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## MATHS

## BOOKS - VIDHYASANGAM - RAO'S

## ACADEMY MATHS (KANNADA

## ENGLISH)

## AREA OF PARALLELOGRAMS AND <br> TRIANGLES

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


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1. In $A B C D$ is a parallelogram, $A E \perp D C$ and $C F$
$\perp A D$. If $A B=16 \mathrm{~cm}, \mathrm{AE}=8 \mathrm{~cm}$ and $\mathrm{CF}=10 \mathrm{~cm}$,
find $A D$.

2. If $E, F, G$ and $H$ are respectively the midpoints of the sides of a parallelogram $A B C D$, show that $\operatorname{ar}(E F G H)=\frac{1}{2} \operatorname{ar}(A B C D)$


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3. $P$ and $Q$ are any two points lying on the sides $D C$ and $A D$ respectively of $a$ parallelogram ABCD. Show that ar (APB) = ar (BQC).


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4. In $P$ is a point in the interior of $a$ parallelogram ABCD. Show that(ii) ar (APD) + $\operatorname{ar}(\mathrm{PBC})=\operatorname{ar}(\mathrm{APB})+\operatorname{ar}(P C D)^{\prime}$

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5. In, PQRS and ABRS are parallelograms and $X$ is any point on side $B R$. Show that
$\operatorname{ar}(\mathrm{PQRS})=\operatorname{ar}(\mathrm{ABRS})$
as (AXS) $=\frac{1}{2}$ ar (PQRS)


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6. 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 fields 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 113

1. In the figure $11.23, \mathrm{E}$ is any point on median $A D$ of a $\triangle A B C$. Show that ar (ABE) $=\operatorname{ar}(A C E)$.

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


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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, $A B C$ and $A B D$ are two triangles on the same base $A B$. If line- segment $C D$ is bisected
by $A B$ at $O$, show that $\operatorname{ar}(A B C)=\operatorname{ar}(A B D)$.


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5. If $E, F, G$ and $H$ are respectively the midpoints of the sides of a parallelogram $A B C D$,
show that $\operatorname{ar}(E F G H)=\frac{1}{2} \operatorname{ar}(A B C D)$


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6. $D$ and $E$ are points on sides $A B$ and $A C$ respectively of $\Delta \mathrm{ABC}$ such that ar (DBC) $=$ ar
$E B C)$. Prove that $D E \| B C$.


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7. Diagonals $A C$ and $B D$ of a trapezium $A B C D$ with $A B \| D C$ intersect each other at $O$. Prove
that $\operatorname{ar}(A O D)=\operatorname{ar}(B O C)$.


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8. In, $A B C D E$ is a pentagon. A line through $B$
parallel to AC meets DC produced at F. Show
that
(i) $\operatorname{ar}(\mathrm{ACB})=\operatorname{ar}(\mathrm{ACF})$
(ii) $\operatorname{ar}($ AEDF $)=\operatorname{ar}(A B C D E)$


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Exercise 114

1. Parallelogram $A B C D$ and rectangle $A B E F$ are on the same base $A B$ and have equal areas.

Show that the perimeter of the parallelogram is greater than that of the rectangle.

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2. In, $D$ and $E$ are two points on $B C$ such that $B D=\operatorname{De}=E C$. Show that $\operatorname{ar}(A B D)=\operatorname{ar}(A D E)=a r$
(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. Diagonals $A C$ and $B D$ of a quadrilateral $A B C D$
intersect each other at P. Show that ar (APB)
$\times \operatorname{ar}(\mathrm{CPD})=\operatorname{ar}(\mathrm{APD}) \times \operatorname{ar}(\mathrm{BPD})$.
[Hint : From A and C, draw perpendiculars to BD.

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