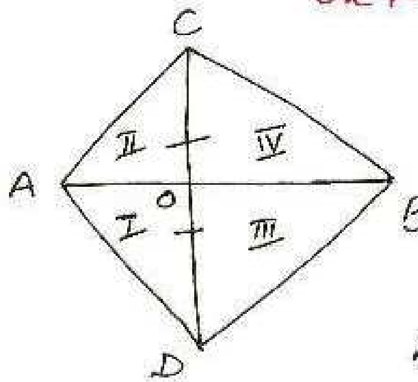
ex 9.3

(4)



To Prove - ar ($\triangle ABC$) = ar (ABD)

Proof - AO is median to side CD of $\triangle ACD$

$\therefore$ ar ($\triangle$ I) = ar ($\triangle$ II) ... (i) [Median divides a $\triangle$ into 2 $\triangle$s equal in area]

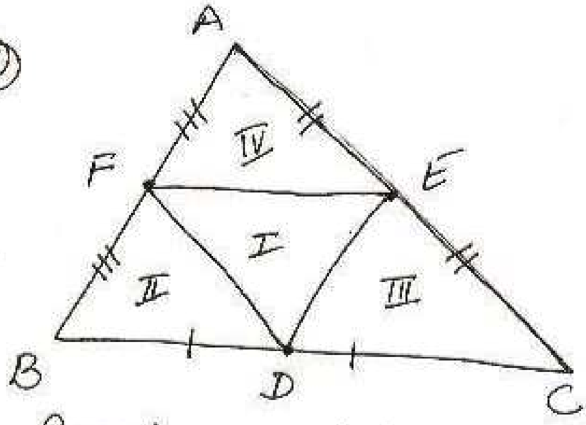
Similarly ar ($\triangle$ III) = ar ($\triangle$ IV) ... (ii)

(i) + (ii)

ar ($\triangle$ I) + ar ($\triangle$ III) = ar ($\triangle$ II) + ar ($\triangle$ IV)

$\Rightarrow$ ar ($\triangle ABD$) = ar ($\triangle ABC$)

(5)



To Prove (i) $\square$ BDEF is a ||gm

(ii) ar ($\triangle DEF$) = $\frac{1}{4}$ ar ($\triangle ABC$)

(iii) ar ($\square$ BDEF) = $\frac{1}{2}$ ar ($\triangle ABC$)

Proof - FE joins midpoints of sides AB and AC of $\triangle ABC$

$\therefore$ FE || BC $\Rightarrow$ FE || BD [Midpt. theorem]

Sim. DE || BF

$\square$ BDEF is a ||gm

ar ($\triangle$ I) = ar ($\triangle$ II) ... (i) [diagonal divides of ||gm into 2 $\triangle$s equal in area]

Sim. ar ($\triangle$ I) = ar ($\triangle$ III) ... (ii)

and ar ($\triangle$ I) = ar ($\triangle$ IV) ... (iii)

ar ($\triangle$ I) = ar ($\triangle$ I) ... (iv)

(i) + (ii) + (iii) + (iv)

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4 ar ($\triangle$ I) = ar ($\triangle$ I) + ar ($\triangle$ II) + ar ($\triangle$ III) + ar ($\triangle$ IV)

$\Rightarrow$ ar ($\triangle DEF$) = $\frac{1}{4}$ ar ($\triangle ABC$)

(×2) 2 ar ($\triangle DEF$) = $2 \times \frac{1}{4}$ ar ($\triangle ABC$)

$\Rightarrow$ ar (||gm BDEF) = $\frac{1}{2}$ ar ($\triangle ABC$) [diagonal divides a ||gm into 2 $\triangle$s equal in area]