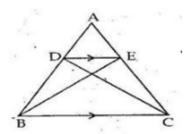


Exercise 10A

Question 11:

Given: A \triangle ABC in which points D and E lie on AB and AC, such that $ar(\triangle$ BCE) = $ar(\triangle$ BCD)



To Prove: DE || BC

Proof $\,\,$: As Δ BCE and Δ BCD have same base BC, and are

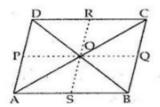
equal in area, they have same altitudes.

This means that they lie between two parallel lines.

∴ DE ∥BC

Question 12:

Given : A parallelogram ABCD in which O is a point inside it $\text{To Prove: (i) ar}(\Delta \text{OAB}) + \text{ar}(\Delta \text{OCD}) = \frac{1}{2} \text{ar}(\|\text{gm ABCD})$ $(\text{ii) ar}(\Delta \text{OAD}) + \text{ar}(\Delta \text{OBC}) = \frac{1}{2} \text{ar}(\|\text{gm ABCD})$



Construction: Through O draw PQ || AB and RS || AD Proof: (i) Δ AOB and parallelogram ABQP have same base AB and lie between parallel lines AB and PQ. 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.

$$\text{in}(\Delta AOB) = \frac{1}{2} \text{ar}(\|\text{gm ABQP})$$
 Similarly,
$$\text{ar}(\Delta COD) = \frac{1}{2} \text{ar}(\|\text{gm PQCD})$$
 So,
$$\text{ar}(\Delta AOB) + \text{ar}(\Delta COD)$$

$$= \frac{1}{2} \text{ar}(\|\text{gm ABQP}) + \frac{1}{2} \text{ar}(\|\text{gm PQCD})$$

$$= \frac{1}{2} \left[\text{ar}(\|\text{gm ABQP}) + \text{ar}(\|\text{gm PQCD}) \right]$$

$$= \frac{1}{2} \left[\text{ar}(\|\text{gm ABQP}) \right]$$

∆ AOD and || gm ASRD have the same base AD and lie between same parallel lines AD and RS.

So,
$$\operatorname{ar}(\Delta \mathsf{AOD}) = \frac{1}{2}\operatorname{ar}(\|\mathsf{gm}\ \mathsf{ASRD})$$

Similarly, $\operatorname{ar}(\Delta \mathsf{BOC}) = \frac{1}{2}\operatorname{ar}(\|\mathsf{gm}\ \mathsf{RSBC})$
 $\therefore \operatorname{ar}(\Delta \mathsf{AOD}) + \operatorname{ar}(\Delta \mathsf{BOC}) = \frac{1}{2}\left[\operatorname{ar}(\|\mathsf{gm}\ \mathsf{ASRD}) + \operatorname{ar}(\|\mathsf{gm}\ \mathsf{RSBC})\right]$
 $= \frac{1}{2}\left[\operatorname{ar}(\|\mathsf{gm}\ \mathsf{ABCD})\right]$

*********** END ********