MATHS

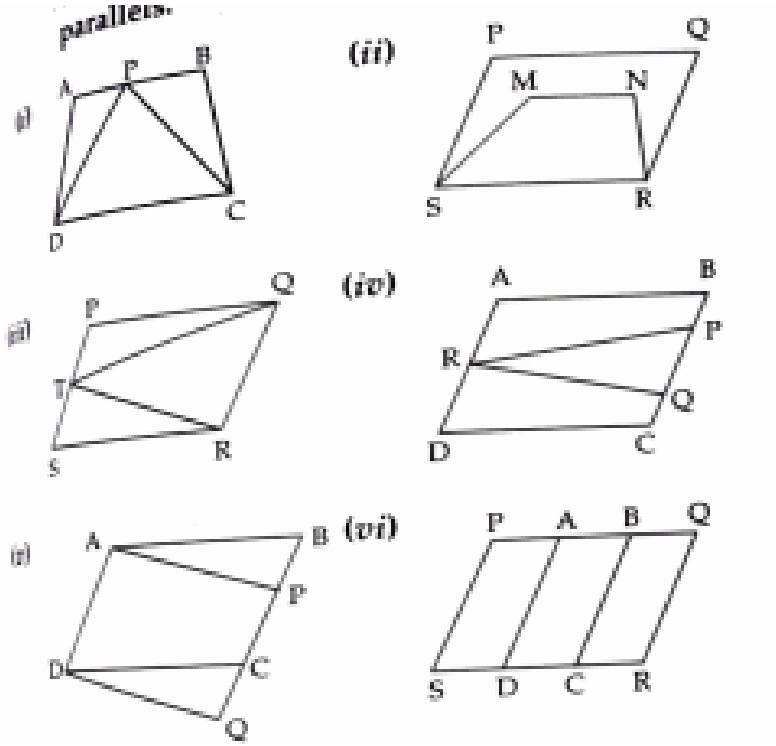
BOOKS - SWAN PUBLICATION

AREAS OF PARALLELOGRAMS AND TRIANGLES

Exercise 9 1

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

Insuch a case, write the common base and the two parallels.



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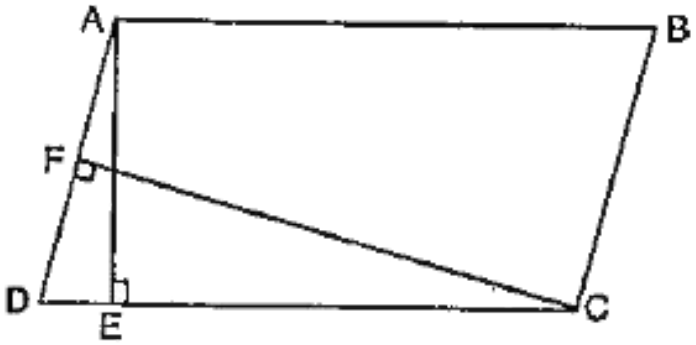
Exercise 9 2

1. In Fig ., ABCD is 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 parallelogram ABCD. Show that ar (APB) = ar (BQC).

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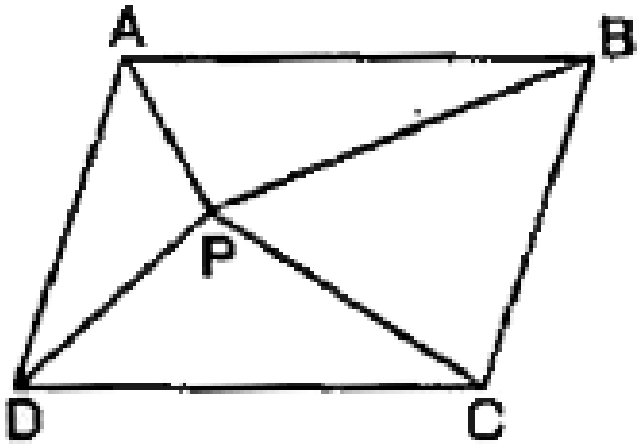
4. In Fig ., P is a point in the interior of a parallelogram ABCD . Show that



$$ar(APB) + ar(PCD) = \frac{1}{2}ar(ABCD)$$

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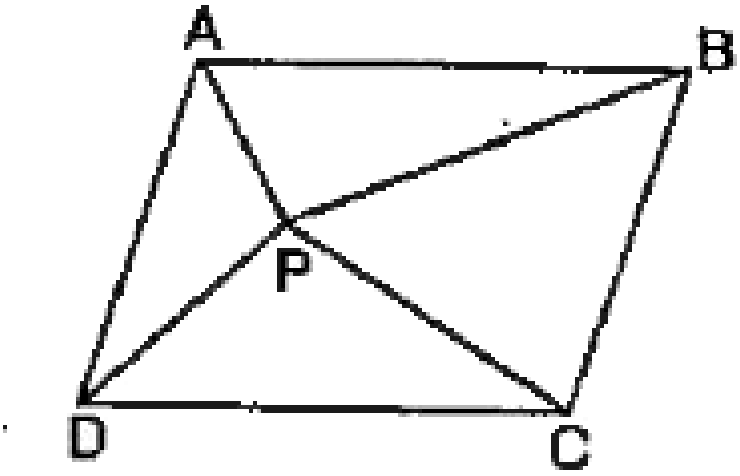
5. In Fig ., P is a point in the interior of a parallelogram ABCD . Show that



$$ar(APD) + ar(PBC) = ar(APB) + ar(PCD)$$

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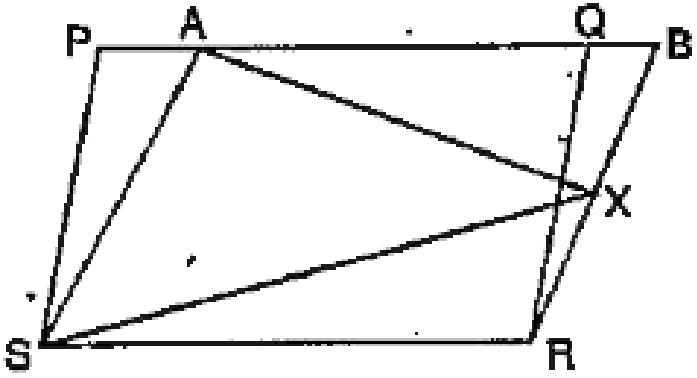
6. In Fig ., PQRS and ABRS are parallelograms and X is any point on side BR .Show that $ar(PQES) = ar(ABRS)$



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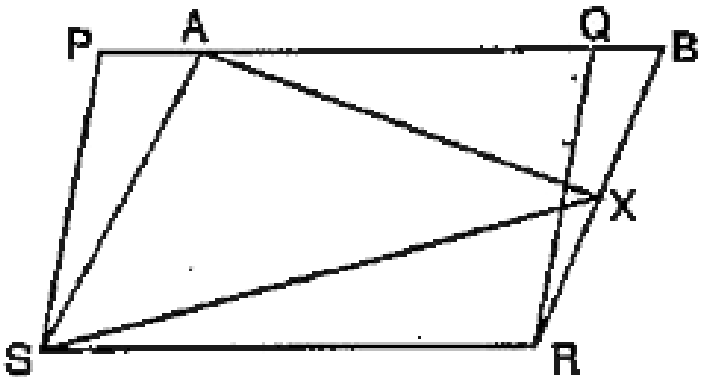
7. In Fig ., PQRS and ABRS are parallelograms and X is any point on side BR .Show that



$ar(AXS) = \frac{1}{2}$ ar (PQRS)

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8. 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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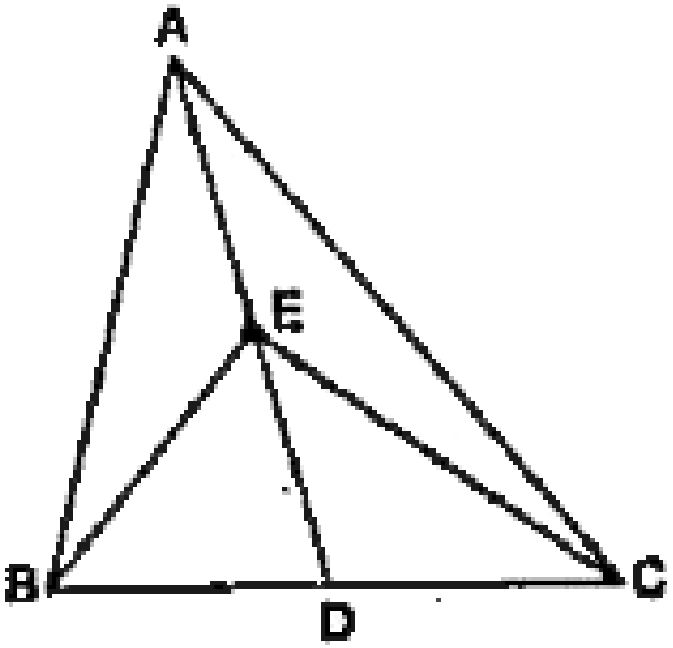
Exercise 9 3

1. In Fig ., E is any point on median AD of a ΔABC . Show that ar (ABE = ar (ACE) .



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2. E is any point on median AD of a $\triangle ABC$.

Show that ar (ABE) = ar (ACE).

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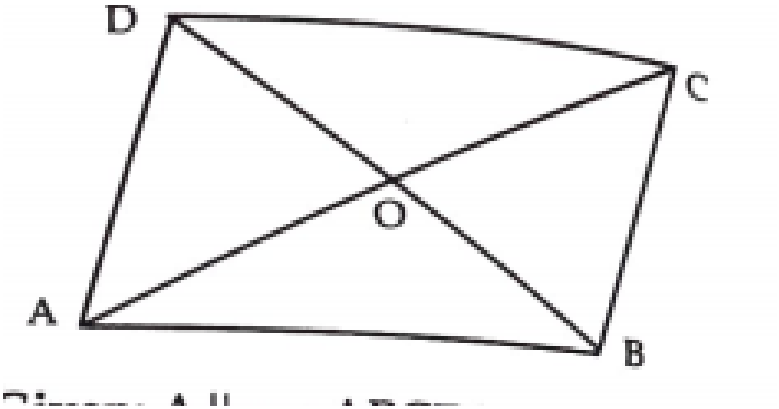
3. Show that the diagonals of a parallelogram divide it into four triangles of equal area.



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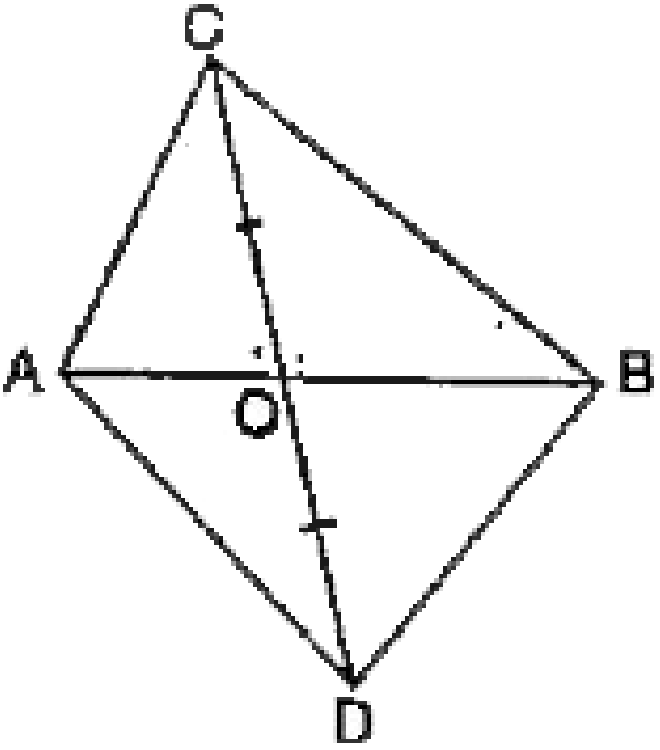
4. In Fig ., ABC and ABD are two triangles on the same base AB . If line -segment CD is

bisected by AB at O, show that ar (ABC) = ar (ABD) .



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5. D, E and F are respectively 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 $\triangle ABC$. Show that:- BDEF is a parallelogram.

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7. D, E and F are respectively the mid-points of the sides BC, CA and AB of a $\triangle ABC$. Show that:- BDEF is a parallelogram.

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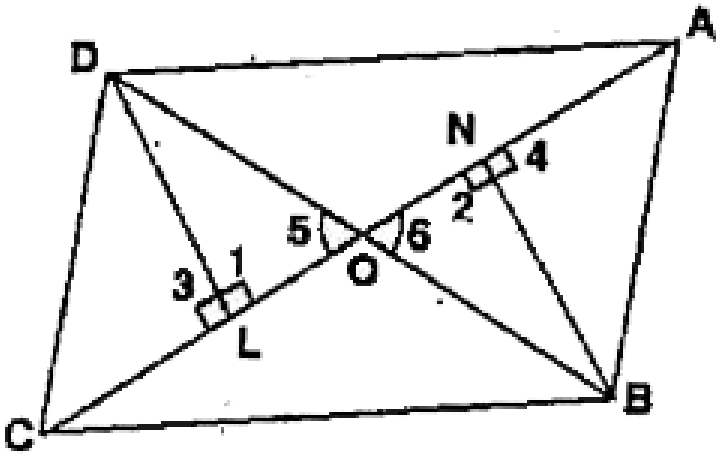
8. In Fig ., diagonals AC and BD of quadrilateral ABCD intrsect at O such that OB =OD . If AB = CD , then show that :



ar (DOC)=ar(AOB)

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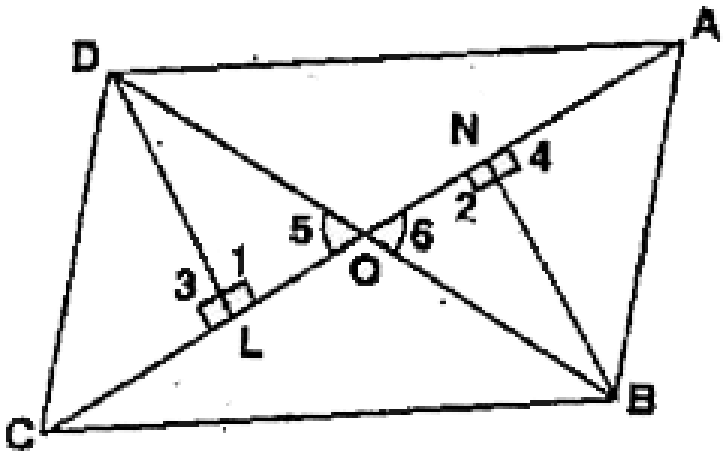
9. In Fig ., diagonals AC and BD of quadrilateral aBCD intrsect at O such that OB =OD . If AB = CD , then show that :



ar (DCB)=ar (ACB)

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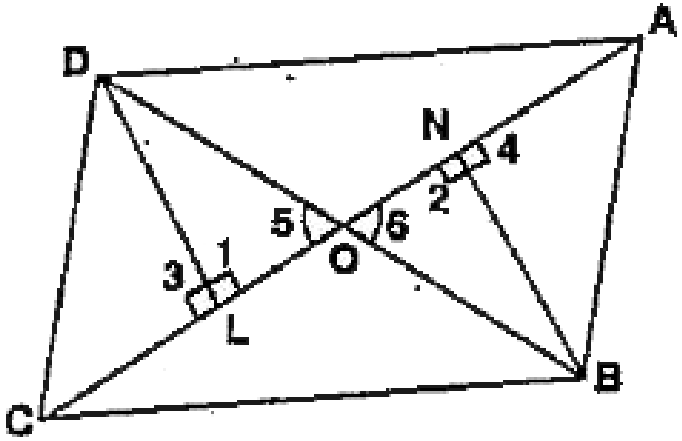
10. In Fig ., diagonals AC and BD of quadrilateral ABCD intrsect at O such that OB =OD . If AB = CD , then show that :



$DA \mid\mid CB$ 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 (DBC) = ar (EBC). Prove that $DEIIBC$.

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12. XY is a line parallel to side BC of triangle ABC. If $BEIIAC$ and $CFIIAB$ 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). [Hint : Join AC and

PQ. Now compare ar (ACQ) and ar (APQ).]

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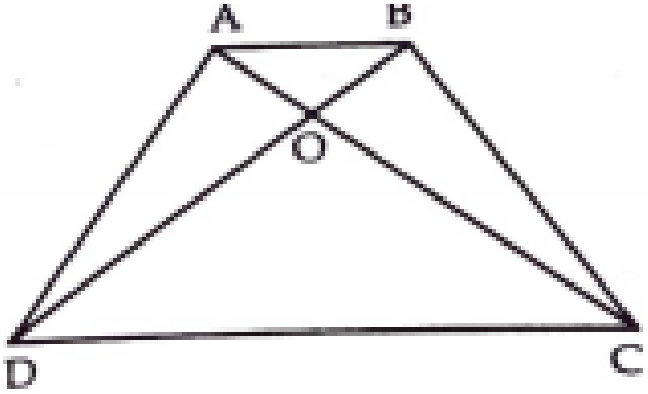
14. In the figure. ABCD in a trapezium in which AB||DC. Proe that $ar(\triangle AOD) = ar(\triangle BOC)$



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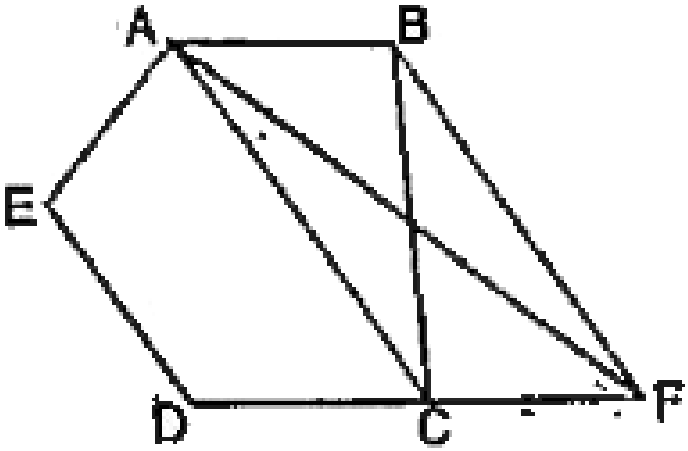
15. In Fig ., ABCDE is a pentagon . A line through B parallel to AC meets DC produced at F . Show that



ar (ACB)=ar (ACF)

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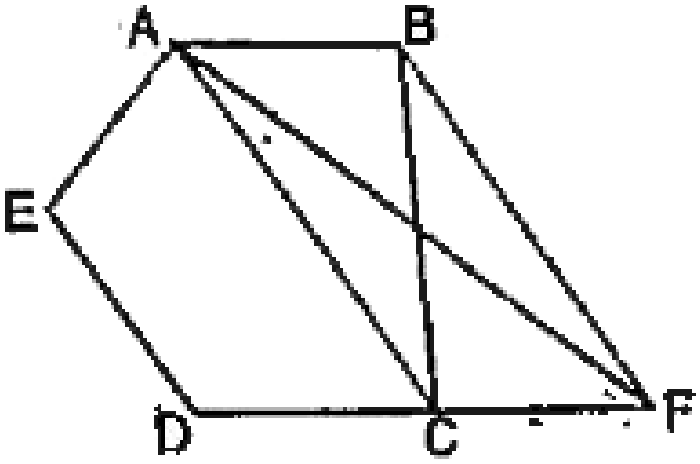
16. In Fig ., ABCDE is a pentagon . A line through B parallel to AC meets DC produced at F . Show that



ar(AEDF) = ar (ABCDE)

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17. Find the area of a square plot of side 8m.

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18. ABCD is a trapezium with AB || DC. A line parallel to AC intersects AB at X and BC at Y. Prove that ar (ADX) = ar (ACY). [Hint : Join CX.]

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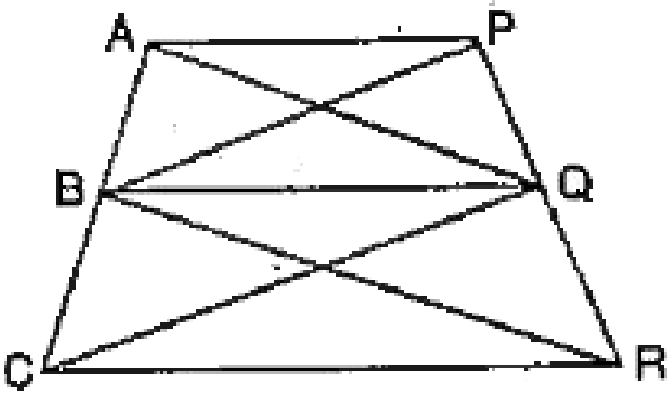
19. In Fig ., AP||BQ ||CR . Prove that $ar(\Delta PBR) = ar(\Delta AQC)$



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20. Diagonals AC and BD of a quadrilateral ABCD intersect at O in such a way that ar

(AOD) = ar (BOC). Prove that ABCD is a trapezium.

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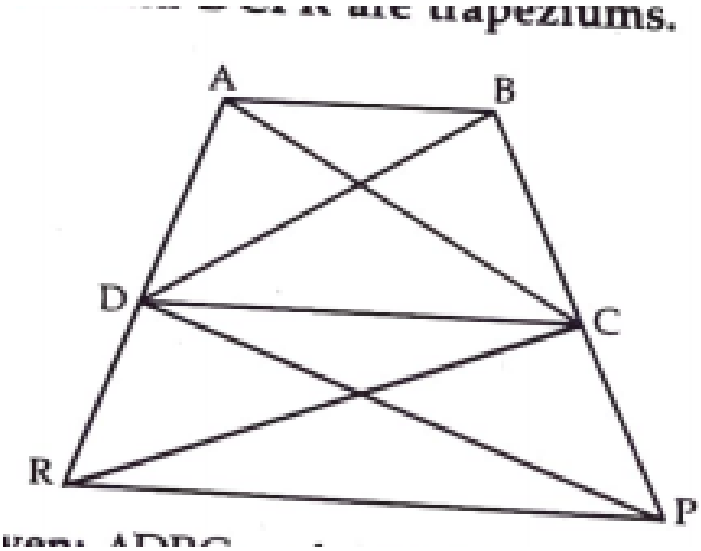
21.



ar(DRC) = ar(DPC) and ar(BDP) = ar(ARC). Show that

both the quadrilaterals ABCD and DCPR are trapeziums.

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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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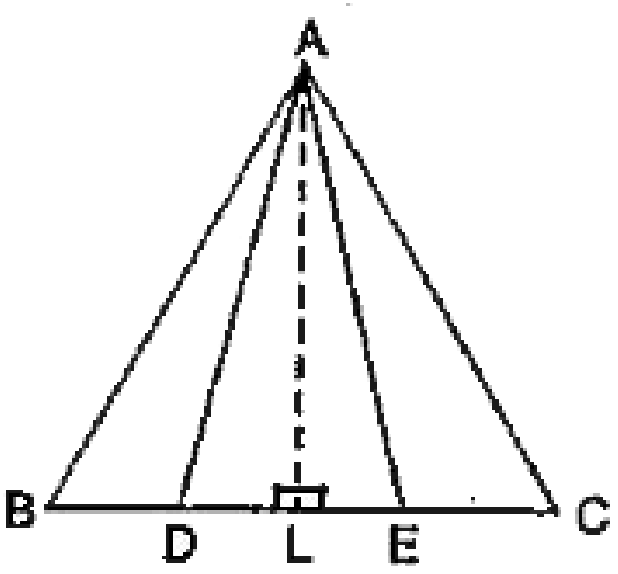
2. In Fig ., D and E are two points on BC such that BD = DE = EC . Show that ar (ABD) = ar (ADE) = ar (AEC).



Can you now answer the question that you have left in the introduction of this chapter ,

whether the field of Budhia has been actually divided into three parts of equal area ?

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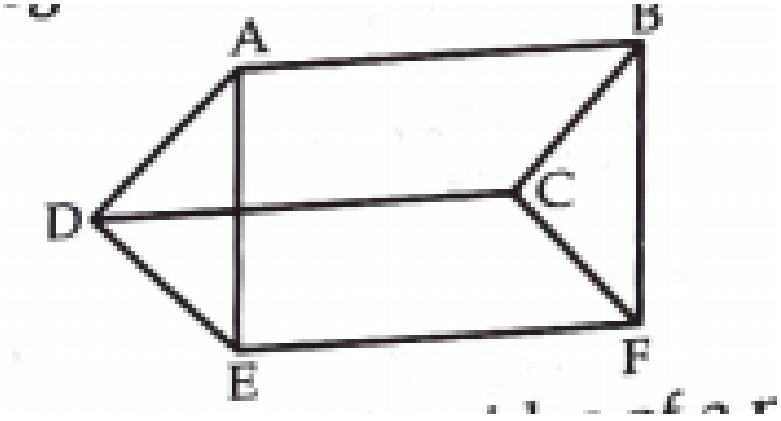
3.



ABCD, DCFE and ABFE are parallelograms. Show that ar(ADE) = ar(BCF)

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4. 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(BPC) = ar(DPQ)

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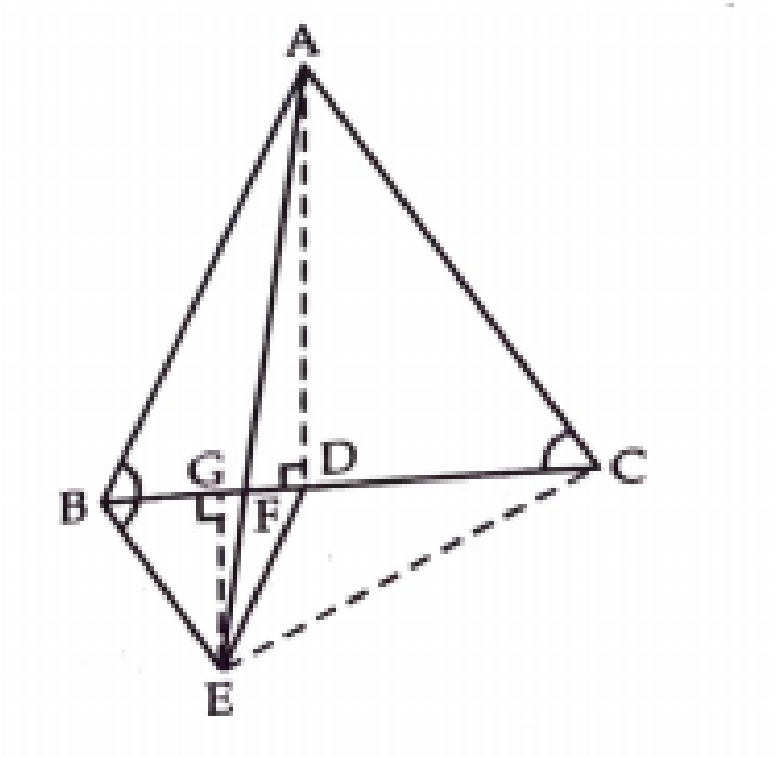
5.



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

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

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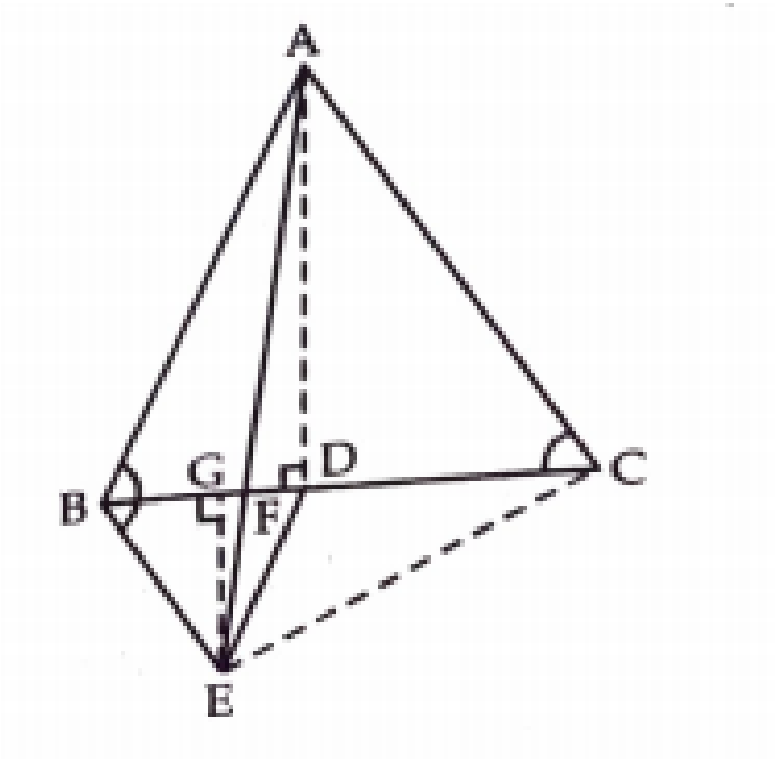
6.



ABC and BDE are two equilateral triangles such that D is the mid-point of BC. If AE interesects

BC at F, show that :

$\text{ar(BDE)} = \frac{1}{2}\text{ar(BAE)}$`

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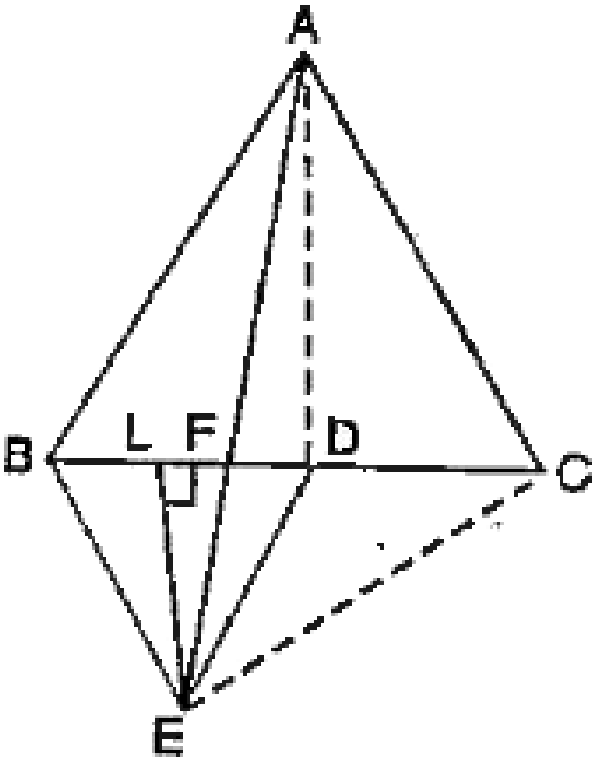
7. In Fig ., ABC and BDE are two equilateral triangles such that D is the mid -point of BC .If AE intersects BC at F , show that



$ar(ABC) = 2ar(BEC)$

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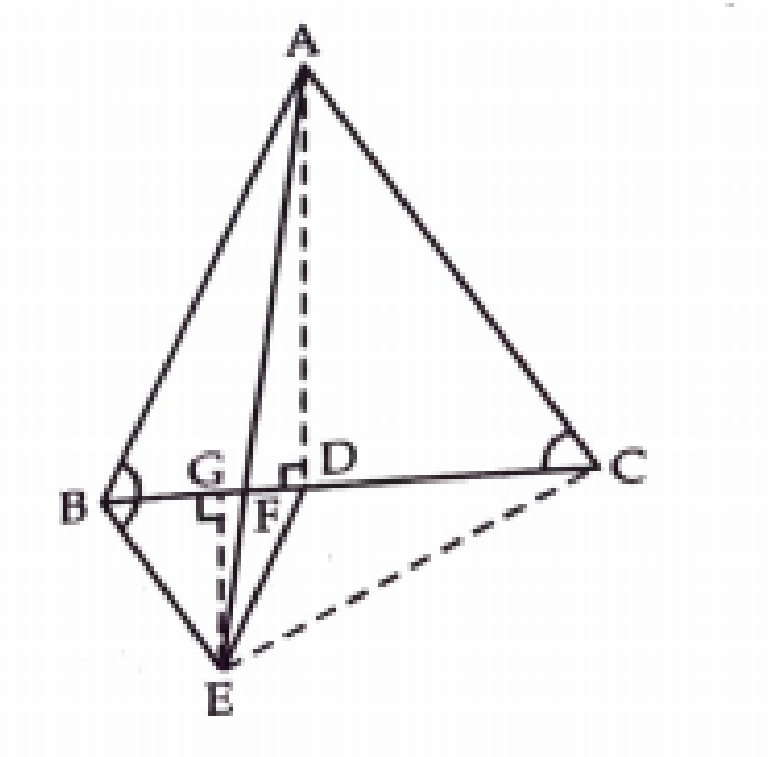
8.



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

ar(BFE) = ar(AFD)

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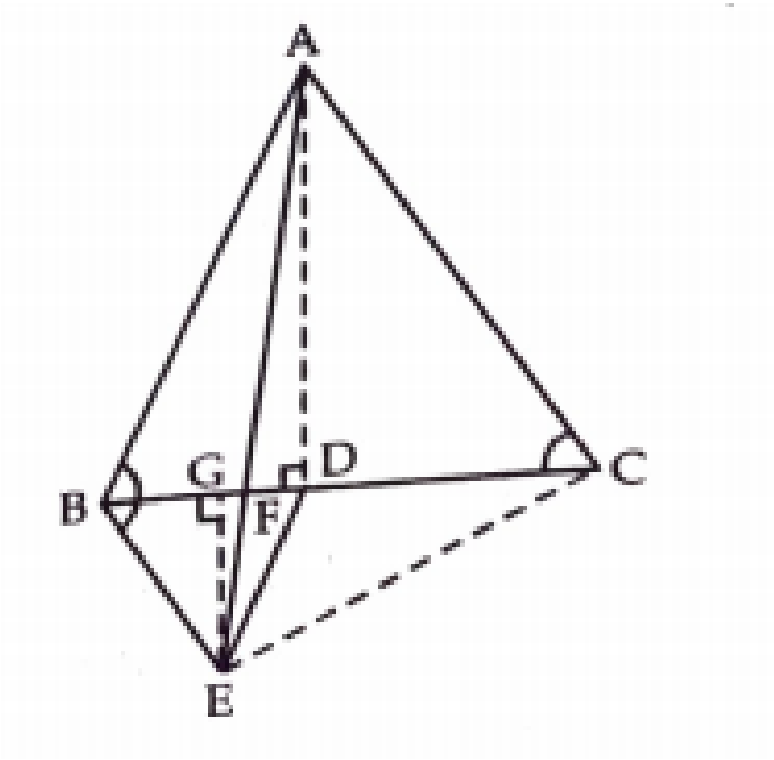
9.



ABC and BDE are two equilateral triangles such that D is the mid-point of BC. If AE interesects

BC at F, show that :

ar(BFE) = 2ar(FED)

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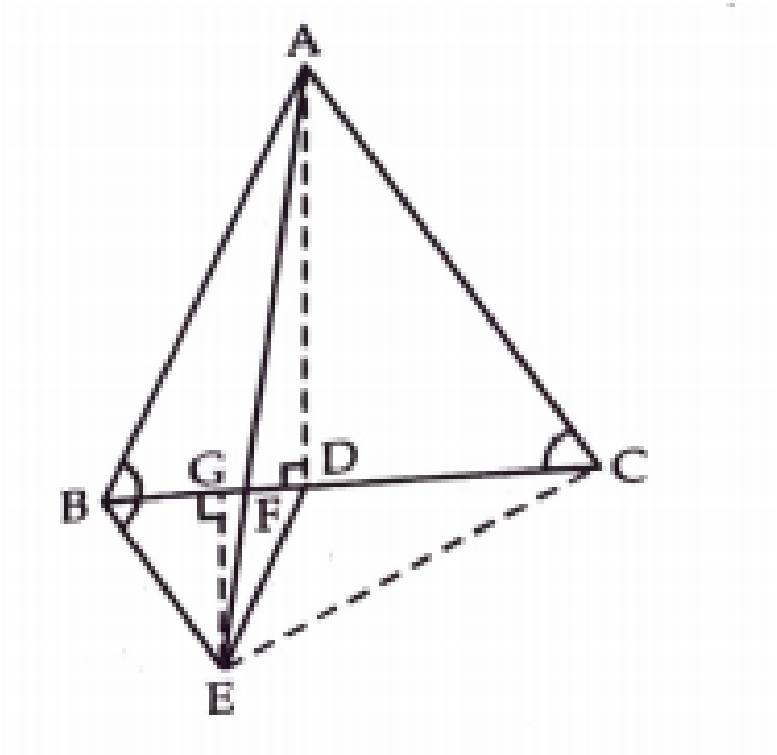
10.



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

ar(FED) = $\frac{1}{8}$ar(AFC)

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11. Diagonals AC and BD of quadrilateral ABCD intersect each other at P. Show that ar $(APB) \times ar(CPD)$ = ar $(APD) \times ar(BPC)$.

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12. P and Q are respectively the midpoints of sides AB and BC or a triangle ABC and R is the mid-point of AP, show ar(PRQ)=$\frac{1}{2}$ ar(ARC).

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13. P and Q are respectively the midpoints of sides AB and BC or a triangle ABC and R is the mid-point of AP, show ar(PRQ)=$\frac{1}{2}$ ar(ARC).

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14. P and Q are respectively the midpoints of sides AB and BC or a triangle ABC and R is the mid-point of AP, show ar(PBQ)=ar(ARC).

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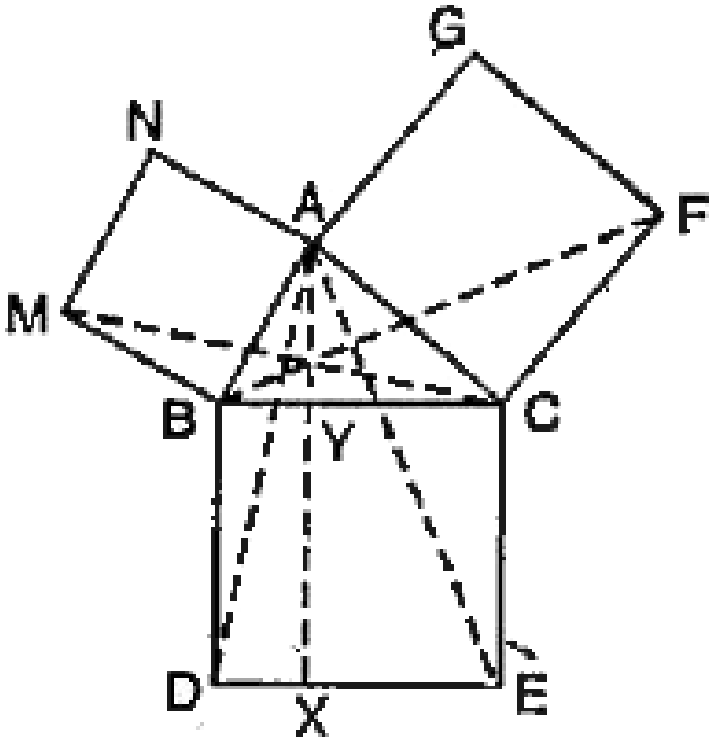
15. In Fig ., ABC is a right triangle right angled at A. BCED , ACFG and ABMN are squares on the sides BC , CA and AB resprectively .Line segment $AX \perp DE$ meets BC at Y . Show that



$\Delta MBC \cong \Delta ABD$

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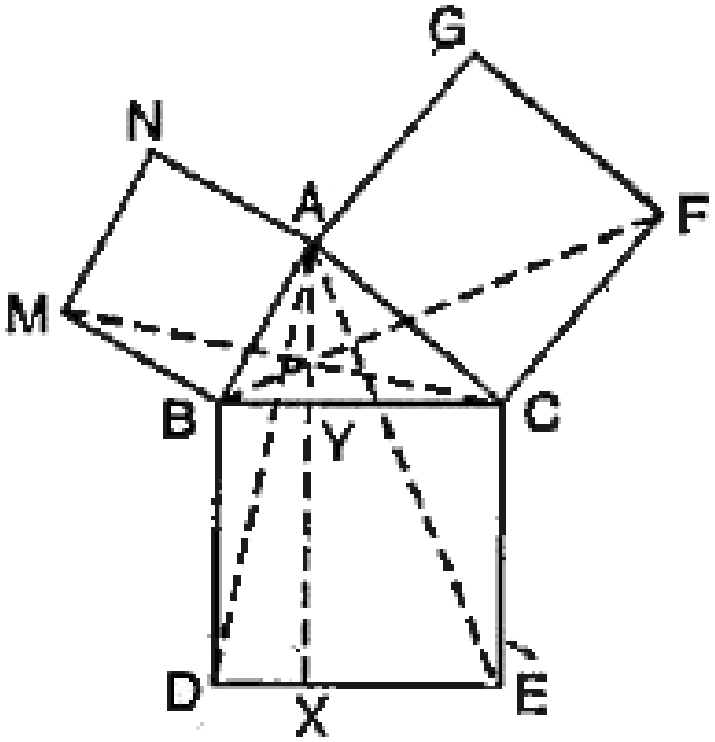

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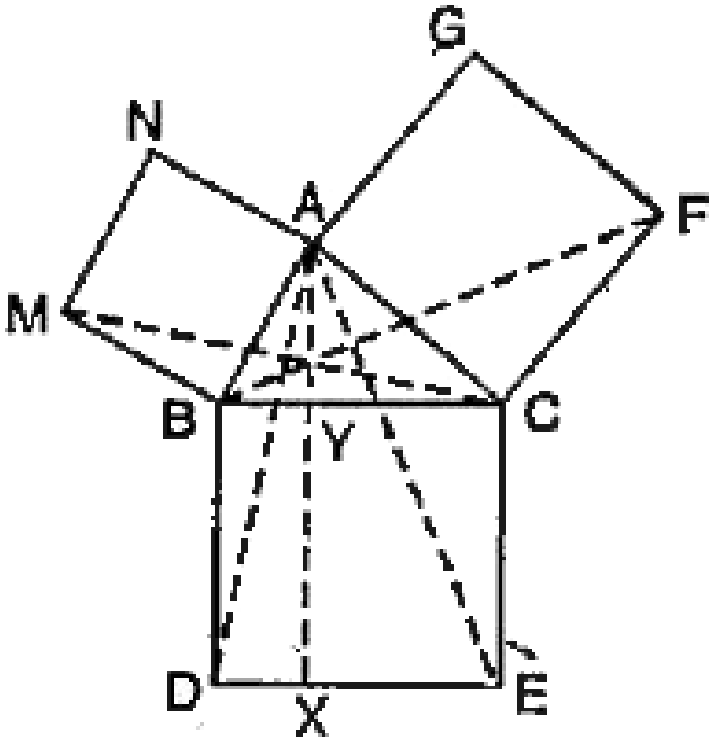

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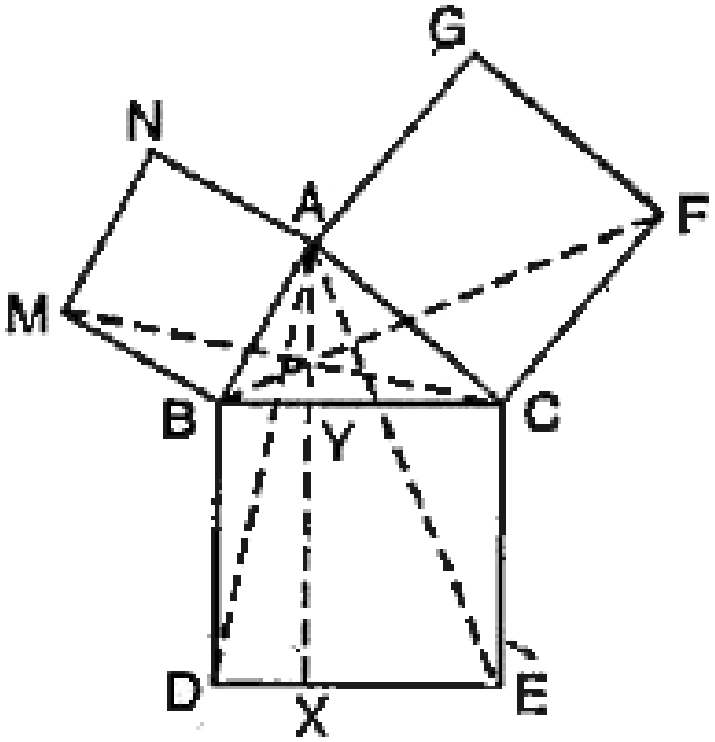

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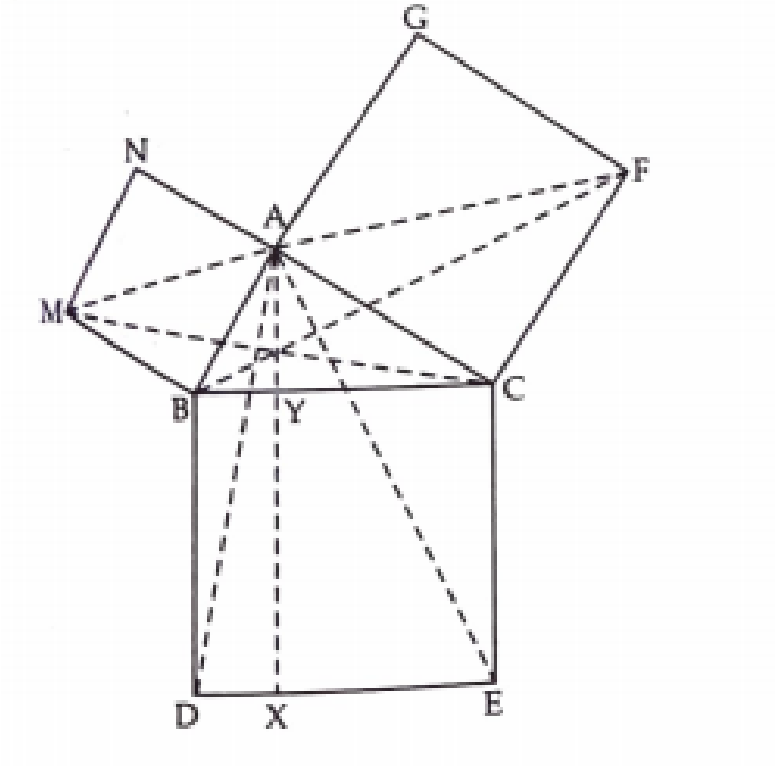

ABC is a right triangle right angled at A. BCED, ACFG and ABMN are squares on the sides BC, CA and AB respectively. Line segent AX $\perp$ DE meets

BC at Y. Show that:

ar(CYXE) = 2ar(FCB)

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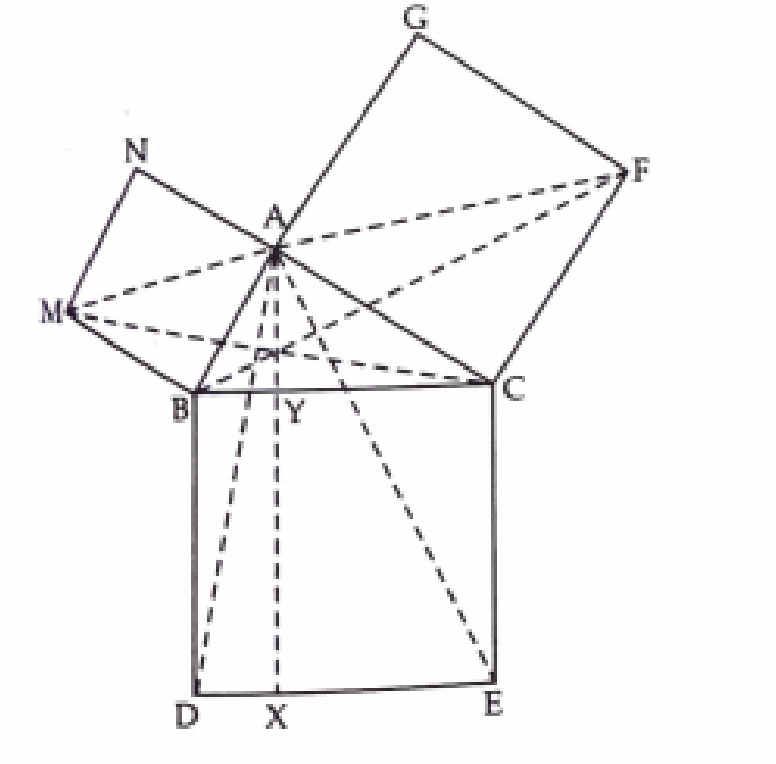
20.



ABC is a

right triangle right angled at A. BCED, ACFG and ABMN are squares on the sides BC, CA and AB respectively. Line segent AX $\perp$ DE meets BC at Y. Show that:

ar(CYXE) = ar(ACFG)

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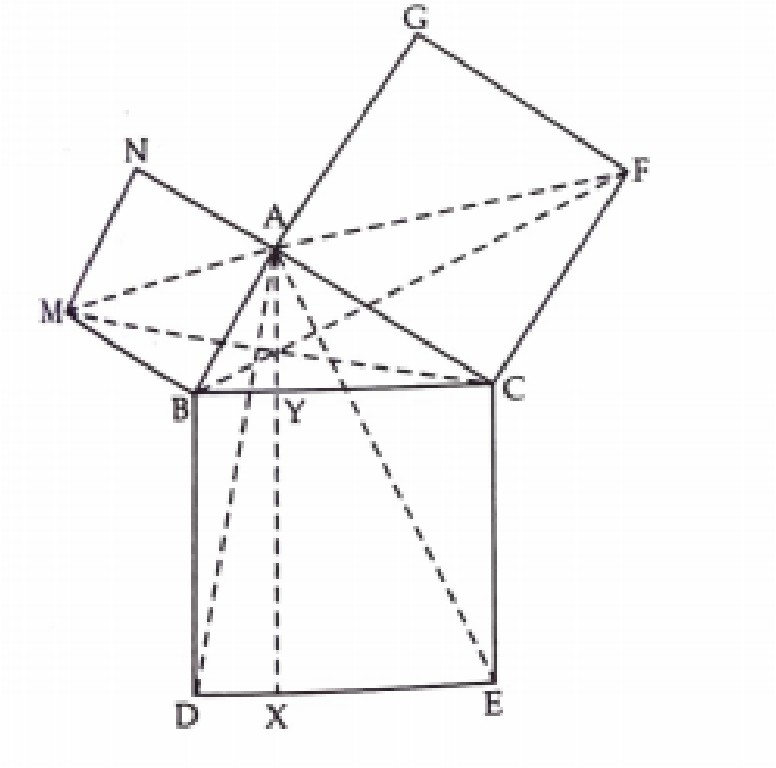
21.



ABC is a right triangle right angled at A. BCED, ACFG and ABMN are squares on the sides BC, CA and AB respectively. Line segent AX $\perp$ DE meets

BC at Y. Show that:

ar(BCED) = ar(ABMN) + ar (ACFG)

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Objective Type Questions

1. State whether the following statements are true (T) or false (F) :

If A and B are two congruent figures then their areas will be equal .

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2. Two figures are said to be on the same base and between the same parallels , if they have a common base (side) and the vertices opposite to the common base of each figure lie on a line parallel to the base .

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3. Parallelogram on equal bases and between the same parallels are equal in area.

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4. If a triangle and a parallelogram are on the same base and between the same parallels then the area of the triangle is equal to half the area of the parallelogram .

5. Two triangles on the same base and between the same parallel lines have unequal areas .

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6. The median of a triangle divides it into two

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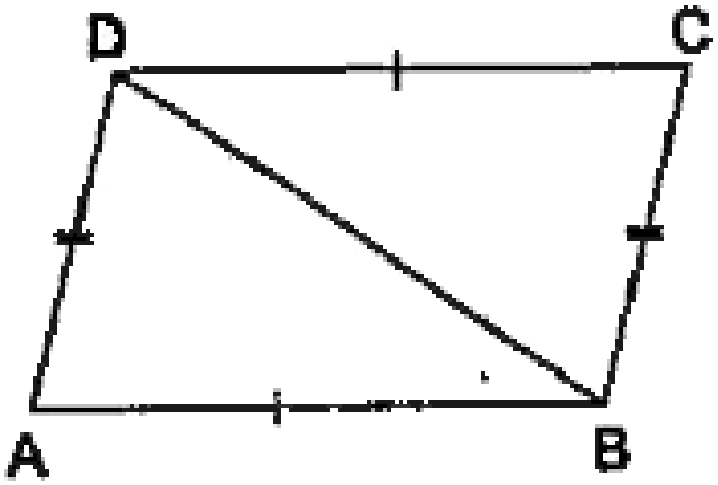
7. In the given figure ABCD is a parallelogram and BD is its diagonal ,then ar

$(\Delta ABD) \neq ar(\Delta CDB)$



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8. A diagonal of parallelogram divides it into four triangles of equal area.

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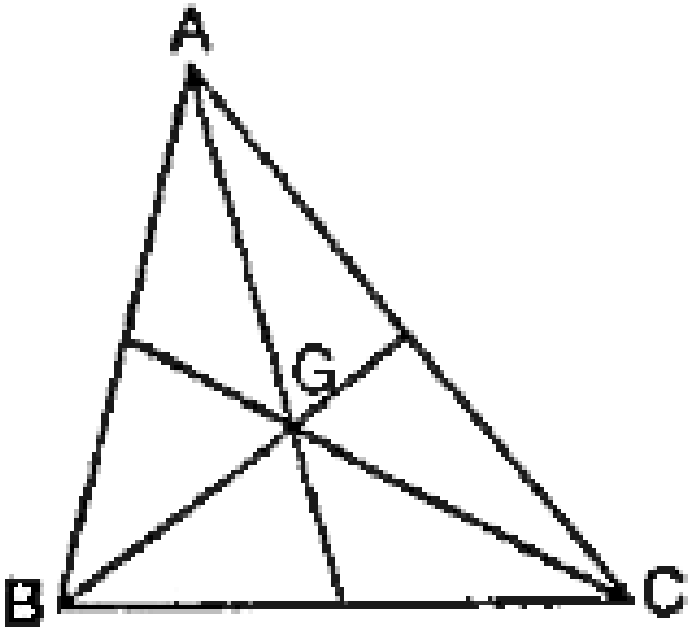
9. The medians of a triangle ABC intersect each other at G then

$$ar(\Delta AGB) = \frac{1}{3}ar(\Delta aBC)$$



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10. The perimeter of a trapezium is equal to the product of its height and the sum of the parallel sides .

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11. Fill in the Blanks :

Area of || gm = Base $\times$ .....

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12. Area of triangle $= \frac{1}{2} \times \ldots\ldots\ldots\ldots \times$ Altitude.

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13. Area of rhombus $= \frac{1}{2} \times \ldots\ldots\ldots\ldots$.

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14. Area of trapezium $= \frac{1}{2} \times \text{Height} \times (\ldots\ldots\ldots\ldots\ldots)$

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15. Area of a || gm whose base is 4 cm and the height is 5 cm will be = ...

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16. What will be the height of a triangle whose base is 4 cm and area is $20cm^2$.

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17. ABC is a triangle in which AB=AC=10cm and $\angle A = 90^\circ$ .What will be the area of ΔABC ?

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18. PQRS is a rhombus .If PQ= 3cm , what will be the perimeter of rhombus ?

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19. What will be the height of a || gm whose area is $20cm^2$ and the base is 10 cm .

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20. If the diagonals of a rhombus are 6 cm and 8 cm then what will be its area ?

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