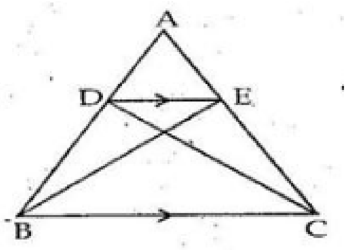
Exercise 10A

Question 11:

Given: A ΔABC in which points D and E lie on AB and AC, such that ar (ΔBCE) = ar (ΔBCD)



To Prove: $DE \parallel BC$

Proof : As ΔBCE and ΔBCD have same base BC, and are equal in area, they have same altitudes.

This means that they lie between two parallel lines.

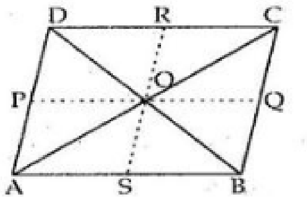
$\therefore$ $DE \parallel BC$

Question 12:

Given : A parallelogram ABCD in which O is a point inside it

To Prove: (i) $ar(\Delta OAB) + ar(\Delta OCD) = \frac{1}{2} ar(\| gm\ ABCD)$

(ii) $ar(\Delta OAD) + ar(\Delta OBC) = \frac{1}{2} ar(\| gm\ ABCD)$



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.

$\therefore \quad ar(\Delta AOB) = \frac{1}{2} ar(\| gm\ ABQP)$

Similarly, $ar(\Delta COD) = \frac{1}{2} ar(\| gm\ PQCD)$

So, $ar(\Delta AOB) + ar(\Delta COD)$

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

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

$= \frac{1}{2} [ar \| gm\ ABCD]$

(ii) Δ AOD and $\|$ gm ASRD have the same base AD and lie between same parallel lines AD and RS.

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

Similarly, $ar(\Delta BOC) = \frac{1}{2} ar(\| gm\ RSBC)$

$\therefore \quad ar(\Delta AOD) + ar(\Delta BOC) = \frac{1}{2} [ar(\| gm ASRD) + ar(\| gm RSBC)]$

$= \frac{1}{2} [ar(\| gm ABCD)]$

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