



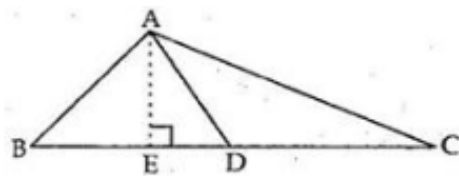
Exercise 10A

Question 23:

Given : ABC is a triangle in which AD is the median.

To Prove: $\text{ar}(\triangle ABD) = \text{ar}(\triangle ACD)$

Construction: Draw $AE \perp BC$



Proof: $\text{ar}(\triangle ABD) = \frac{1}{2} \times BD \times AE$

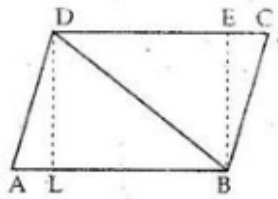
and, $\text{ar}(\triangle ADC) = \frac{1}{2} \times DC \times AE$

Since, $BD = DC$ [Since D is the median]

So, $\text{ar}(\triangle ABD) = \frac{1}{2} \times BD \times AE$
 $= \frac{1}{2} \times DC \times AE = \text{ar}(\triangle ADC)$

$\therefore \text{ar}(\triangle ABD) = \text{ar}(\triangle ACD)$

Question 24:



Given : ABCD is a parallelogram in which BD is its diagonal.

To Prove: $\text{ar}(\triangle ABD) = \text{ar}(\triangle CBD)$

Construction : Draw $DL \perp AB$ and $BE \perp CD$

Proof: $\text{ar}(\triangle ABD) = \frac{1}{2} \times AB \times DL$ (i)

and, $\text{ar}(\triangle CBD) = \frac{1}{2} \times CD \times BE$ (ii)

Now, since ABCD is a parallelogram

$\therefore AB \parallel CD$

and $AB = CD$ (iii)

Since distance between two parallel lines is constant,

$\Rightarrow DL = BE$ (iv)

Form (i), (ii), (iii), and (iv) we have

$$\begin{aligned} \text{ar}(\triangle ABD) &= \frac{1}{2} \times AB \times DL \\ &= \frac{1}{2} \times CD \times BE = \text{ar}(\triangle CBD) \end{aligned}$$

$\therefore \text{ar}(\triangle ABD) = \text{ar}(\triangle CBD)$

***** END *****