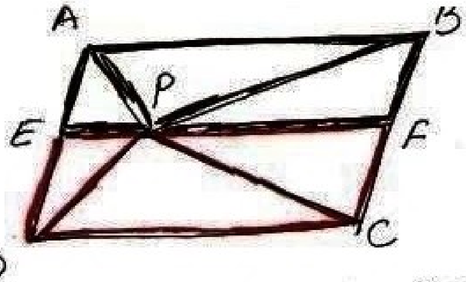
(4) ex 9.2



To Prove – $ar(APB) + ar(PCD) = \frac{1}{2} ar(ABCD)$

$ar(\triangle APD) + ar(\triangle PBC) = ar(APB) + ar(PCD)$

Const – draw $EPF \parallel DC$

Proof – $AD \parallel BC$ [opp. sides of ||gm]

$\Rightarrow DE \parallel CF$

$EF \parallel DC$

$\square DCFE$ is a ||gm

$EF \parallel DC$, $AB \parallel DC$

$\therefore EF \parallel AB$

$AD \parallel BC$

$AE \parallel BF$

$\square EFBA$ is a ||gm

$ar(\triangle PDC) = \frac{1}{2} ar(\text{||gm } DCFE)$ ... (I)

$ar(\triangle APB) = \frac{1}{2} ar(\text{||gm } EFBA)$ ... (II)

[$\triangle$ and ||gm on same base and between same parallel lines]

(I) + (II)

$ar(\triangle APB) + ar(\triangle PCD) = \frac{1}{2}[ar(\text{||gm } DCFE + ar(\text{||gm } EFBA)]$

$= \frac{1}{2} ar(\text{||gm } ABCD)$ ... (III)

Similarly $ar(\triangle APD) + ar(\triangle PBC) = \frac{1}{2}(ar \text{ ||gm } ABCD)$ ... (IV)

From (III) and (IV)

$ar(\triangle APD) + ar(\triangle PBC) = ar(\triangle APB) + ar(\triangle PCD)$