MATHS

BOOKS - MTG IIT JEE FOUNDATION

AREAS OF PARALLELOGRAMS AND TRIANGLES

Illustrations

1. In a parallelogram ABCD, AB = 8 cm. The altitudes corresponding to sides AB and AD are 4 cm and 5 cm respectively. Find AD.

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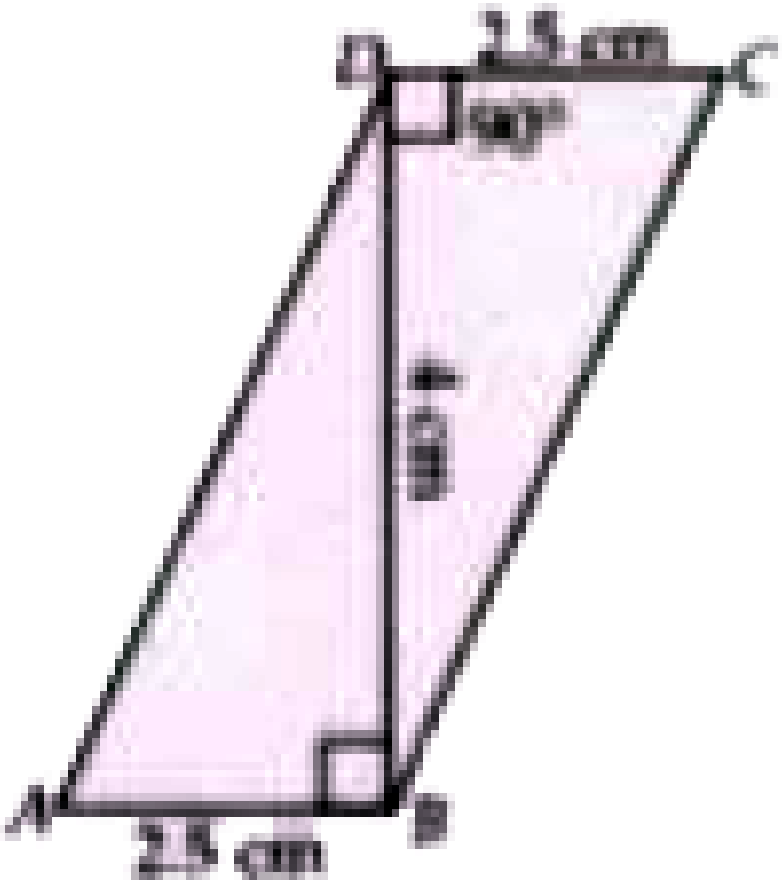
2. ABCD is a quadrilateral and BD is one of its diagonals, as shown in the figure. Prove that quadrilateral ABCD is a parallelogram, also find its area.



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3. Show that the segment joining the mid-points of a pair of opposite sides of a parallelogram, divides it into two equal parallelograms.

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4. Prove that of all parallelograms of which the sides are given, the parallelogram which is rectangle has the greatest area.

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5. Show that a median of a triangle divides it into two triangles of equal areas.

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6. In Figure, $ABCD$ is a quadrilateral and $BE \mid AC$ and also BE meets DC produced at E. Show that area of ADE is equal to the area of the quadrilateral $ABCD$

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7. The diagonals of quadrilateral ABCD, AC and BD intersects at O. Prove that if BO = OD then the triangles ABC and ADC are equal in area.

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8. The area of a trapezium is half the product of its height and sum of parallel sides.

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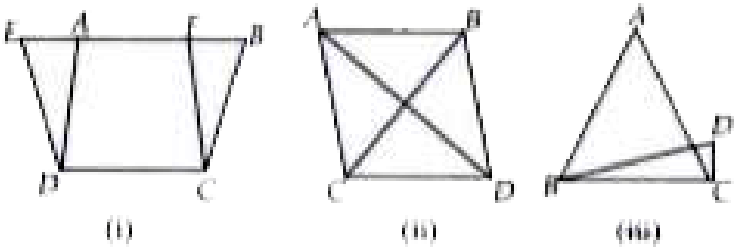
Solved Examples

1. Which of the following figures lie on the same base and between the same parallels. In such a case, write the common base and the two

parallels.



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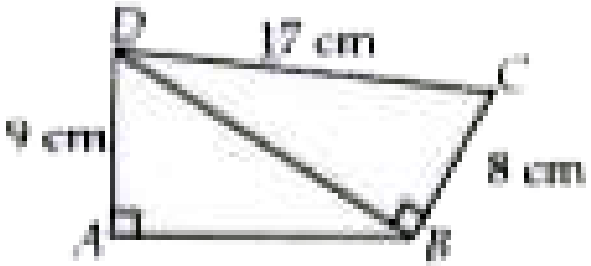
2. Compute the area of quadrilateral ABCD.



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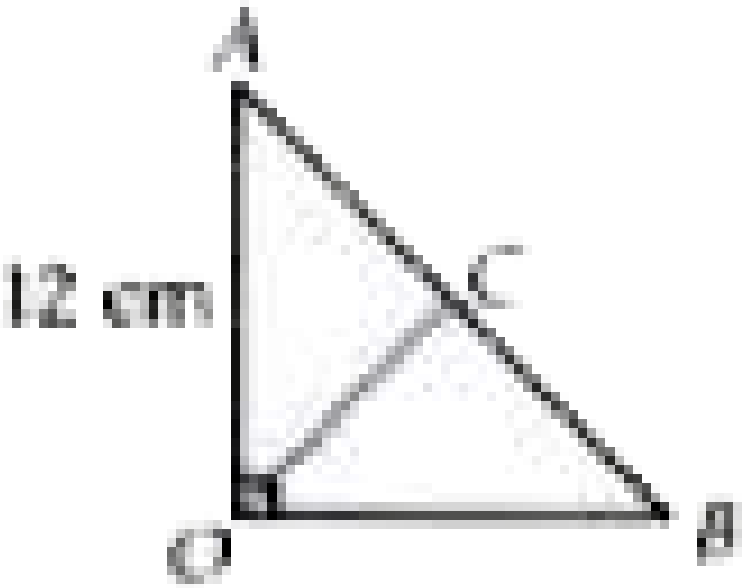
3. In the given figure $\angle AOB$= 90°, AC= BC, OA = 12 cm and OC = 6.5 cm.

Find the area of $\triangle AOB$.



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4. PQRS is a rectangle inscribed in a quadrant of a circle of radius 13 cm and A is any point on PQ. If PS = 5 cm, then ar $(\Delta PAS) =$.

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5. P is any point on the diagonal BD of the parallelogram ABCD. Prove that ar($\triangle APD$) = ar($\triangle CPD$).

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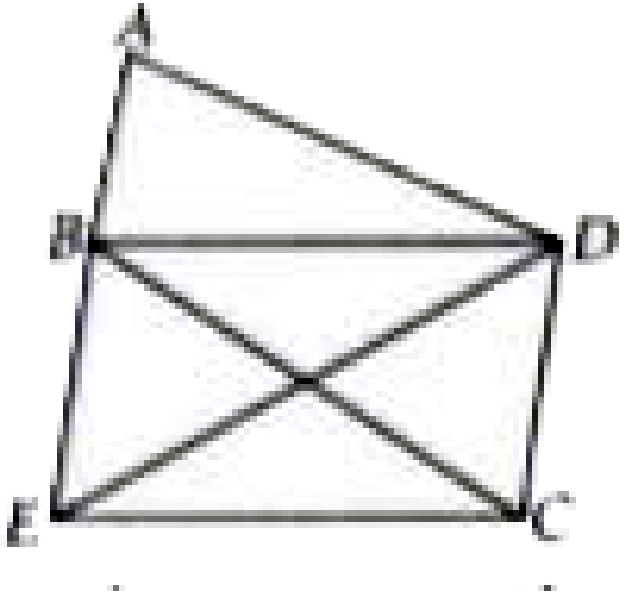
6. ABCD is a quadrilateral. The straight line through C parallel to the diagonal DB intersects AB produced at E. Prove that the ar(quad. ABCD) = ar($\triangle ADE$).



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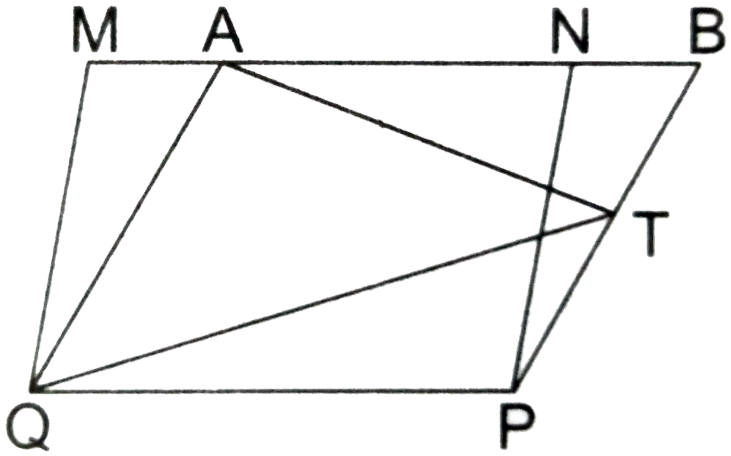
7. In the adjoining figure, MNPQ and ABPQ are parallelogram and T is any point on the side BP. Prove that

(i) $ar(MNPQ) = ar(ABPQ)$

(ii)$ar(\ \triangle\ ATQ) = \frac{1}{2}ar(MNPQ).$



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8. In Figure, $OCDE$ is a rectangle inscribed in a quadrant of a circle of radius $10cm$. If $OE = 2\sqrt{5}$, find the area of the rectangle.

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9. If the diagonals AC, BD of a quadrilateral $ABCD$, intersect at O, and separate the quadrilateral into four triangles of equal area, show that quadrilateral $ABCD$ is a parallelogram.

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10. Show that the area of a rhombus is half the product of the lengths of its diagonals. GIVEN : A rhombus $ABCD$ whose diagonals AC and BD intersect at O. TO PROVE : $ar(rhombus ABCD) = \frac{1}{2}(AC x BD)$

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11. A point D is taken on the side BC of a ΔABC such that $BD = 2DC$. Prove that $ar(\Delta ABD) = 2ar(\Delta ADC)$

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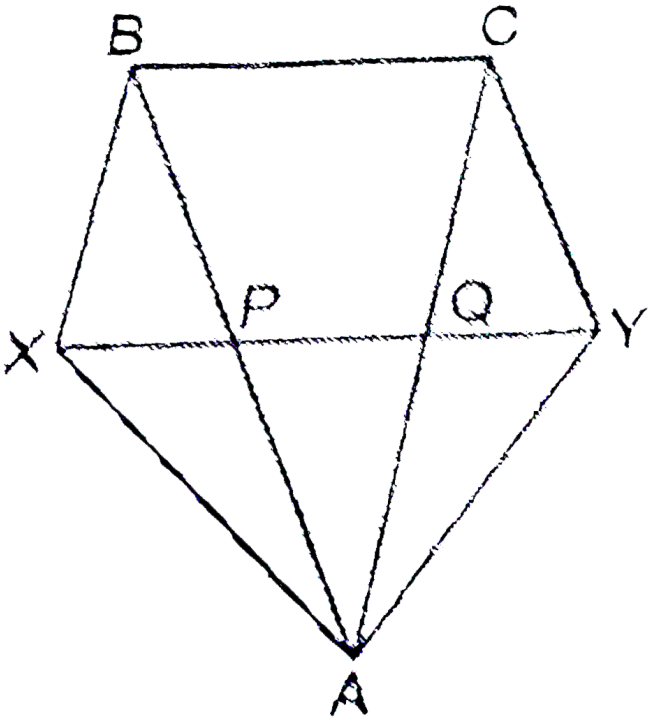
12. In the given figure, $BC||XY, BX||CA$ and $AB \mid \mid YC$. Prove that area $(\Delta ABX) = area(\Delta ACY)$



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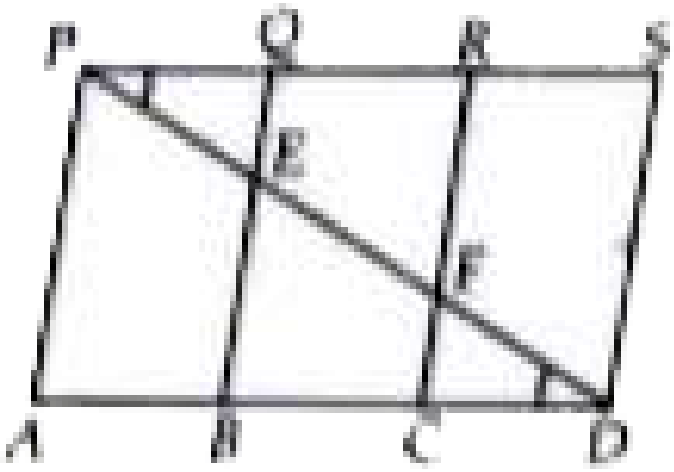
13. In the given figure PSDA is a parallelogram in which PQ =QR= RS and AP II BQ II CR II VS.Prove that ar($\triangle PQE$) = ar($\triangle DCF$).



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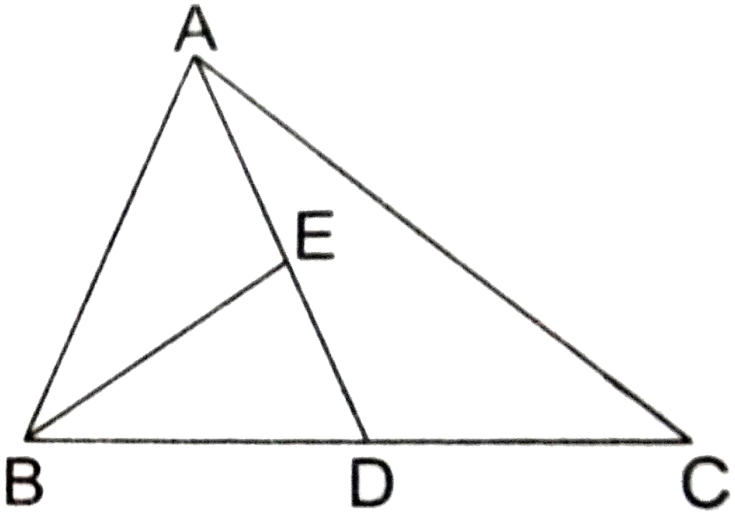
14. ABC is a triangle in which D is the midpoint of BC and E is the midpoint of AD.

Prove that $ar(\triangle BED) = \frac{1}{4}ar(\triangle ABC)$.



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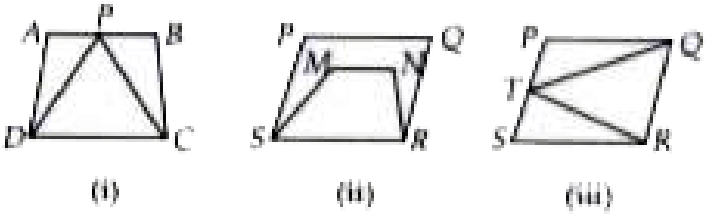
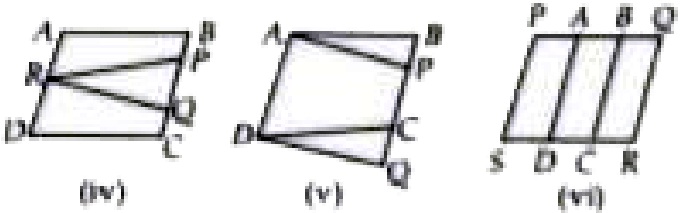
Ncert Section Exercise 9 1

1. Which of the following figures lie on the same base and between the same parallels. In such a case, write the common base and the two parallels.





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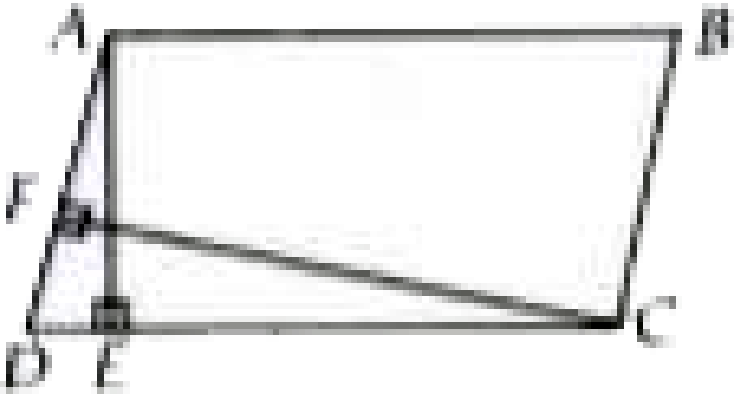
Ncert Section Exercise 9 2

1. In the given figure ABCD is a parallelogram, AE $\perp$ DC and CF $\perp$ AD. If AB = 16 cm, AE = 8 cm and CF = 10 cm,find AD.



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2. If E, F, G and H are respectively the mid-points of the sides of a parallelogram $ABCD$, show that $ar(EFGH) = \frac{1}{2}ar(ABCD)$.

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3. P and Q are any two points lying on the sides DC and AD respectively of a parallelogramABCD. Show that $ar\ (APB) = ar\ (BQC)$.

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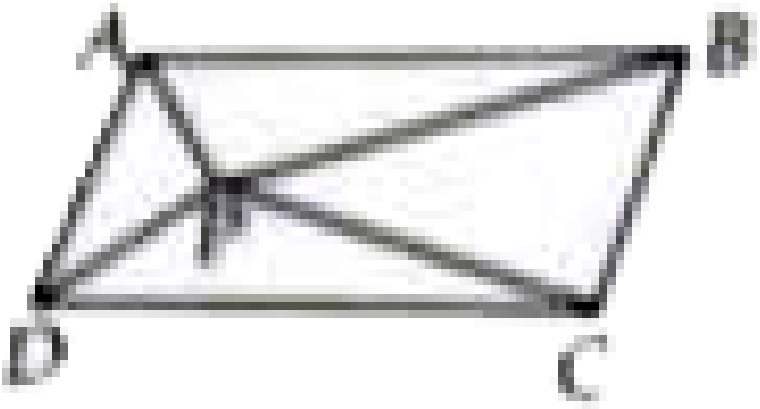
4. In the figure, P is a point in the interior of a parallelogram ABCD. Show that

(i) ar($\triangle APB$) + $ar\left(\triangle PCD = \frac{1}{2}ar(ABCD)\right.$

(ii) ar($\triangle APD$) + $ar(\triangle PBC) = ar(\triangle APB) + ar(\triangle PCD)$



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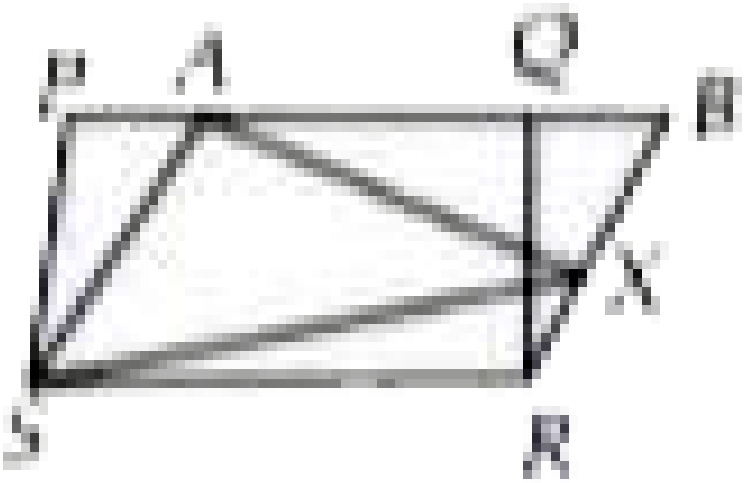
5. In the figure, PQRS and ABRS are parallelograms and X is any point on side BR. Show that

ar(PQRS) = ar(ABRS)



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6. In Fig. 9.17, PQRS and ABRS are parallelograms and X is any point on side BR. Show that (i) $ar\ (PQRS) = ar\ (ABRS)$ (ii) $ar\ (AX\ S) = \frac{1}{2}\ ar\ (PQRS)$

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7. A farmer was having a field in the form of a parallelogram PQRS. She took any point A on RS and joined it to points P and Q. In how many parts the field is divided? What are the shapes of these parts? The farmer wants to sow wheat and pulses in equal portions of the field separately. How should she do it?

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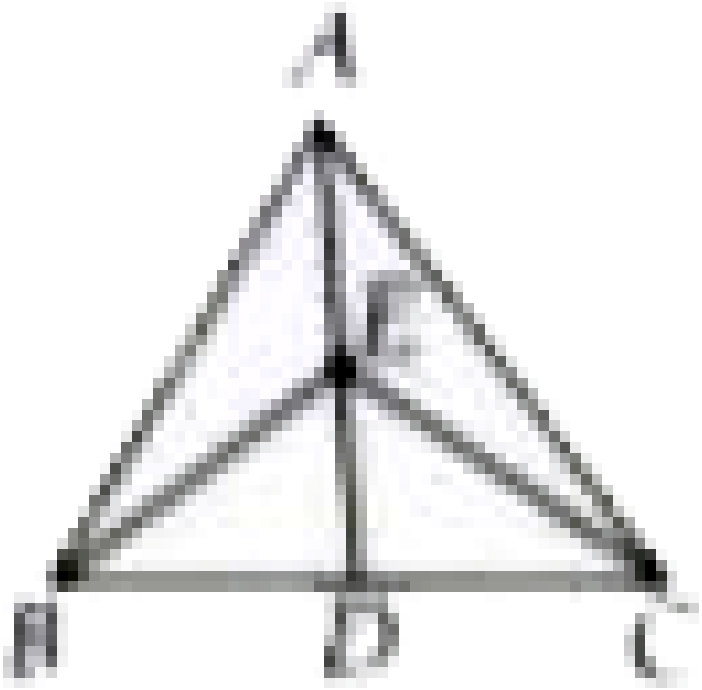
Ncert Section Exercise 9 3

1. In the figure, E is any point on median AD of a $\triangle ABC$. Show that ar($\triangle ABE$)= ar($\triangle ACE$).



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2. In a triangle ABC, E is the mid-point of median AD. Show that ar $(\triangle BED) = \frac{1}{4}ar(\triangle ABC)$.

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

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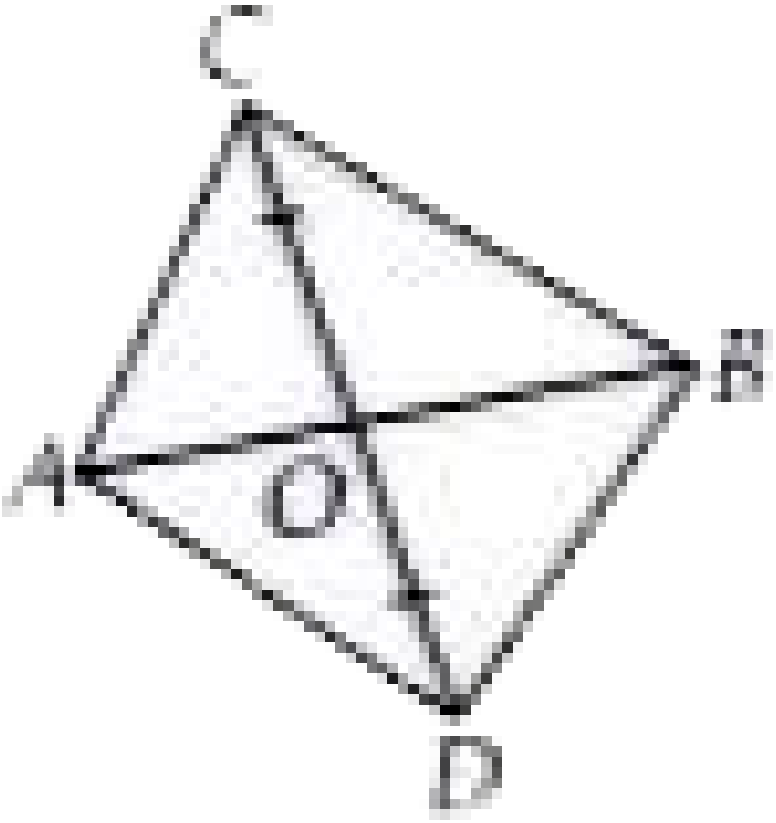
4. In figure, ABC and ABD are two triangles on the same base AB. If line segment CD is bisected by AB at O , show that ar

$(\triangle ABC) = ar(\triangle ABD)$.



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5. D, E and F are the mid-points of the sides BC, CA and AB of a triangle ABC. Show that

BDEF is a parallelogram

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6. D, E and F are respectively the mid-points of the sides BC, CA and AB of a ΔABC. Show that

$ar(\triangle DEF) = \frac{1}{4}ar(\triangle ABC)$

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7. D, E and F are respectively the mid-points of the sides BC, CA and AB of a ΔABC. Show that

ar(BDEF) $= \frac{1}{2}ar(\triangle ABC)$

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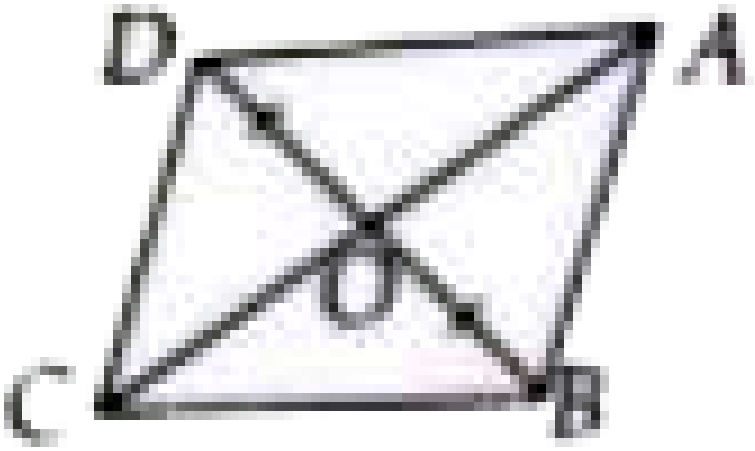
8. In the figure, diagonals AC and BD of quadrilateral ABCD intersect at O such that OB = OD. If AB = CD, then show that



ar(ΔDOC) = ar(ΔAOB)

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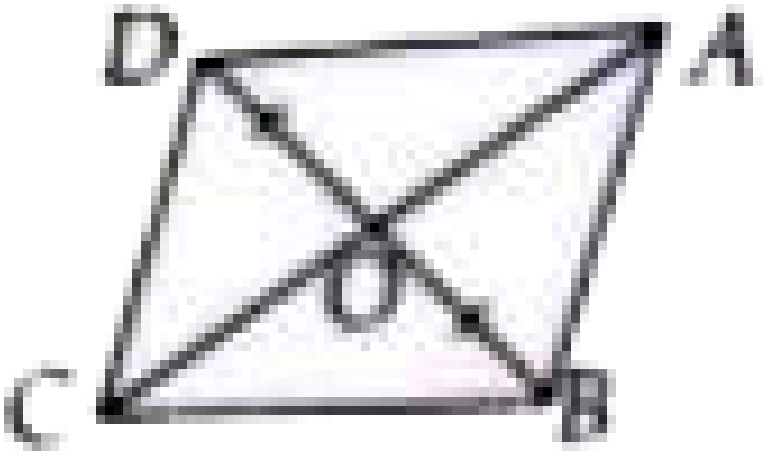
9. In the figur e, diagonals AC and BD of quadrilateral A BCD intersect at 0 such that OB = OD. If AB = CD, then show that



$ar(\Delta DCB) = ar(\Delta ACB)$

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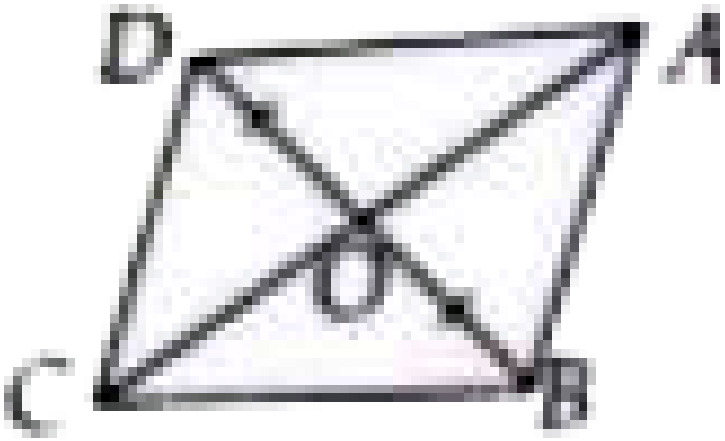
10. In the figure, diagonals AC and BD of quadrilateral ABCD intersect at 0 such that OB = OD. If AB = CD, then show that



DA I I CB or ABCD is a parallelogram.

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11. D and E are points on sides AB and AC respectively of ΔABC such that ar(ΔDBC) = ar(ΔEBC). Prove that DE I I BC.

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12. XY is a line parallel to side BC of a triangle ABC. If $BE \parallel AC$and $CF \parallel AB$meet XY at E and F respectively, show that

$ar\ (ABE)\ =\ ar\ (ACF)$

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13. The side AB of a parallelogram ABCD is produced to any point P. A line through A and parallel to CP meets CB produced at Q and then parallelogram PBQR is completed. Show that $ar\ (ABCD)\ =\ ar\ (PBQR)$.

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14. Diagonals AC and BD of a trapezium ABCD with AB || DC intersect each other at O. Prove that ar(ΔAOD) = ar(ΔBOC).

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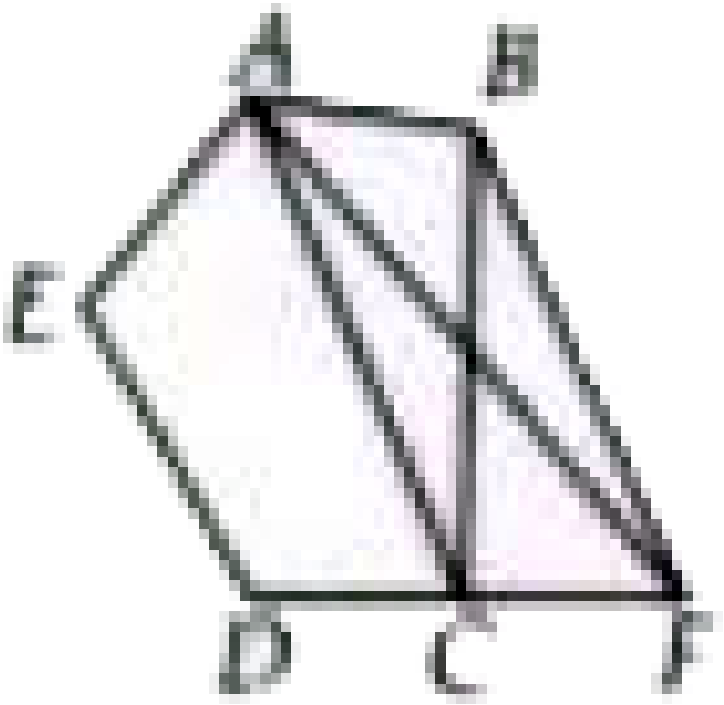
15. In the figure, ABCDE is a pentagon. A line through B parallel to AC meets DC produced at F. Show that



ar(ΔAEDF) = ar(ΔABCDE)

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16. A villager Itwaari has a plot of land of the shape of a quadrilateral. The Gram Panchayat of the village decided to take over some portion of his plot from one of the corners to construct a Health Centre. Itwaari agrees to the above proposal w

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17. ABCD is a trapezium with AB||DC. A line parallel to AC intersects AB at X and BC at Y. Prove that ar(ΔADX) = ar(ΔACY).

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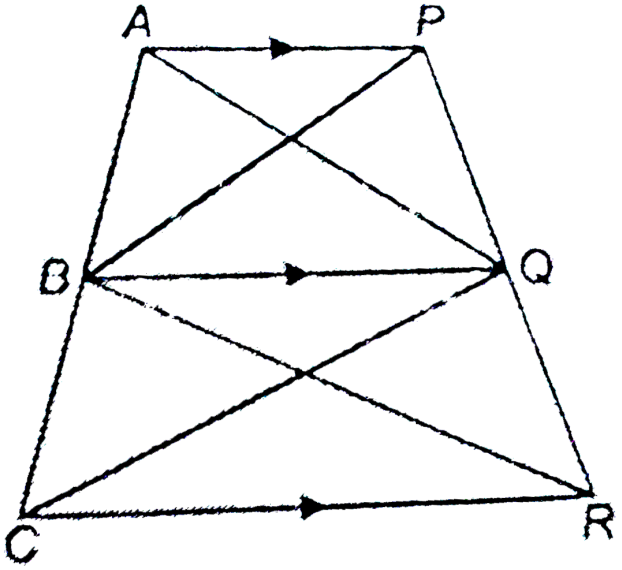
18. In the given figure, $AP||BQ||CR$. Prove that $ar(\Delta AQC) = ar(\Delta PBR)$



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19. Diagonals AC and BD of a quadrilateral ABCD intersect at O in such a way that ar(ΔAOD) = ar(ΔBOC). Prove that ABCD is a trapezium.

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Ncert Section Exercise 9 4

1. Parallelogram ABCD and rectangle ABEF are on the same base AB and have equal areas. Show that the perimeter of the parallelogram is greater than that of the rectangle.

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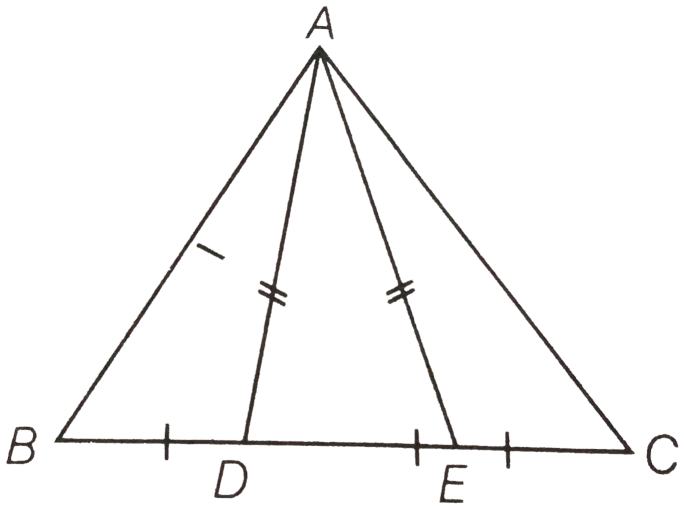
2. In figure ,D and E are Points on side BC of a ΔABC such that BD=CE and AD=AE.Show that $\Delta ABD \cong \Delta ACE$.



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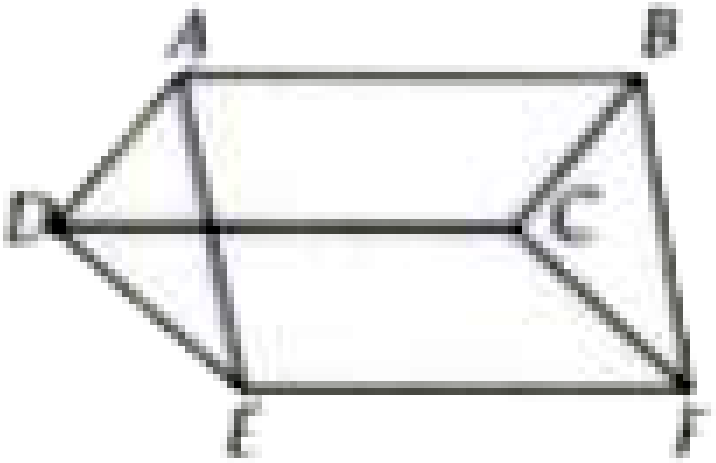
3. In the figure, ABCD, DCFE and ABFE are parallelograms. Show that ar(Δ ADE) = ar(ΔBCF).



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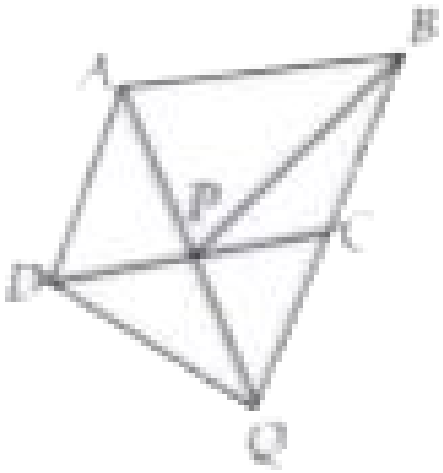
4. In the figure, ABCD is a parallelogram and BC is produced to a point Q such that AD = CQ. If AQ intersect DC at P, show that ar(ΔBPC) = ar(Δ DPQ).



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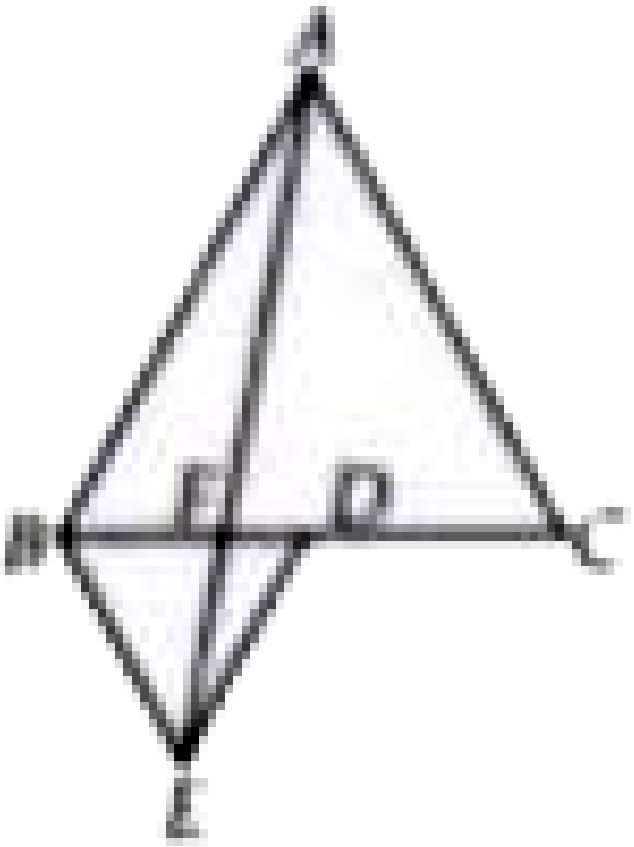
5. In figure, ABC and BDE are two equilateral triangles such that D is the mid-point of BC. If AE intersects BC at F, show that



$ar(\Delta BDE) = 1/4\ ar(\Delta ABC)$

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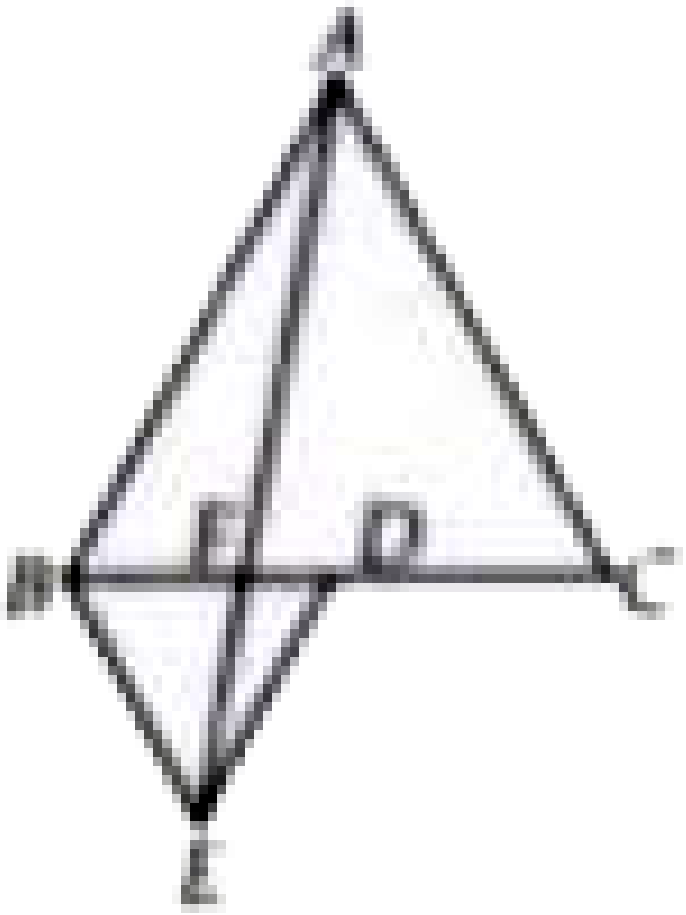
6. In figure, ABC and BDE are two equilateral triangles such that D is the mid-point of BC. If AE intersects BC at F, show that



ar(ΔBDE) = 1/2 ar(ΔBAE)

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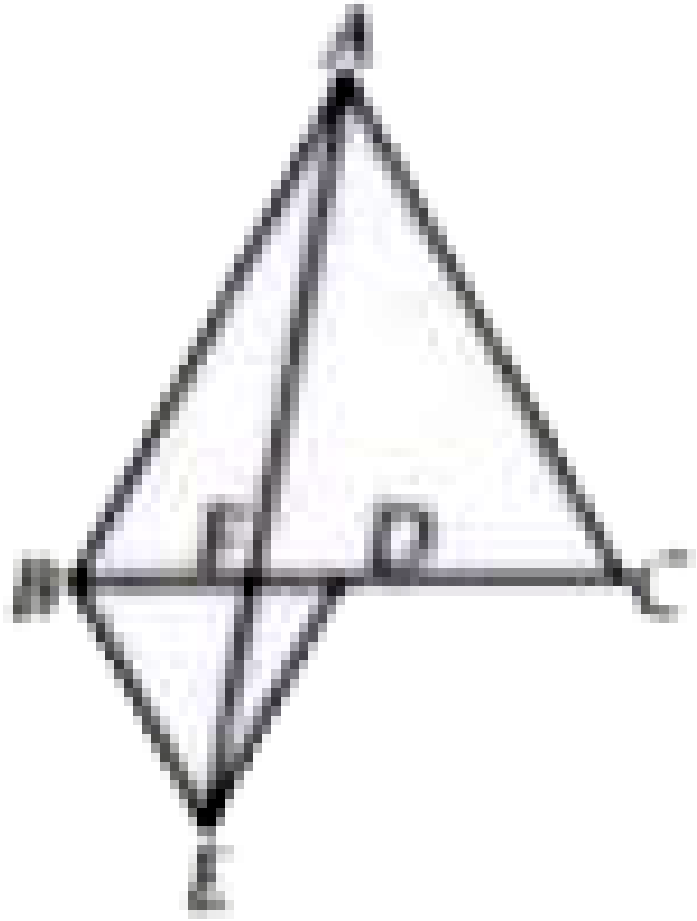
7. In figure, ABC and BDE are two equilateral triangles such that D is the mid-point of BC. If AE intersects BC at F, show that



ar(ΔABC) = 2 ar(ΔBEC)

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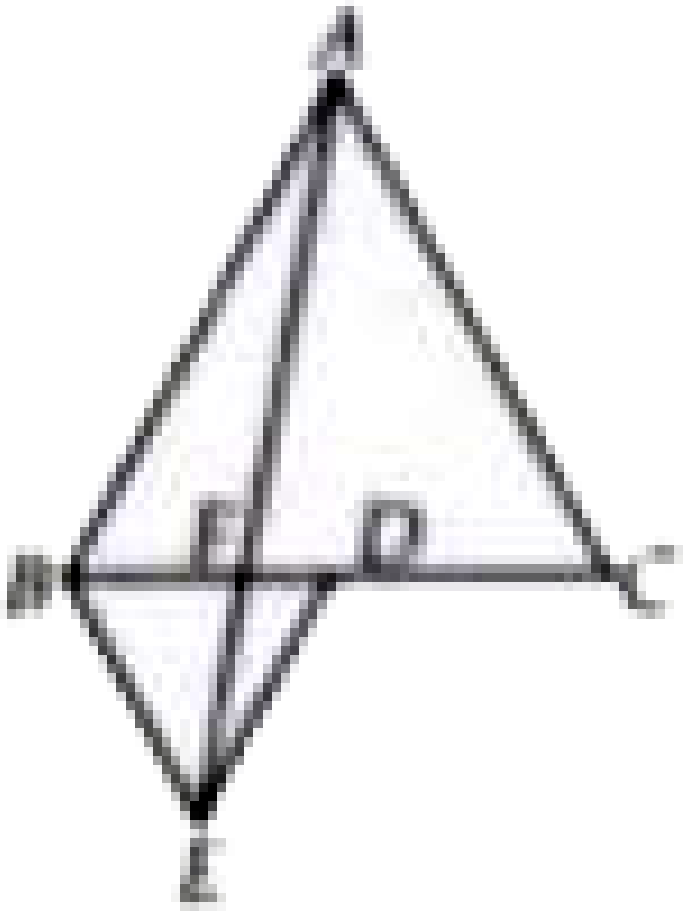
8. In figure, ABC and BDE are two equilateral triangles such that D is the mid-point of BC. If AE intersects BC at F, show that



ar(ΔBFE) = 2 ar(ΔFED)

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9. Diagonals AC and BD of $\square ABCD$ intersect each other at point P. Show that

$ar(\triangle APB) \times ar(\triangle CPD) = ar(\triangle APD) \times ar(\triangle BPC)$

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10. P and Q are respectively the mid-points of sides AB and BC of a triangle ABC and R is the mid-point of AP, show that

ar(ΔPRQ) = 1/2 ar(ΔARC)

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11. In ΔABC, P is a point on BC such that $BP : PC = 4 : 5$ and Q is the mid - point of BP. Then area (ΔABQ) : area (ΔABC) is equal to :

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12. ABC and BDE are two equilateral triangles such that D is the mid-point of BC. Then, $ar(\Delta BDE) = \frac{1}{2}ar(\Delta ABC)$.

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13. ABC is a right triangle right angled at A. BCED, ACFG and ABMN aresquares on the sides BC, CA and AB respectively. Line segment $AX \perp DE$meets BCat Y. Show that:(i) $\Delta MBC \cong \Delta ABD$(ii) `a r\ (B Y X D)\ =\ 2\

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14. ABC is a right triangle right angled at A. BCED, ACFG and ABMN aresquares on the sides BC, CA and AB respectively. Line segment $AX \perp DE$meets BCat Y. Show that:(i) $\Delta MBC \cong \Delta ABD$(ii) `a r\ (B Y X D)\ =\ 2\

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15. ABC is a right triangle right angled at A. BCED, ACFG and ABMN aresquares on the sides BC, CA and AB respectively. Line segment $AX \perp DE$meets BCat Y. Show that:(i) $\Delta MBC \cong \Delta ABD$(ii) `a r\ (B Y X D)\ =\ 2\

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16. ABC is a right triangle right angled at A. BCED, ACFG and ABMN aresquares on the sides BC, CA and AB respectively. Line segment $AX \perp DE$meets BCat Y. Show that:(i) $\Delta MBC \cong \Delta ABD$(ii) `a r\ (B Y X D)\ =\ 2\

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17. In Figure, ABC is a right triangle right angled at A, $BCED$, $ACFG$ and AMN are square on the sides BC, CA and AB respectively. Line segment $AX \perp DE$ meets BC at Y. Show that: $ar\ (CYXE) = 2ar(\ FCB)$

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18. In Figure, ABC is a right triangle right angled at A, $BCED$, $ACFG$ and AMN are square on the sides BC, CA and AB respectively. Line segment $AX \perp DE$ meets BC at Y. Show that: $ar\,(BYXD) = ar\,(ABMN)$

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19. In Figure, ABC is a right triangle right angled at A, $BCED$, $ACFG$ and AMN are square on the sides BC, CA and AB respectively. Line segment $AX \perp DE$ meets BC at Y. Show that: $FCB \cong ACE$

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Exercise Multiple Choice Questions

1. The area of a rhombus is $20cm^2$. If one of its diagonals is 5 cm, the other diagonal is

A. 5 cm

B. 6 cm

C. 8 cm

D. 10 cm

Answer: C

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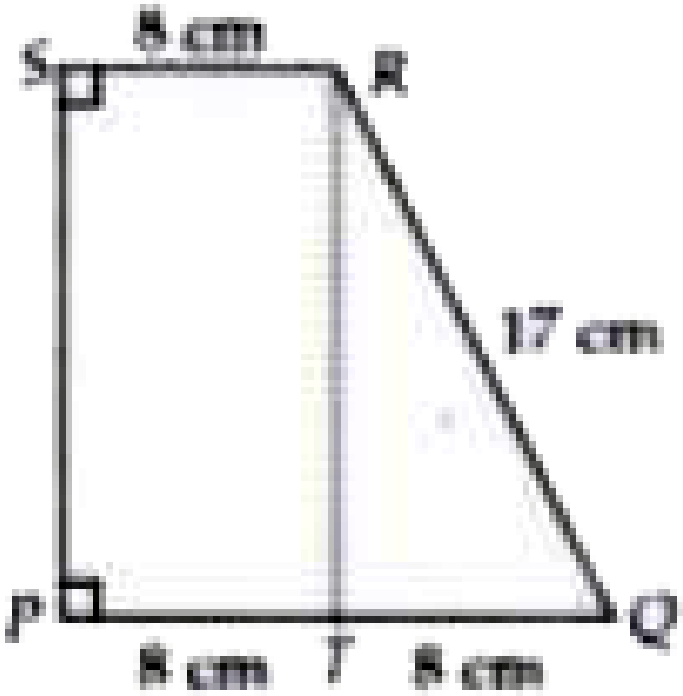
2. The area of trapezium PQRS in the adjoining figure is



A. 112 cm^2

B. 120 cm^2

C. 160 cm^2

D. 180 cm^2

Answer: D

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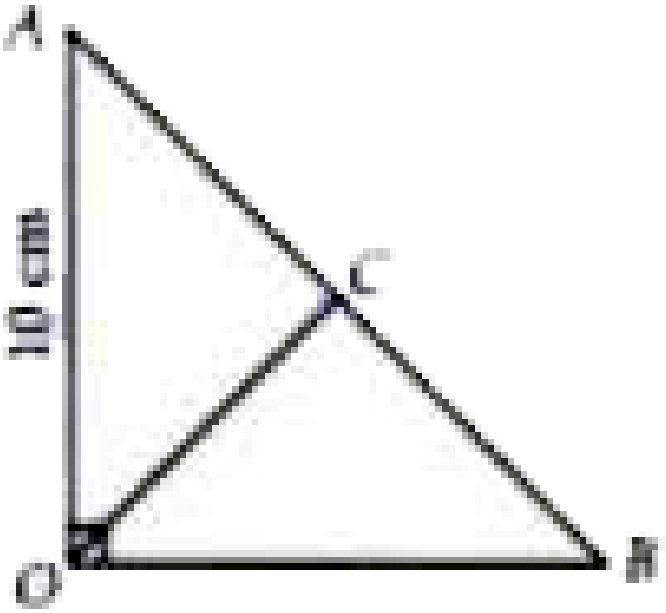
3. In the adjoining figure, $\angle AOB = 90^{\circ}, AC = BC, OA = 10cm$ and $OC = 13cm. . Theareaof\Delta A$ is



A. 120 cm^2

B. 135 cm^2

C. 140cm^2

D. 148 cm^2

Answer: A

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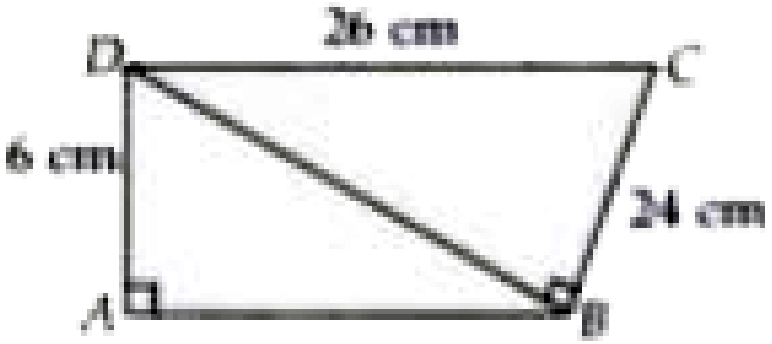
4. In the adjoining figure, the area of quadrilateral ABCD is



A. 148 cm^2

B. 144cm^2

C. 120 cm^2

D. 122 cm^2

Answer: B

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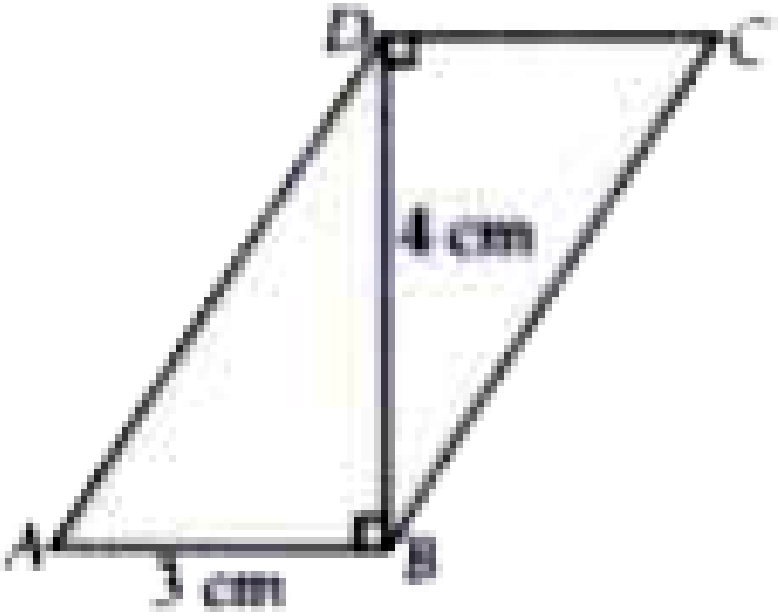
5. In the adjoining figure, ABCD is a parallelogram. Then its area is equal to



A. 9 cm^2

B. 12 cm^2

C. 15 cm^2

D. 36 cm^2

Answer: B

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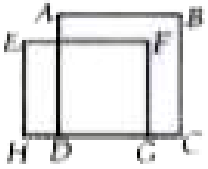
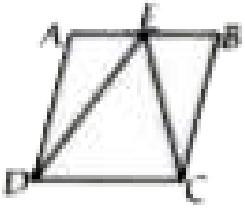
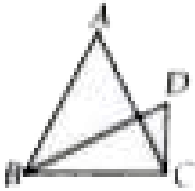
6. Which of the following figures lie on the same base and between the same parallels ?

A. 

B. 

C. 

D. all of these

Answer: B

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7. In a parallelogram ABCD, AB = 12 cm and the altitude corresponding to AB is 8 cm. If AD= 10 cm, then the altitude corresponding to AD is equal to

A. 8.5 cm

B. 9 cm

C. 9.6 cm

D. 10.8 cm

Answer: C

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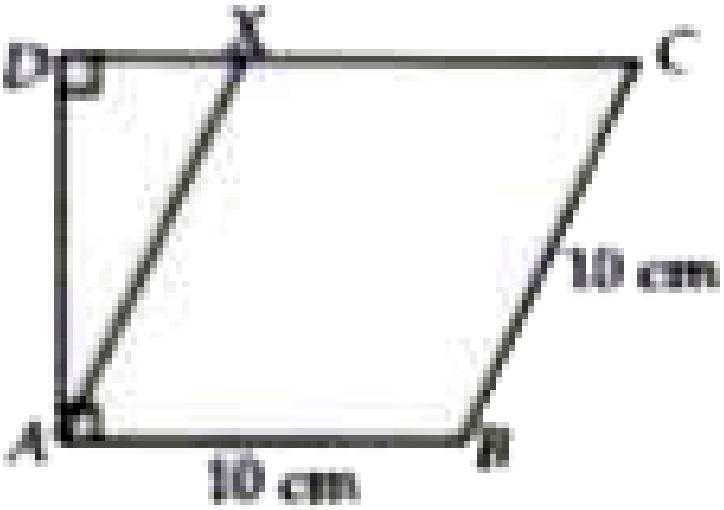
8. In the given figure, $\angle BAD = \angle$ADC = 90° and AX I I BC. If AB = BC = 10 cm and DC = 16 cm, then the area of ABCX is



A. 80 cm^2

B. 40 cm^2

C. 20 cm^2

D. 42 cm^2

Answer: A

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9. The area of a rhombus if the lengths of whose diagonals are 16 cm and 24 cm, is

A. 180 cm^2

B. 184 cm^2

C. 198 cm^2

D. 192 cm^2

Answer: D

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10. The area of a trapezium whose parallel sides are 9 cm & 16 cm and the distance between these sides is 8 cm, is

A. 60 cm^2

B. 72 cm^2

C. 56 cm^2

D. 100 cm^2

Answer: D

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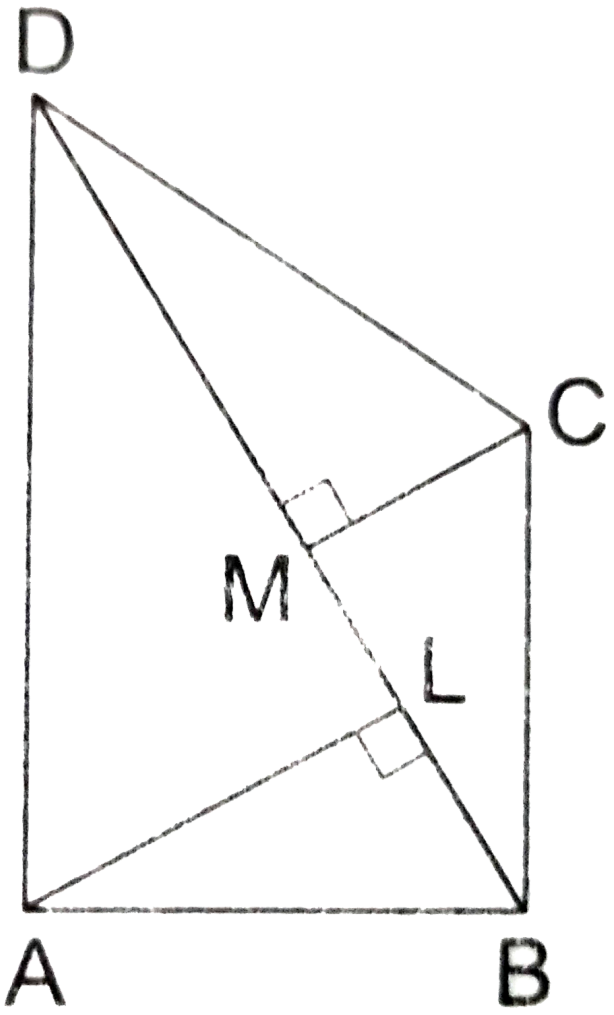
11. In the adjoining figure, ABCD is a quadrilateral in which diag. BD = 14 cm. If $AL \perp BD$ and $CM \perp BD$ such that AL = 8 cm and CM = 6 cm,

find the area of quad. ABCD.



A. 60 cm^2

B. 72 cm^2

C. 84 cm^2

D. 98 cm^2

Answer: D

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12. $p\ AND\ q$ are any two points lying on the sides $DC\ and\ AD$ respectively of a parallelogram $ABCD$. Show that $ar(APB) = ar\ (BQC)$.

A. ar(ΔAPB)

B. ar(ΔPBC)

C. ar(ΔAPD)

D. None of these

Answer: A

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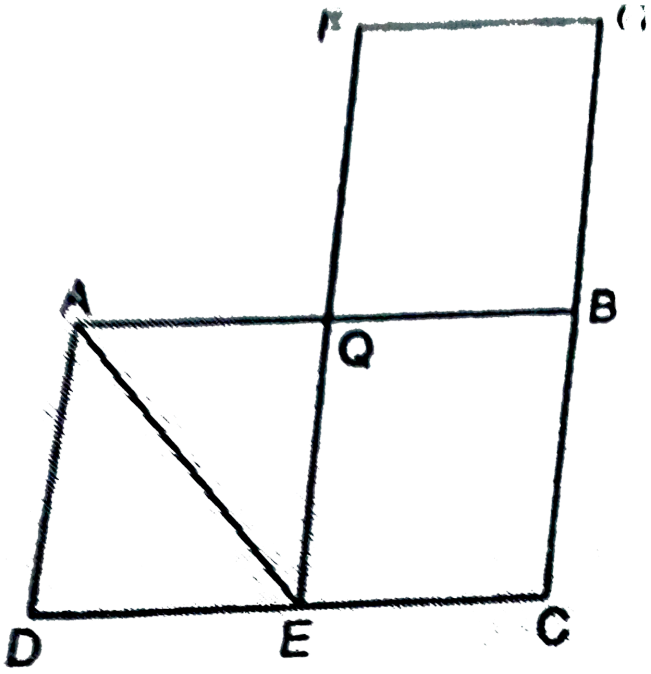
13. In the given figure, ABCD and FECG are parallelograms equal in area. If $ar(\Delta AQE) = 12cm^2$, find $ar(||gmFGBQ)$



A. 12 cm^2

B. 20 cm^2

C. 24 cm^2

D. 36 cm^2

Answer: C

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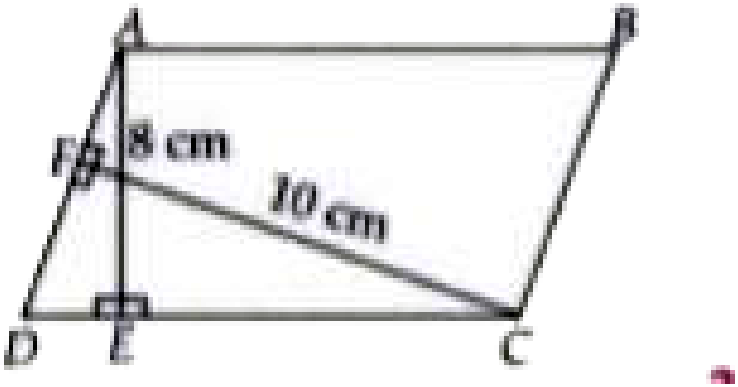
14. In figure, ABCD is a parallelogram, $AE \perp DC$ and $CF \perp AD$. If AD = 12 cm, AE = 8 cm and CF= 10 cm find CD.



A. 17 cm

B. 12 cm

C. 10 cm

D. 15 cm

Answer: D

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15. In a triangle ABC, E is the mid-point of median AD. Show that $ar\ (BED) = \frac{1}{4} ar\ (ABC)$

A. 2

B. 1/4

C. 4

D. 1/2

Answer: B

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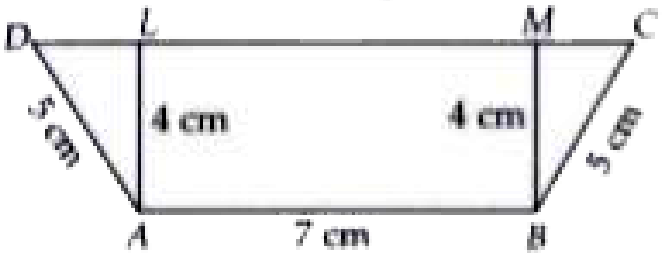
16. In figure, ABCD is a trapezium in which AB I I DC. Find the length of DC.



A. 17 cm

B. 11 cm

C. 13 cm

D. 15 cm

Answer: C

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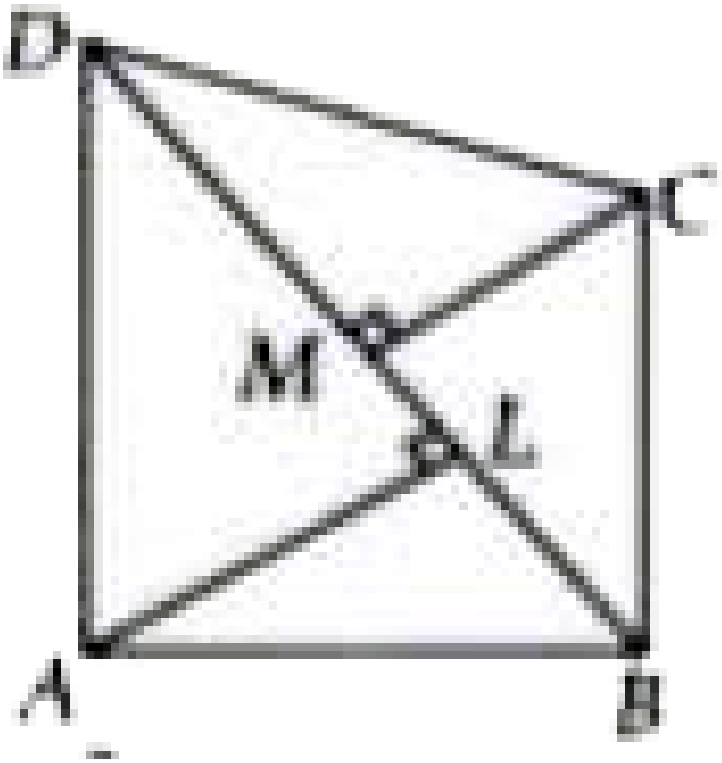
17. In the figure, ABCD is a quadrilateral BD = 20 cm. If $AL \perp BD$ and $CM \perp BD$ such that AL = 10 cm and CM = 5 cm, find the area of quad.

ABCD.



A. 150 cm^2

B. 180 cm^2

C. 100 cm^2

D. 140 cm^2

Answer: A

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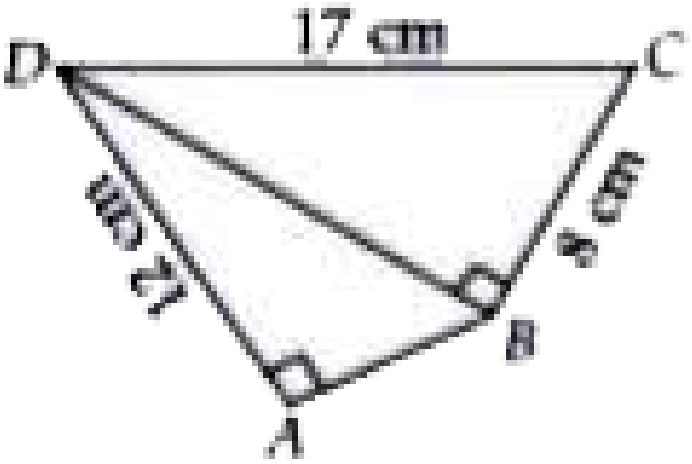
18. Calculate the area of quad. ABCD.



A. 102 cm^2

B. 154 cm^2

C. 132 cm^2

D. 114 cm^2

Answer: D

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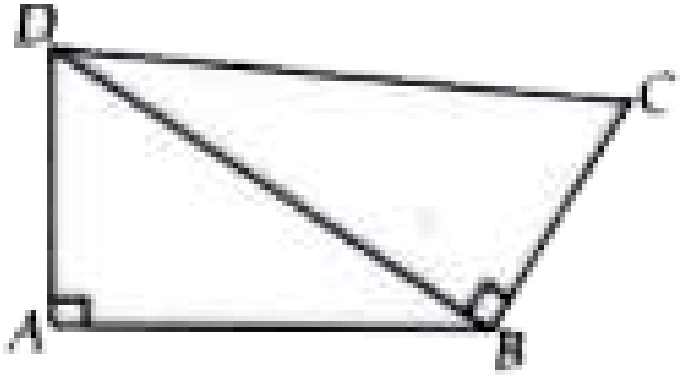
19. In the given figure, $AB \perp AD$, $BC \perp BD$ and AD = 9 cm, BC = 8 cm and CD= 17 cm. Find the area of quadrilateral ABCD



A. 112 cm^2

B. 114 cm^2

C. 119 cm^2

D. 117 cm^2

Answer: B

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20. If E, F, G and H are respectively the mid-points of the sides of a parallelogram $ABCD$, show that $ar(EFGH) = \frac{1}{2}ar(ABCD)$.

A. 1/3

B. 2/3

C. 4/3

D. 3/4

Answer: A

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21. PQRS is an isosceles trapezium in which PS = 10 cm, PQ = SR = 13 cm and the distance between PS and QR is 12 cm. Find the area of the trapezium.

A. 180 cm^2

B. 160 cm^2

C. 176 cm^2

D. 194 cm^2

Answer: A

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22. Theorem 9.1 : Parallelograms on the same base and between the same parallels are equal in area.

A. perimeter

B. volume

C. area

D. weight

Answer: C

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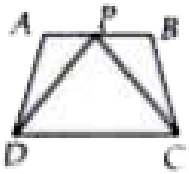
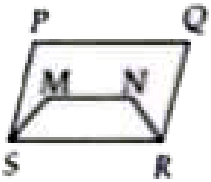
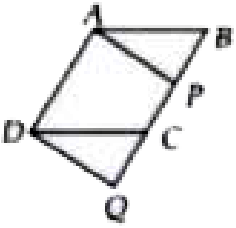
23. Which of the following figures lie on the same base and between the same parallels?

A. 

B. 

C. 

D. Both (a) and (c)

Answer: D

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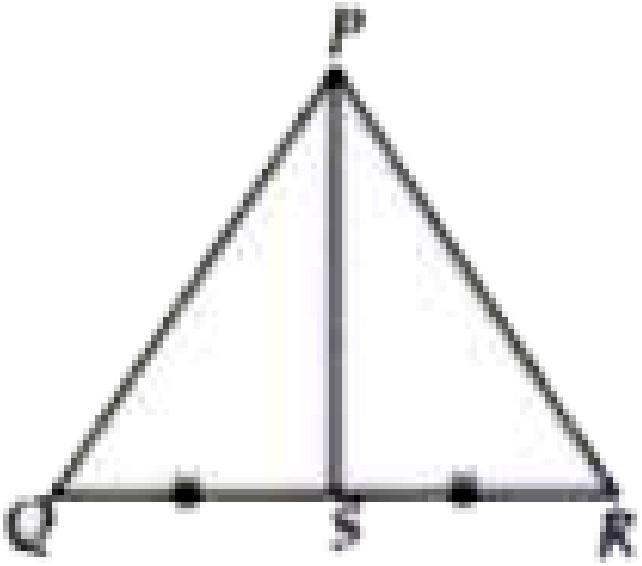
24. If PS is median of the triangle PQR, then ar(ΔPQS): ar(ΔQRP) is



A. 1 : 1

B. 2 : 1

C. 1 : 2

D. Can't be determined

Answer: C

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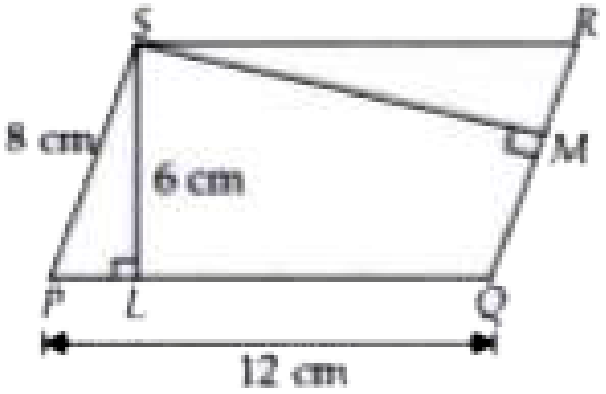
25. In parallelogram PQRS, find SM.



A. 9 cm

B. 7 cm

C. 5 cm

D. 12 cm

Answer: A

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26. In a trapezium ABCD, AB || DC, AB = a cm, and DC = b cm. If M and N are the midpoints of the nonparallel sides, AD and BC respectively then find the ratio of ar(DCNM) and ar(MNBA).

A. (3b +a) : (3a + b)

B. (3a + b) : (3b +a)

C. (2a + 3b): (3a + b)

D. (3a + 2b): (2a + 3b)

Answer: B

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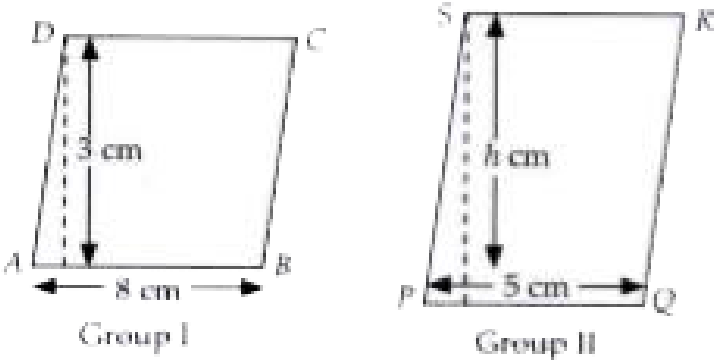
27. In a class, teacher gave two cardboard pieces having equal area which are in the shape of a parallelogram to two groups. Find h.



A. 4.8 cm

B. 9.6 cm

C. 2.2 cm

D. 4.6 cm

Answer: A

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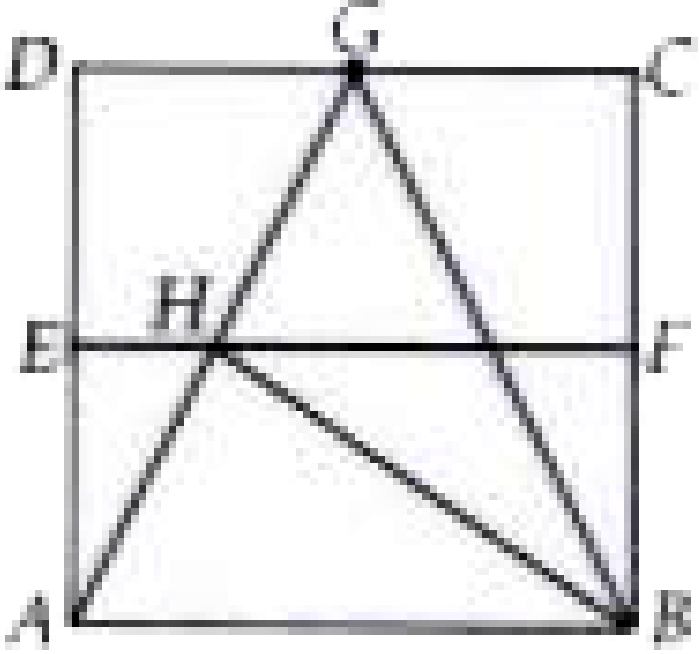
28. In the figure, ABCD is a square. E and Fare midpoints of AD and BC respectively. The ratio of areas of ΔGAB and ΔHAB



A. 4 : 1

B. 1 : 4

C. 1 : 2

D. 2 : 1

Answer: D

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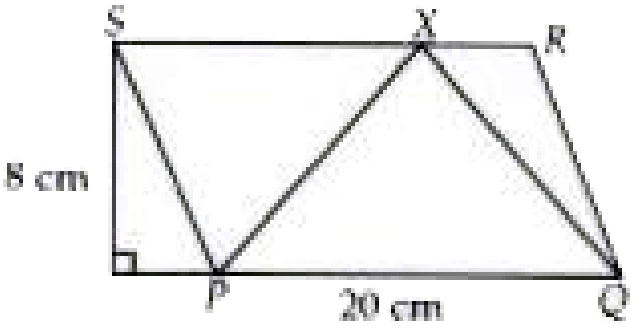
29. In the given figure, PQRS is parallelogram, then find the area of ΔPQX.



A. 80 cm^2

B. 40 cm^2

C. 120 cm^2

D. 60 cm^2

Answer: A

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30. If the area, base and corresponding altitude of a parallelogram are x^2, x - 3 and x + 4 respectively, then the value of x is

A. 12

B. 13

C. 3

D. 4

Answer: A

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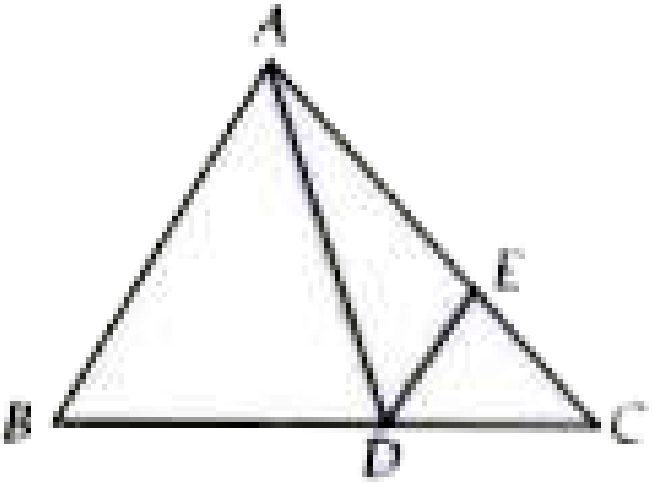
31. In the given figure, AD is the median and E is any point on AC, such that ar(ΔMDE) : ar(ΔABD) = 2 : 3, then find the ratio of ar(ΔEDC): ar(Δ

ABC).



A. 3 : 4

B. 1 : 6

C. 6 : 1

D. 4 : 3

Answer: B

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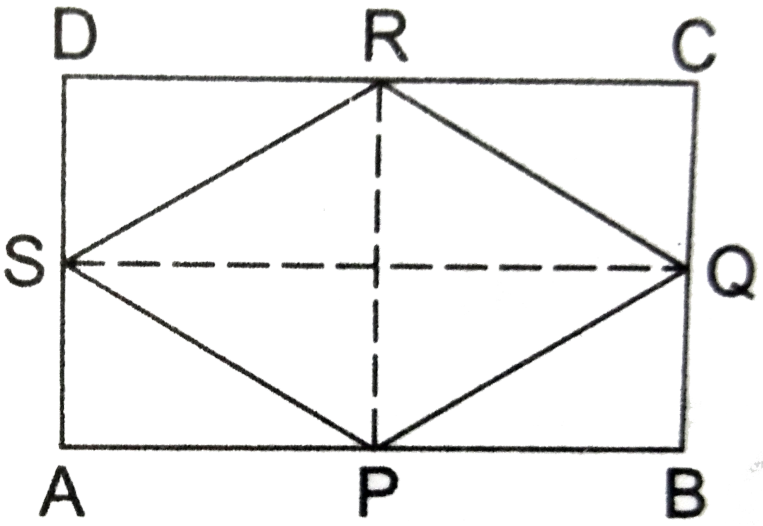
32. The figure formed by joining the midpoints of the adjacent sides of a rectangle of sides 8 cm and 6 cm is a



A. rectangle of area 24 cm^2

B. square of area 24 cm^2

C. trapezium of area 24 cm^2

D. rhombus of area 24 cm^2

Answer: D

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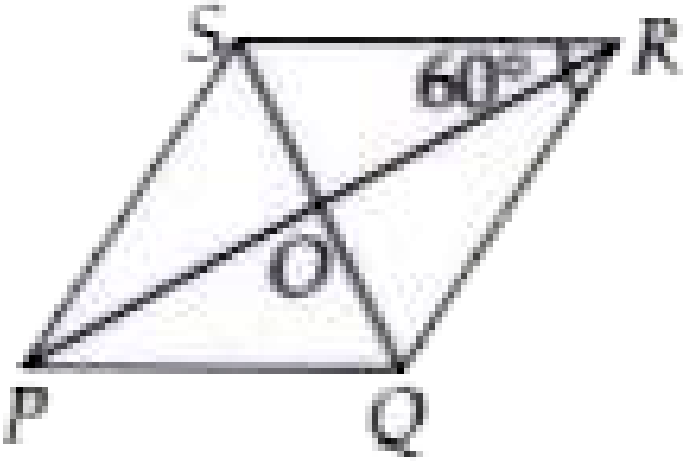
33. PQRS is a rhombus in which $\angle R = 60^{o}$. Then PR : QS =



A. $\sqrt{3}:1$

B. $\sqrt{3}:\sqrt{2}$

C. 3 : 1

D. 3 : 1

Answer: A

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34. The lengths of the diagonals of a rhombus are 12 cm and 16 cm. The area of the rhombus is

A. 192 cm^2

B. 96 cm^2

C. 64 cm^2

D. 80 cm^2

Answer: B

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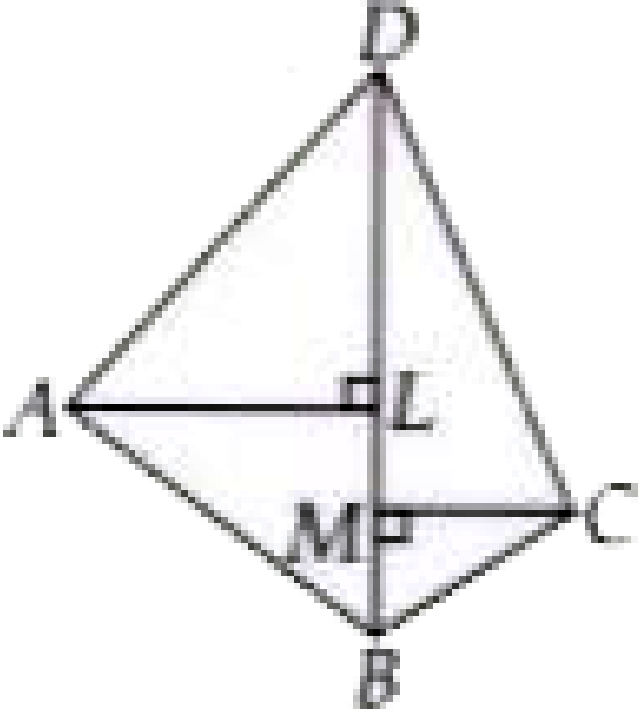
35. In a quadrilateral ABCD, it is given that BD = 16 cm. If $AL \perp BD$ and $CM \perp BD$ such that AL = 9 cm and CM = 7 cm, then ar(quad. ABCD) is



A. 256 cm^2

B. 128 cm^2

C. 64 cm^2

D. 96 cm^2

Answer: B

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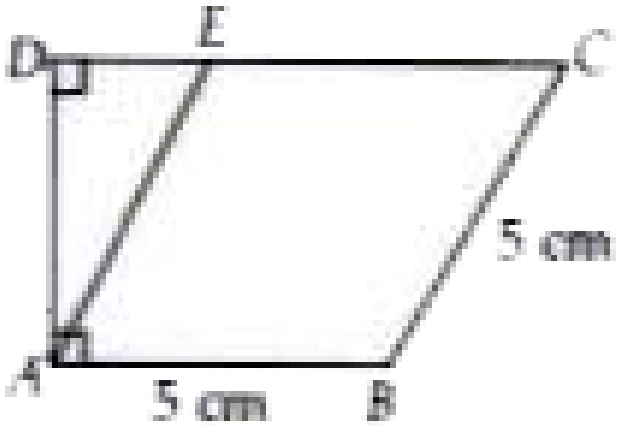
36. In. the figure the angles BAD and ADC are right angles and AE I I BC, if AB = BC = 5 cm and DC= 9 cm, find AD.



A. 3 cm

B. 4 cm

C. 12 cm

D. 6 cm

Answer: A

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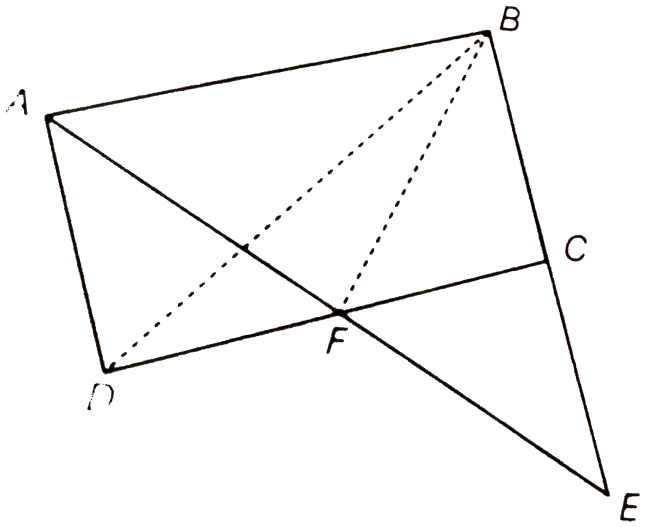
37. ABCD is a parallelogram in which BC is produced to E such that CE = BC. AE intersects CD at F.



If $ar(\Delta DFB) = 3cm^2$, then find the area of the parallelogram ABCD.

A. 6 cm^2

B. 12 cm^2

C. 9 cm^2

D. 18 cm^2

Answer: B

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38. A swimming pool, 30 m long has a depth of water of 80 cm at one end and 2.4 m the other end. Find the area of the vertical cross-section of the pool along the length.

A. 54 m^2

B. 48 m^2

C. 36 m^2

D. 42 m^2

Answer: B

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39. In a square PQRS, X and Y are mid points of sides PS and QR respectively. XY and QS intersect a t O. Find the area of ΔXOS, if PQ = 8 cm.

A. 6 cm^2

B. 12 cm^2

C. 4 cm^2

D. 8 cm^2

Answer: D

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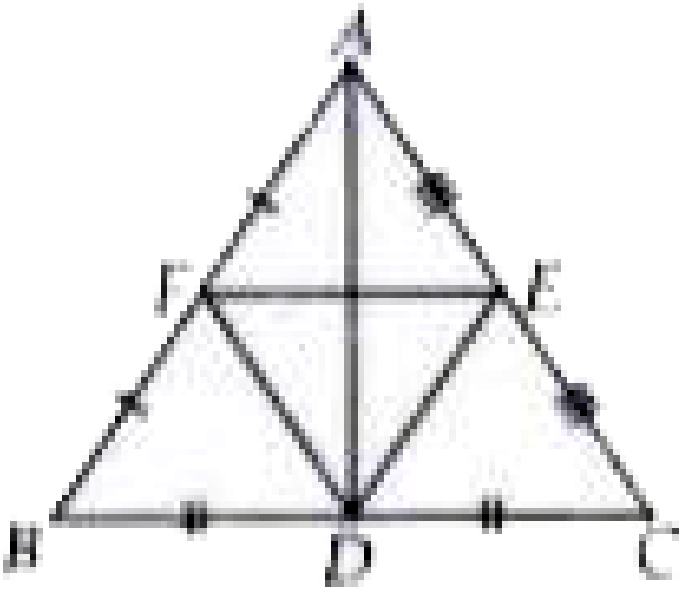
40. In figure, if ar(ΔABC) = 28 cm^2, then find ar(II^{gm} AEDF).



A. 21 cm^2

B. 18 cm^2

C. 16 cm^2

D. 14 cm^2

Answer: D

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41. Which of the following statements is false?

A. If the point D divides the side BC of MBC in the ratio m : n then ar(ΔABD) : ar(ΔADC) = m : n.

B. A quadrilateral formed by joining the midpoint of the sides of a quadrilateral in order, is a parallelogram.

C. If P is any point on the median AD of a ΔABC, then ar (ΔABP) $\neq$ ar (ΔACP).

D. None of these

Answer: C

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42. The medians of ΔABC intersect at point G. Prove that:

area of $\Delta AGB = \frac{1}{3} \times$ area of ΔABC

A. 4

B. 3

C. 1

D. 2

Answer: B

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43. The perimeter of an isosceles right triangle is 2p, its area is

A. $(3 - 2\sqrt{2})p^2$

B. $(1 - 2\sqrt{2})p^2$

C. $(3 + 2\sqrt{2})p^2$

D. $(1 + 2\sqrt{2})p^2$

Answer: A

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44. In the figure, the semicirce centered at O has a diam.eter 6 cm. The chord BC is parallel to AD and $BC = \frac{1}{2}AD$. The area of the trapezium ABCD in cm^2, is :

A. 4

B. $4\sqrt{2}$

C. 8

D. $8\sqrt{2}$

Answer: D

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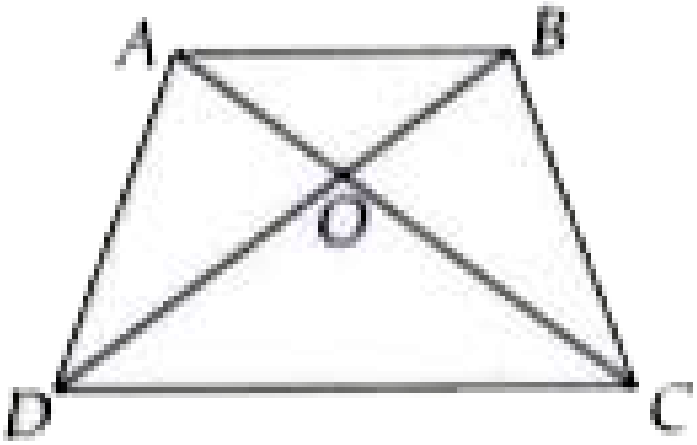
45. In the following figure, AB II CD. Diagonals AC and BD intersect at point O. If BO : OD = 1 : 3, then (area of ΔAOB)/(area of ΔABD) =



A. 1/4

B. 1/9

C. 16

D. 116

Answer: A

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Exercise Match The Following

1. In ΔABC, D and E are points on AB and AC respectively such that DE||BC and DE divides the ΔABC into two parts of equal areas. Then ratio of AD and BD is

A. P-4, Q-2, R-3, S -1

B. P-2, Q-4, R-1, S-3

C. P-3, Q-2, R-4, S-1

D. P-1, Q-2, R-3, S-4

Answer: B

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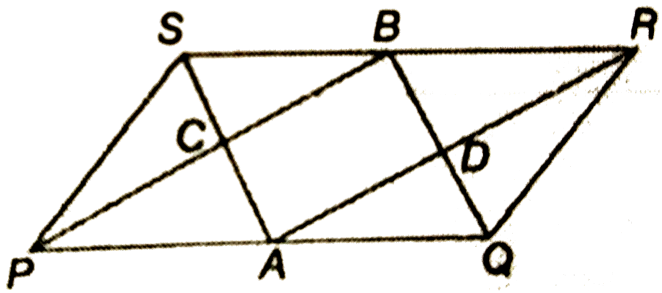
2. In the given figure, PQRS is a parallelogram. A and B are the mid-point of $\overline{PQ}$ and $\overline{SR}$ respectively. If PS=BR, then the quadrilateral ADBC is

a..... ,



A. P-4, Q-2, R-1, S-3

B. P-1, Q-2, R-3, S-4

C. P-2, Q-3, R-1, S-4

D. P-3, Q-1, R-4, S-2

Answer: D

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Exercise Assertion Reason Type

1. ABCD is a quadrilateral whose diagonals AC divides it into two parts, equal is area. Then, ABCD is

A. If both assertion and reason are tme and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is trne.

Answer: A

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2. Assertion : If the diagonals of a rhombus are 8 cm and 12 cm, then the area of rhombus is given by 96 cm^2.

Reason : Area o f rhombus is 1/2 $\times d_1 \times d_2$ where d_1 and d_2 are the lengths of the diagonals.

A. If both assertion and reason are tme and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is trne.

Answer: D

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3. Assertion : In a parallelogram PQRS, QS is one of the diagonals then ar(ΔPQS) = ar(ΔQRS)

Reason : If a planar region formed by a figure R is made up of two no

noverlapping planar regions formed by figures R_1 and R_2, then ar(R) = ar(R_1) + ar(R_2).

A. If both assertion and reason are tme and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is trne.

Answer: B

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4. Assertion : If area of ΔABD is equal to 24 cm^2 then a rea of p arallelogram ABCD is 24 cm^2

Reason : If a triangle and a parallelogram are on the same base and between same parallels, then area of the triangle is equ al to h alf of the parallelogram.

A. If both assertion and reason are tme and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is trne.

Answer: D

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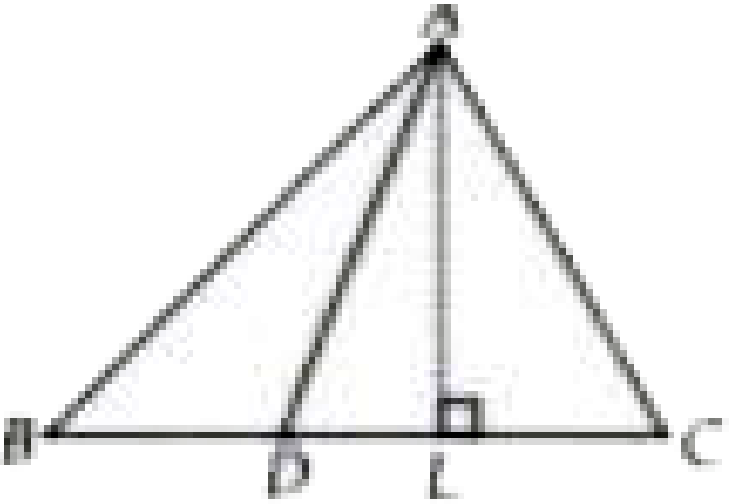
5. Assertion : In the given fig ure, the point D divides the side BC of $\triangle ABC$ in the ratio $m:n$, then ratio of $ar(ABD)$ and $ar(ADC)$ is $m:n$



Reason : Area of triangle = 1/2 $\times$ Base $\times$ Height

A. If both assertion and reason are tme and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is trne.

Answer: A

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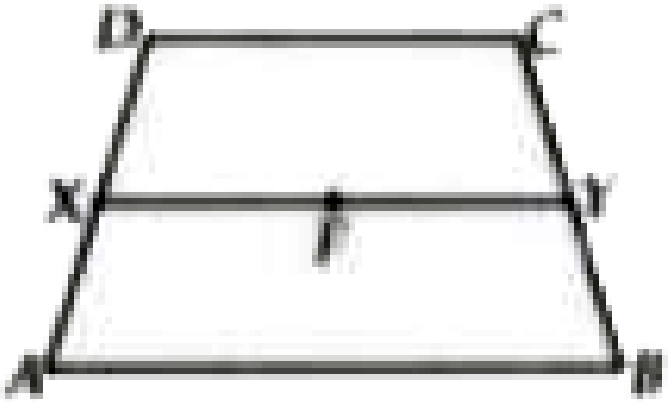
Exercise Comprehension Type

1. ABCD is a trapezium in which AB || DC a and DC= 40 cm and AB = 60 cm.

If X and Y a re respectively, the midpoints of AD and BC, then



XY=

A. 40 cm

B. 50 cm

C. 60 cm

D. 30 cm

Answer: B

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2. ABCD is trapezium in which $AB \| DC$, DC = 30 cm and AB = 50 cm. If X and Y are, respectively the mid-points of AD and BC, prove that $ar(DCYX) = \frac{7}{9}ar(XYBA)$.

A. Trapezium

B. Parallelogram

C. Rectangle

D. Square

Answer: A

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3. ABCD is trapezium in which $AB \| DC$, DC = 30 cm and AB = 50 cm. If X and Y are, respectively the mid-points of AD and BC, prove that $ar(DCYX) = \frac{7}{9}ar(XYBA)$.

A. 1/2

B. 2

C. 11/9

D. 9/11

Answer: D

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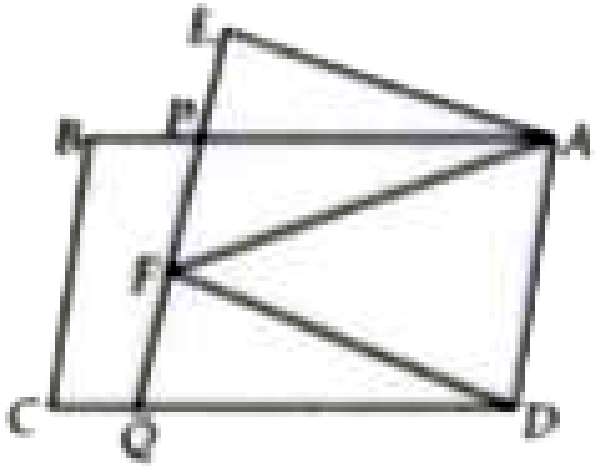
4. In the given figure, ABCD and AEFD a re two parallelograms.



PE =

A. BP

B. FQ

C. AP

D. CQ

Answer: B

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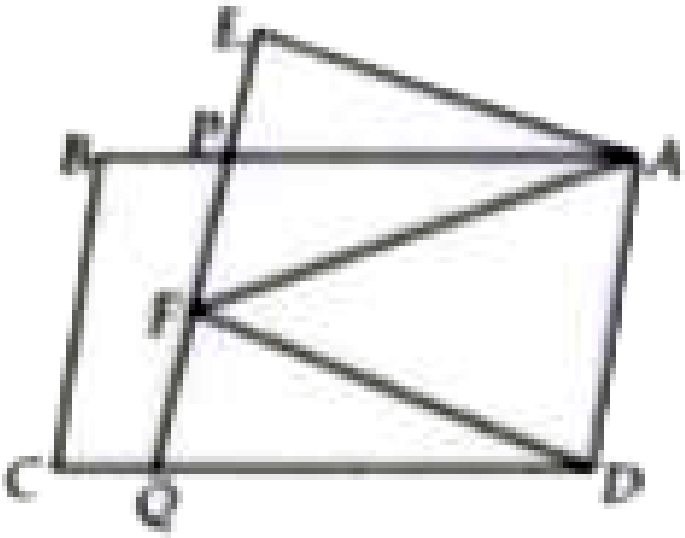
5. In the given figure, ABCD and AEFD a re two parallelograms.



(ar(ΔAPE))/(ar(ΔPFA)) =

A. (ar(ΔQFD))/(ar(ΔPFD))

B. (ar(ΔAEF))/(ar(ΔPFD))

C. (ar(ΔQFD))/(ar(ΔAEF))

D. None of these

Answer: A

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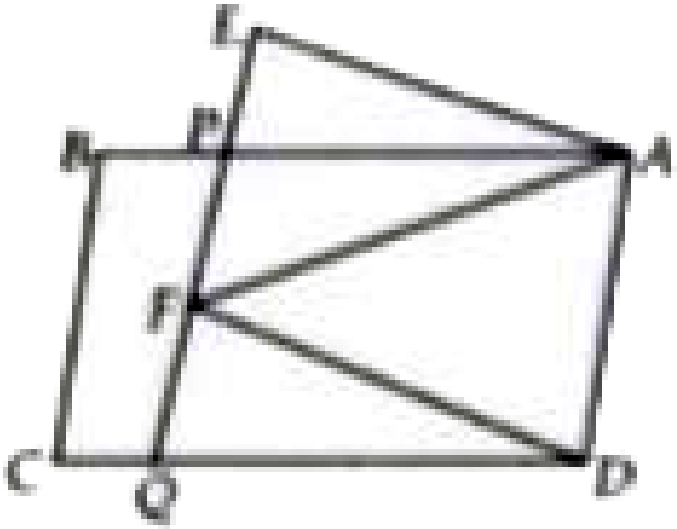
6. In the given figure, ABCD and AEFD a re two parallelograms.



ar(ΔPEA) =

A. ar($|\ |^{gm}$ ΔPEA)

B. ar(ΔPFD)

C. ar(ΔQFD)

D. ar($|\ |^{gm}$ ΔCQPB)

Answer: C

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Exercise Subjective Problems Very Short Answer Type

1. If P is any point in the interior of a parallelogram $ABCD$, then prove that area of the triangle APB is less than half the are of parallelogram.

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2. O' is any point on diagonal AC of a parallelogram ABCD. Prove that :

area of $\Delta AOD =$ area of ΔAOB

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3. BD is one of the diagonals of a quadrilateral $ABCD\cdot AM\ and\ CN$ are the perpendiculars from $A\ and\ C$, respectively, on $BD\cdot$ Show That $ar\left(qua\ddot{A}BCD\right) = \frac{1}{2}BDAM\dot{+}CN$

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4. $ABCD$ is a quadrilateral. A line through D, parallel to AC, meets BC produced in P as shown in Figure. Prove that $ar\,(ABP) = ar\left(Qua\ddot{A}BCD\right)$.

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5. If ar(ΔABC) = 16 cm^2 then find the area of the triangle formed by joining the mid points of the sides of ΔABC.

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6. Find the a rea of a rhombus with length of diagonals as 8 cm and 14 cm

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7. In the adjoining figure, find the area of the parallelogram ABCD.

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8. What is the ratio of areas of two parallelograms on equal bases and between the same parallels?

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9. What can you say about the area of two congruent figures?

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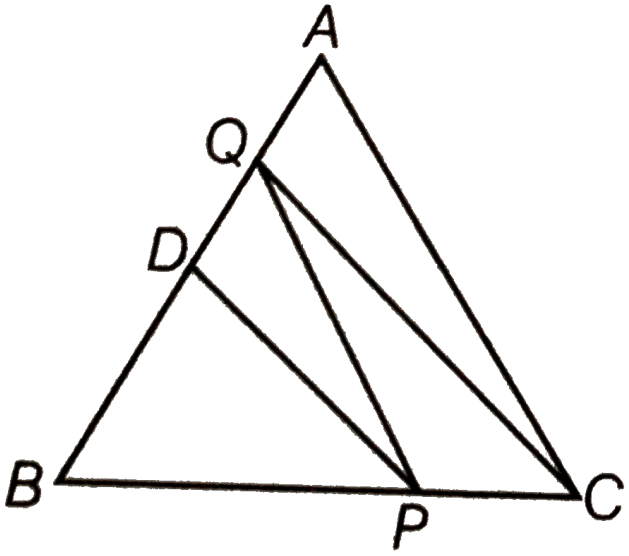
Exercise Subjective Problems Short Answer Type

1. In Δ ABC, D is the mid-point of AB and P is any point on BC. If $CQ \| PD$ meets AB and Q (shown in figure), then prove that $ar(\Delta BPQ) = \frac{1}{2} ar(\Delta ABC)$.



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2. ABCD is a trapezium in which AB I I DC. DC is produced to E such tha t CE= AB, prove that ar(ΔABD) = ar(ΔBCE).

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3. Prove that the area of an equilateral triangle is equal to $\frac{\sqrt{3}}{4}a^2$, where a is the side of the triangle.

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4. In the given figure, ABCD is a parallelogram. E and F are any two points on AB and BC, respectively. Prove that $ar(\triangle ADF) = ar(\triangle DCE)$.

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Exercise Subjective Problems Long Answer Type

1. ABCD is a parallelogram. X and Y are mid-points of BC and CD. Prove that $ar(\triangle AXY) = \frac{3}{8}ar(|^{gm} ABCD)$

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2. The median BE and CF of a triangle ABC intersect at G. Prove that the area of $\Delta GBC =$ area of the quadrilateral AFGE.

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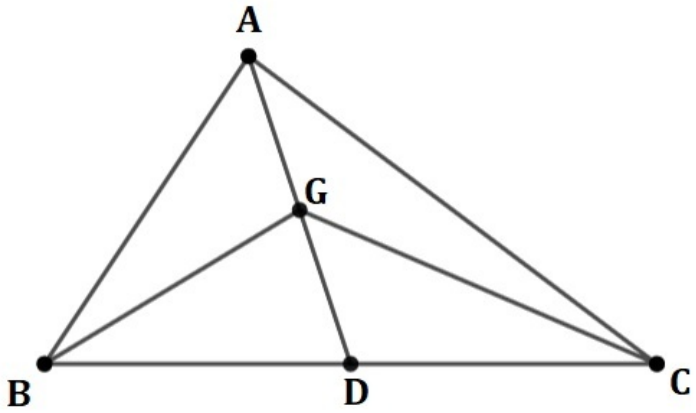
3. AD is a median of triangle ABC. G is a mid point of AD. If area of triangle ABC is 16 sq. cm. Find the area of triangle GDC



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Exercise Integer Numerical Value Type

1. In parallelogram ABCD, AB = 10 cm. The altitudes corresponding to the sides AB and AD are respectively 7 cm and 8 cm. If AD is k cm. Then value of 4 k is

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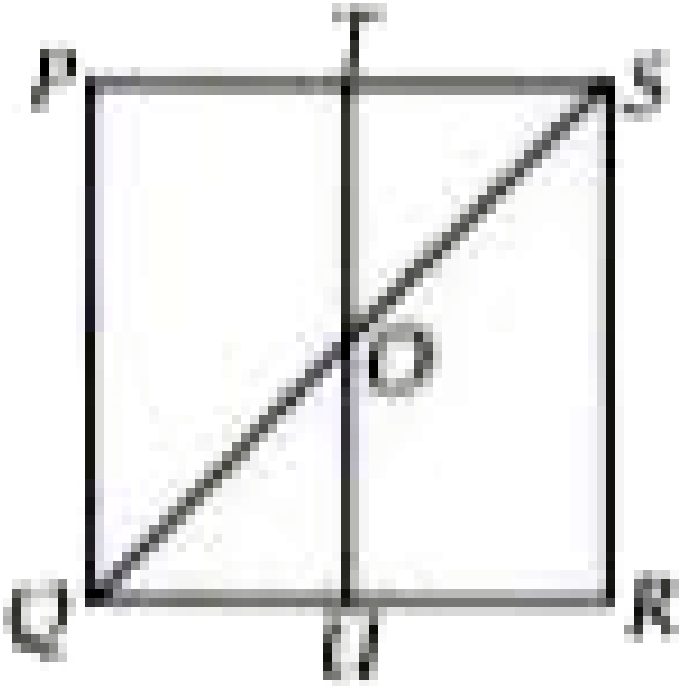
2. In the given figure, PQRS is a square and T and U are respectively, the mid-points of PS and QR. Then what is the area of ΔOTS if PQ = 8 cm?



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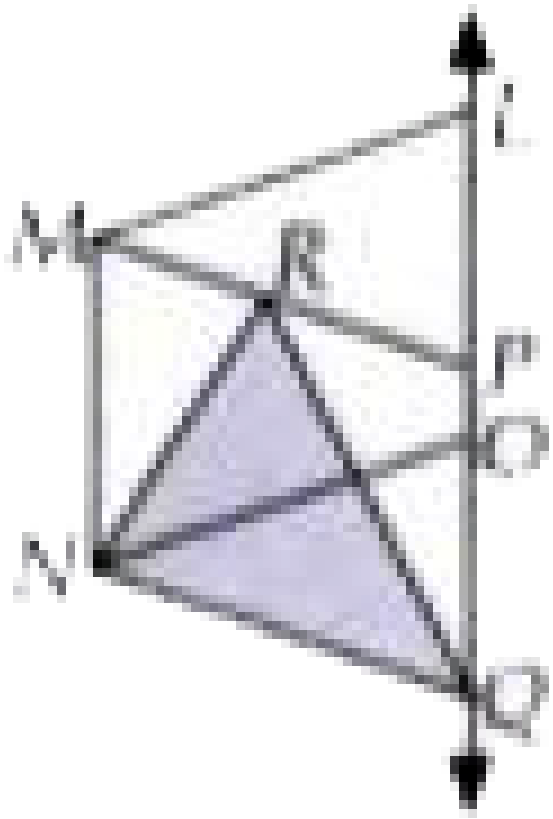
3. In the given figure LMNO and PMNQ are two parallelograms. R is any point on side MP. If ar(ΔNRQ) = k[ar(II^{gm} LMNO)] then 2k equals



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4. D is the mid-point of side BC of ΔABC and E is the mid-point of BO. If O is the mid-point of AE, then ar(ΔBOE) = 1/k ar(ΔABC). Then k equals

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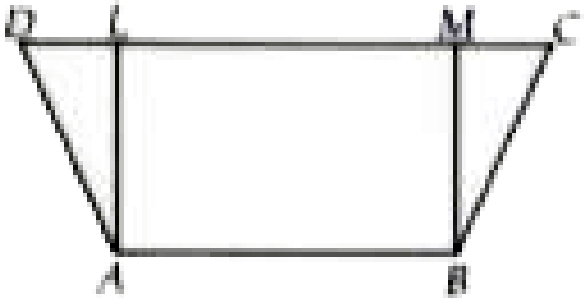
5. In the given figure, ABCD is a trapezium in which AB = 9 cm, AD = BC= 6 cm, DC = x cm, and distance between AB and DC is $2\sqrt{5}$ cm. The value of area of trapezium ABCD is k$\sqrt{5}$. Find the value of k.



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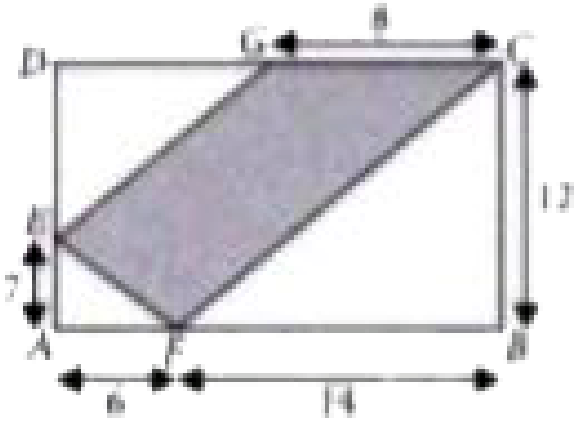
Olympiad Hots Corner

1. In the given figure ABCD is a rectangle and all measurements are in centimeters. Find the area of the shaded region.



A. $240cm^2$

B. $205cm^2$

C. $105cm^2$

D. $95cm^2$

Answer: C

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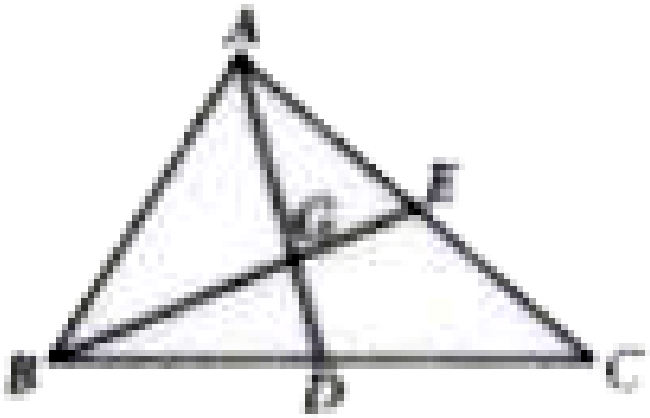
2. In given ΔABC, AD and BE are medians of triangle which intersect each other at point G. If area of ΔBDG is 1 cm^2, then what is the area of

DCEG?



A. 2 cm^2

B. $3cm^2$

C. $4cm^2$

D. $1cm^2$

Answer: A

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3. If side of a square is increased by 20% then the percentage increase in its area is

A. 40%

B. 20%

C. 44%

D. 30%

Answer: C

View Text Solution

4. If each sides of a triangle is doubled then find the ratio of the area of the new triangle thus formed and the given triangle.

A. $1:2$

B. $1:3$

C. $1:4$

D. $2:3$

Answer: C

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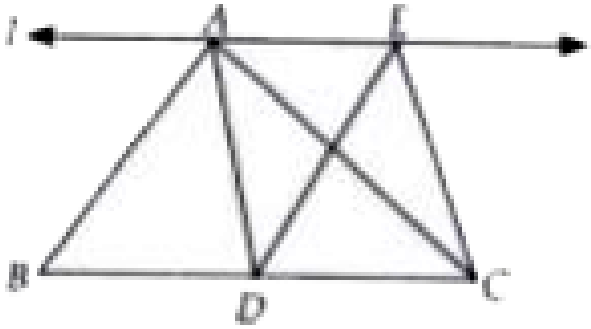
5. In the given figure, $l \| BC$ and D is the mid-point of BC. If area $(\Delta ABC) = a$ x area(ΔEDC), then find the value of a.



A. 1

B. 2

C. 3

D. 4

Answer: B

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6. The perimeter of the rectangular field is 206 meter. What will be its area (in m^2) if its length is 23 meter more than its breadth ?

A. 1520

B. 2420

C. 2480

D. 2520

Answer: D

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7. A person walked diagonally across a square plot. Approximately, what was the percentage saved by not walking along the edges?

A. 0.35

B. 0.3

C. 0.2

D. 0.25

Answer: B

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8. The perimeter of a right angled triangle is 24 cm. If its hypotenuse is 10 cm then area of this triangle is

A. 24 cm^2

B. 10 cm^2

C. 12 cm^2

D. 48 cm^2

Answer: A

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9. In parallelogram ABCD, let AM be the altitude corresponding to the base BC and CN the altitude corresponding to the base AB. If AB = 10 cm, AM = 6 cm and CN = 12 cm, then BC= __ cm.

A. 20

B. 10

C. 12

D. 5

Answer: A

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10. In triangle ABC,D is the midpoint of AB, E is the midpoint of DB and F is the midpoint of BC. If the area of ΔABC is 96, the area of ΔAEF is

A. 16

B. 24

C. 32

D. 36

Answer: D

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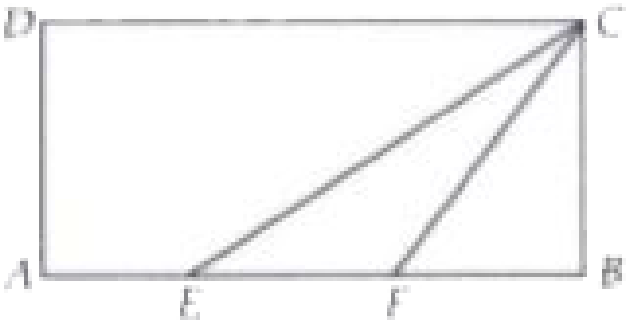
11. In the figure ABCD is a rectangle with AE = EF = FB, the ratio of the areas of triangle CEF and that of rectangle ABCD is



A. $1:6$

B. $1:8$

C. $1:9$

D. $1:10$

Answer: A

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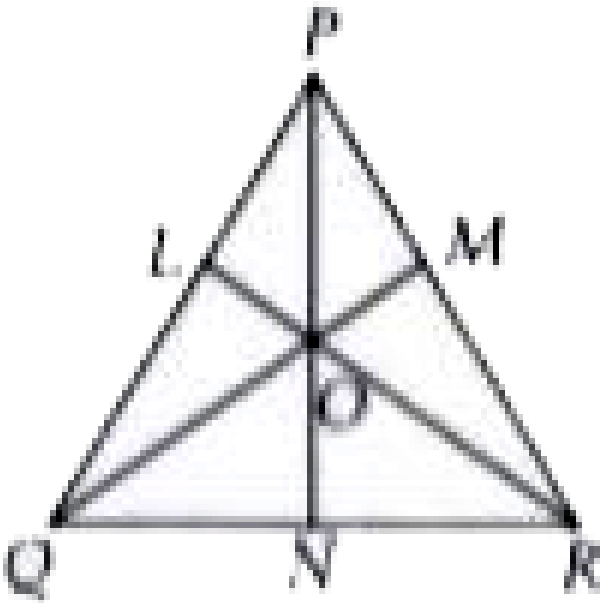
12. If the medians of ΔPQR intersect at O, then ar (ΔPOQ) =



A. ar (ΔQOR)

B. $\frac{1}{3}ar(\Delta PQR)$

C. Both (a) and (b)

D. Neither (a) nor (b)

Answer: C

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13. In the figure, the area of square $ABCDis4cm^2$ and E any point on AB,F,H and K are the mid point of $DE, CF, DG,$ and CH respectively. The area of ΔKDC is -

A. $\frac{1}{4}cm^2$

B. $\frac{1}{8}cm^2$

C. $\frac{1}{16}cm^2$

D. $\frac{1}{32}cm^2$

Answer: B

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14. The diagonals of a parallelogram ABCD intersect at a point O. Through O, a line a drawn to intersect AD at P and BC at Q. Show that PQ divides the parallelogram into two parts of equal area.

A. Two parts of equal area

B. Two parts of area in 2 : 1

C. Two parts of area in 1 : 3

D. Two parts of area in 4 : 3

Answer: A

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