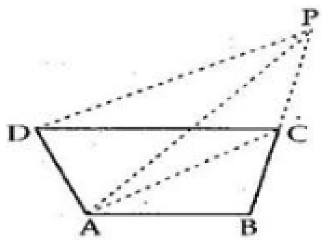
Exercise 10A

Question 13:

Given: ABCD is a quadrilateral in which through D, a line is drawn parallel to AC which meets BC produced in P.

To Prove : $ar(\Delta ABP) = ar(quad. ABCD)$



Proof : Δ ACP and Δ ACD have same base AC and lie between parallel lines AC and DP.

$\therefore \quad ar(\Delta ACP) = ar(\Delta ACD)$

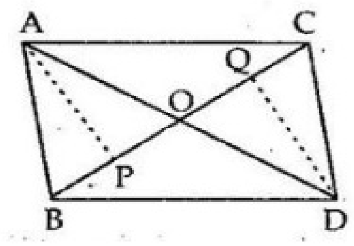
Adding $ar(\Delta ABC)$ on both sides, we get;

$$ar(\Delta ACP) + ar(\Delta ABC) = ar(\Delta ACD) + ar(\Delta ABC)$$

$$\Rightarrow \quad ar(\Delta ABP) = ar(quad. ABCD)$$

Question 14:

Given: Two triangles, i.e. ΔABC and ΔDBC which have same base BC and points A and D lie on opposite sides of BC and $ar(\Delta ABC) = ar(\Delta BDC)$



To Prove: $OA = OD$

Construction: Draw $AP \perp BC$ and $DQ \perp BC$

Proof: We have

$$ar(\Delta ABC) = \frac{1}{2} \times BC \times AP \text{ and}$$

$$ar(\Delta BCD) = \frac{1}{2} \times BC \times DQ$$

So, $\frac{1}{2} \times BC \times AP = \frac{1}{2} \times BC \times DQ$ [from (1)]

$\Rightarrow$ $AP = DQ$ ......(2)

Now, in ΔAOP and ΔQOD, we have

$\angle APO = \angle DQO = 90^\circ$

and $\angle AOP = \angle DOQ$ [vertically opp. angles]

$AP = DQ$ [from (2)]

Thus, by Angle-Angle-Side criterion of congruence, we have

$\therefore$ $\Delta AOP \cong \Delta QOD$ [AAS]

The corresponding parts of the congruent triangles are equal.

$\therefore$ $OA = OD$ [C.P.C.T.]

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