cm
- (c) $1 + 2\sqrt{5}$ cm
- (d) $3 + \sqrt{5}$ cm

Ans. (b)

Q33. If l , b and p be the length, breadth and perimeter of a rectangle and b , l and p are in GP (in order) then $\frac{l}{b}$

Ans. (c)



Q34. In a square PQRS, an equilateral triangle ΔTQR is formed, then $m \angle PTS =$

- (A) 75°
- (B) 90°
- (C) 120°
- (D) 150°

Ans. (d)

- Q35.** Inside a square ABCD, $\triangle BEC$ is an equilateral triangle. If CE and BD intersect at O, then $\angle BOC$ is equal to :
- (a) 60° (b) 75° (c) 90° (d) 120°

Ans. (b)

Q36. ABCD is a square, M is mid-point of AB and N is mid-point of BC. Join DM and AN which meet at O. Therefore, which is true in the following ?

- (a) $OA : OM = 1 : 2$
- (b) $AN = MD$
- (c) $\angle ADM = \angle ANB$
- (d) $\angle AMD = \angle BAN$

Ans. (b)



Q37. Let X by any point within a square ABCD. On AX a square AXYZ is described such that D is within it. Which one of the following is correct?

- (a) $AX = DZ$
- (c) $AD = DZ$

- (b) $\angle ADZ = \angle BAX$
- (d) $BX = DZ$

Ans. (d)

**Q38.**

ABCD is a square. The diagonals AC and BD meet at O let K, L be the points on AB such that $AO = AK$ and $BO = BL$. If $\theta = \angle LOK$, then what is the value of $\tan\theta$?

(a) $\frac{1}{\sqrt{3}}$

(b) $\sqrt{3}$

(c) 1

(d) $\frac{1}{2}$

Ans. (c)

**Q39.**

A square and a rhombus have the same base and the rhombus is inclined at 60° . What is the ratio of the area of the square to the area of the rhombus:

- (a) 1 : 1
- (b) $\sqrt{2} : 1$
- (c) 2 : 1
- (d) 2 : $\sqrt{3}$

Ans. (d)

Q40. ABCD is a rhombus, AB is produced to F and BA is produced to E such that $AB = AE = BF$ then :

- (a) $ED > CF$
- (b) $ED \perp CF$
- (c) $ED^2 + CF^2 = EF^2$
- (d) $ED \parallel CF$

Ans. (b)

Q41. ABCD is a rhombus. A straight line through C cuts AD produced at P and AB produced at Q. If $DP = \frac{1}{2} AB$, then the ratio of the length of BQ and AB is :

- (a) 1 : 1
- (b) 2 : 1
- (c) 1 : 2
- (d) None of the above

Ans. (b)

**Q42.**

ABCD is a trapezium in which $AB = CD$, $AD \parallel BC$, $AD = 5\text{ cm}$ and $BC = 9\text{ cm}$. Therefore, If area of ABCD is 35 cm^2 , then find the length of CD?

- (A) $\sqrt{29}\text{ cm}$ (B) 5 cm (C) 6 cm (D) $\sqrt{21}\text{ cm}$

Ans. (a)

Q43. If ABCD is trapezium in which $AB \parallel DC$, AC and BD cut each other at E, then-

- (A) $DE \cdot EA = EC \cdot BC$
- (B) $DE \cdot EA = EC \cdot AB$
- (C) $DE \cdot EA = EC \cdot DC$
- (D) $DE \cdot EA = EB \cdot EC$

Ans. (d)

Q44. Find the area of a trapezium ABCD in which $AB \parallel DC$, $AB = 26\text{cm}$, $BC = 25\text{ cm}$, $CD = 40\text{ cm}$ and $DA = 25\text{ cm}$.

- (a) 648 cm^2
- (b) 792 cm^2
- (c) 660 cm^2
- (d) 798 cm^2

Ans. (b)

**Q45.**

ABCD is a trapezium with parallel sides $AB = 2$ cm, and $DC = 3$ cm E and F are the mid-points of the non-parallel sides. The ratio of area of ABFE of area of EFCD is :

- (a) 9 : 10
- (b) 8 : 9
- (c) 9 : 11
- (d) 11 : 9

Ans. (c)

**Q46.**

In trapezium $ABCD$, $AB \parallel DC$ and $DC = 2 AB$. EF drawn parallel to AB cuts AD at F and BC at E such that $\frac{BE}{EC} = \frac{3}{1}$. Diagonal DB intersects EF at

G. Find $\frac{AB}{FE}$

(a) $\frac{10}{7}$

(b) $\frac{1}{7}$

(c) $\frac{3}{7}$

(d) $\frac{7}{10}$

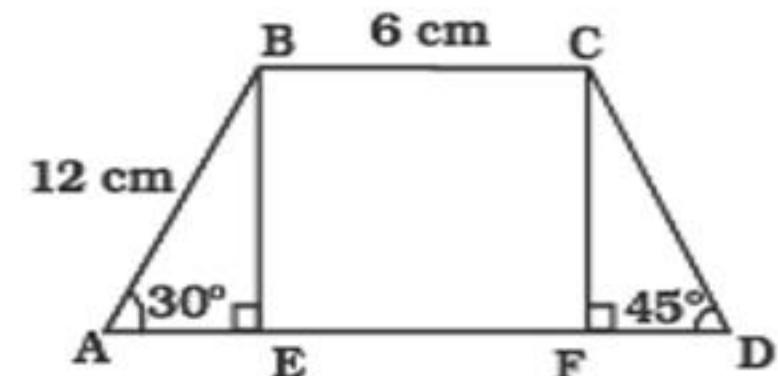
Ans. (a)

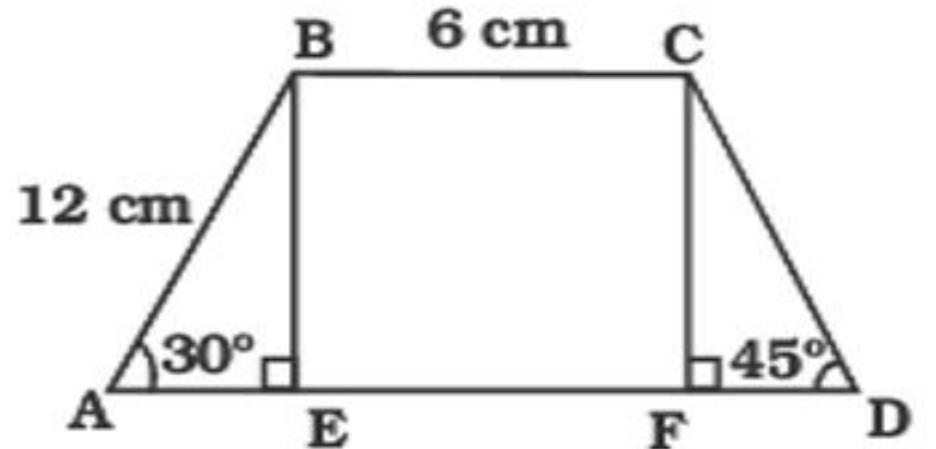


Q47. In a trapezium ABCD, $\angle BAE = 30^\circ$, $\angle CDF = 45^\circ$, BC = 6 cm and AB = 12 cm. Find the area of ABCD.

- (a) $18(3 + \sqrt{3}) \text{ cm}^2$
- (c) $12(3 + 2\sqrt{3}) \text{ cm}^2$

- (b) $36\sqrt{3} \text{ cm}^2$
- (d) None of these



Ans. (a)

Q48. ABCD is a parallelogram. If the bisectors of the $\angle A$ and $\angle C$ meet the diagonal BD at points P and Q respectively, then which one of the following is correct?

- (a) PCQA is a straight line
- (b) $\triangle APQ$ is similar to $\triangle CQP$
- (c) $AP = CP$
- (d) $AP = AQ$

Ans. (b)

Q49.

ABCD is a parallelogram, E and F are the points on the diagonal AC such that $AE = FC$, then quadrilateral BEDF is a :

- (a) Trapezium
- (b) Parallelogram
- (c) Square
- (d) None of these

Ans. (b)

- Q50.** ABCD is a parallelogram and Q and R are circumcentre of $\triangle ABC$ and $\triangle ADC$, then AQCR will be-
- (A) Rectangle
 - (B) Rhombus
 - (C) Trapezium
 - (D) Square

Ans. (b)



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