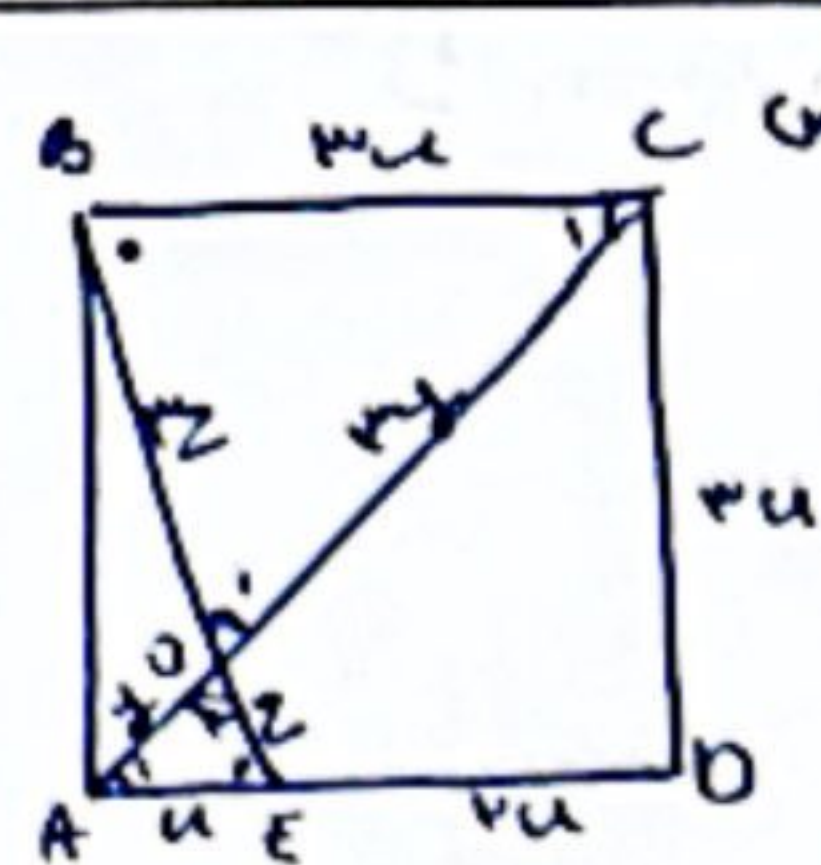


نام و نام خانوادگی پاسخنامه تشریحی تکلیف شماره ...!... کلاس ...!... پنجشنبه

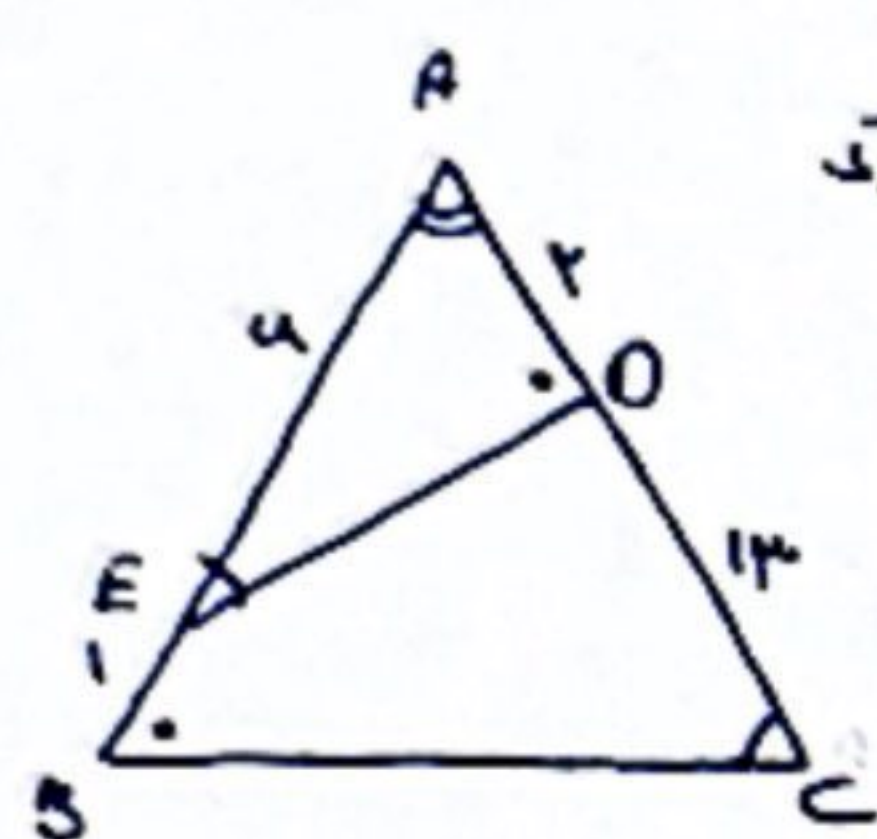


شعاع دو زاویه متقابل به رأس $\hat{O}_1 = \hat{O}_2$ $\Rightarrow \triangle AOE \sim \triangle BOC \Rightarrow \frac{OE}{OA} = \frac{OC}{OB} = \frac{BO}{OE} \Rightarrow BO = 3OE$

- $\triangle ACO$ و $\triangle BCO$: $AC^2 = CO^2 + AO^2 \Rightarrow 14y^2 = (3u)^2 + (u)^2 \Rightarrow 14y^2 = 10u^2 \Rightarrow y = \frac{\sqrt{10}}{2}u$

- $\triangle ABE$ و $\triangle BDE$: $BE^2 = AB^2 + AE^2 \Rightarrow 14z^2 = (4u)^2 + (u)^2 \Rightarrow 14z^2 = 17u^2 \Rightarrow z = \frac{\sqrt{17}}{2}u$

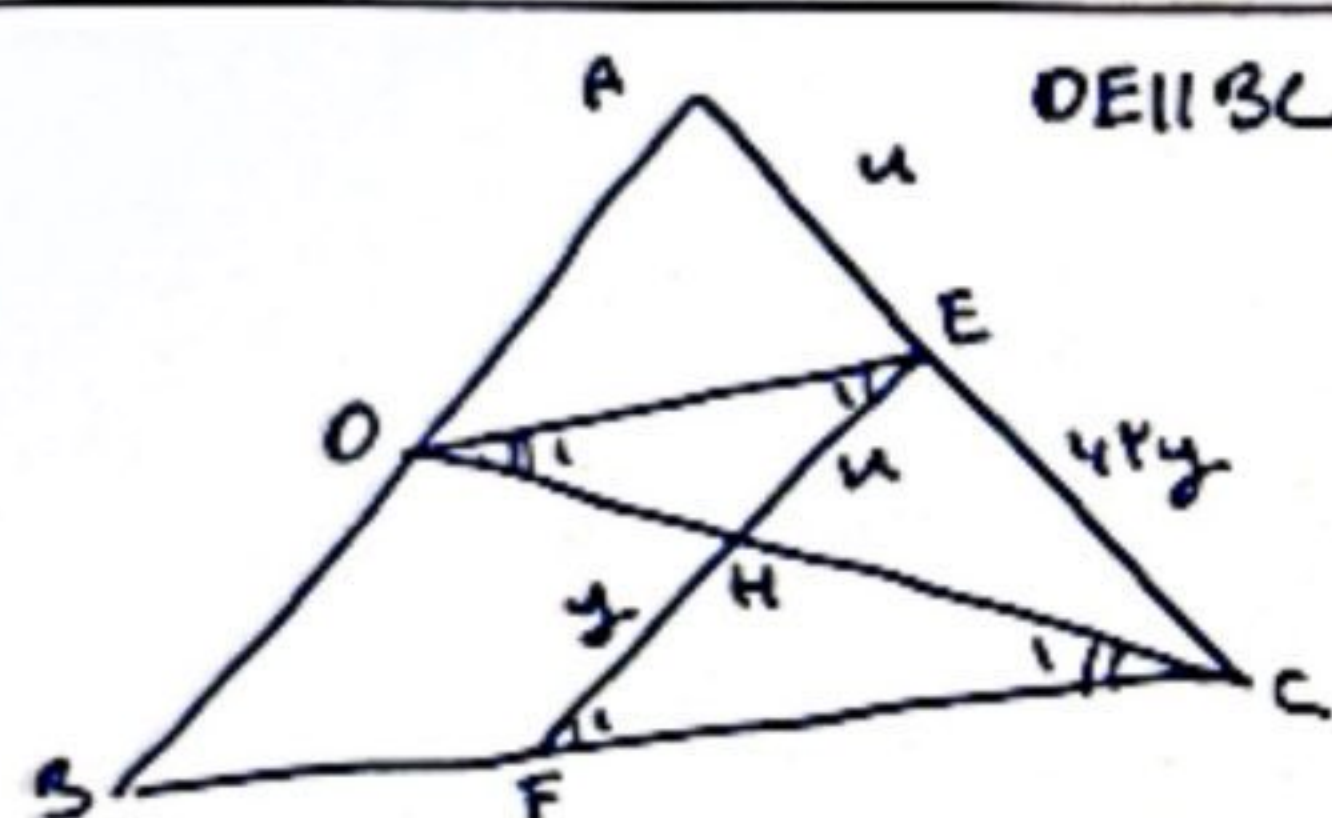
$OE = \frac{z}{2} = \frac{\sqrt{10}}{2}u \Rightarrow \frac{OE}{OA} = \frac{z}{y} = \frac{\sqrt{10}}{2}u \times \frac{2}{\sqrt{17}u} = \frac{\sqrt{10}}{\sqrt{17}} = \frac{\sqrt{10}}{\sqrt{17}}$ (۵)



$\triangle AEO \sim \triangle ACB$ $\Rightarrow \frac{AO}{AB} = \frac{EO}{CB} = \frac{AE}{AC} \Rightarrow \frac{AO}{4} = \frac{EO}{3} = \frac{1}{5} \Rightarrow AO = \frac{4}{5}$

$\triangle AEO \sim \triangle ACB \Rightarrow \frac{AO}{AB} = \frac{EO}{CB} = \frac{AE}{AC} \Rightarrow \frac{AO}{4} = \frac{EO}{3} = \frac{1}{5} \Rightarrow AO = \frac{4}{5}$

$u^2 + u = 3 \Rightarrow u^2 + u - 3 = 0 \Rightarrow (u+2)(u-1) = 0 \Rightarrow u = -2$ (۵)



$DE \parallel BC, \frac{AE}{EB} = \frac{AD}{DC}, \frac{BF}{FC} = \frac{BD}{DA} \Rightarrow \frac{BF}{FC} = \frac{BD}{DA} = \frac{1}{2} \Rightarrow BF = \frac{1}{3}BC = 1$

$\Rightarrow \frac{BF}{FC} = \frac{BD}{DA} = \frac{1}{2} \Rightarrow BF = \frac{1}{3}BC = 1$

$DE \parallel BC \Rightarrow \frac{AE}{EB} = \frac{AD}{DC} \Rightarrow \frac{1}{3} = \frac{AD}{DC} \Rightarrow AD = \frac{1}{2}DC \Rightarrow AD = \frac{1}{3}AC = \frac{5}{3}$

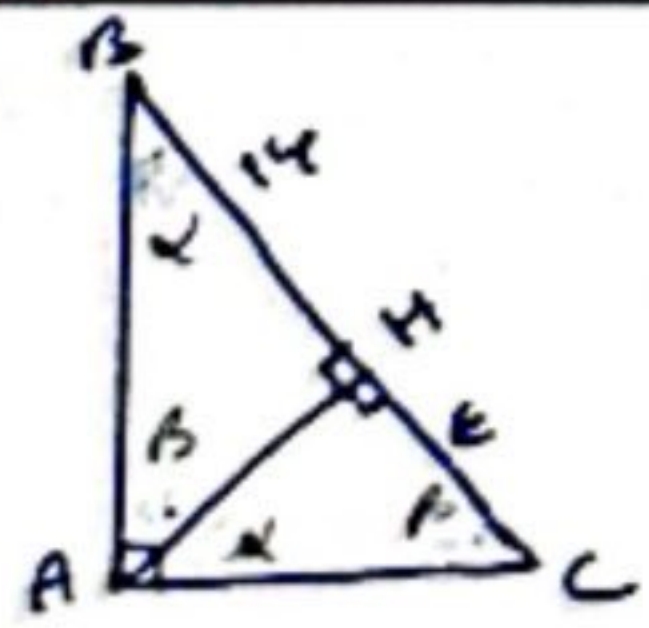
$DE \parallel BC \Rightarrow \frac{AE}{EB} = \frac{AD}{DC} \Rightarrow \frac{1}{3} = \frac{AD}{DC} \Rightarrow AD = \frac{1}{2}DC \Rightarrow AD = \frac{1}{3}AC = \frac{5}{3}$

$\frac{1}{3} = \frac{0.4y}{1.4y} \Rightarrow \frac{1}{3} = \frac{u}{u+1.4y} \Rightarrow u = \frac{1.4y}{2.4}$

$BC = 3DE \Rightarrow BC = 3OE \Rightarrow FC + BF = 3(0.4FC) \Rightarrow FC + 1 = 1.2FC \Rightarrow 1 = 0.2FC \Rightarrow FC = 5$

$I + II = 3, 1.4y + 3 = 4.4y \Rightarrow 3 = 3y \Rightarrow y = 1$ (۵)

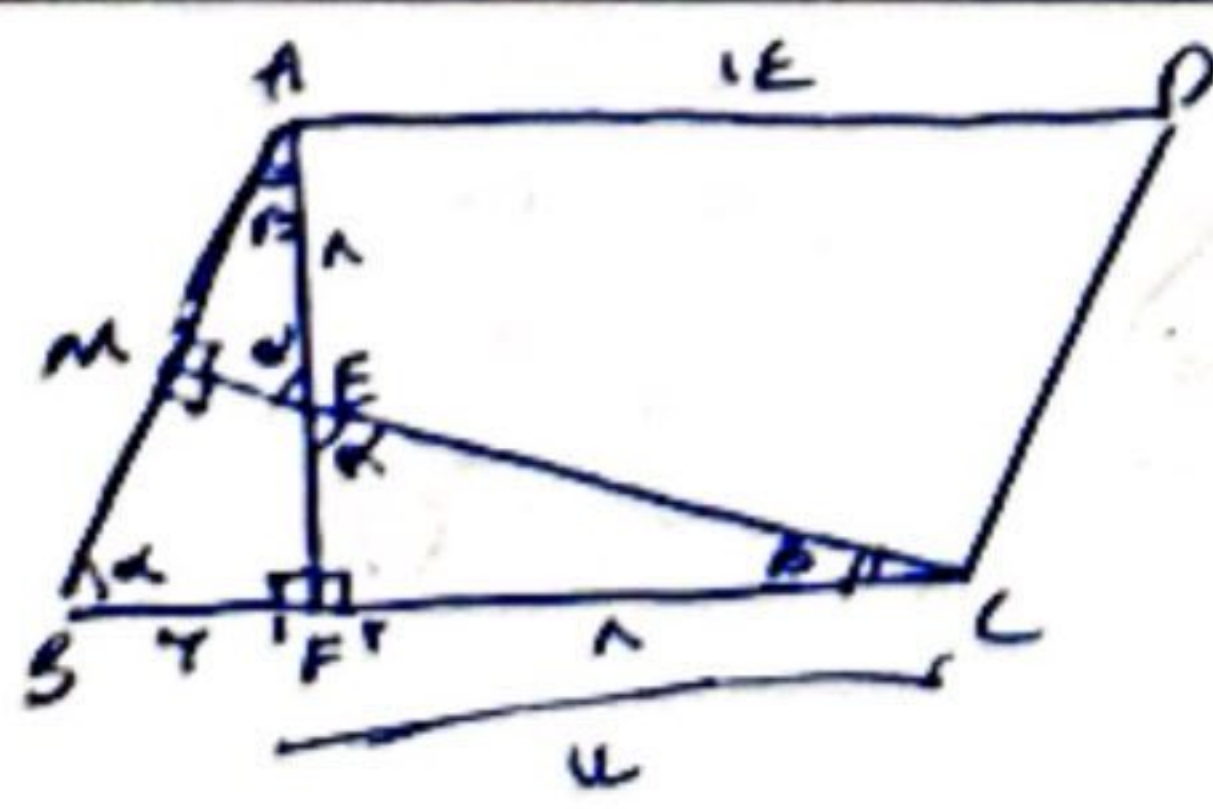
$\Rightarrow BC = BF + FC$



$BH = 4 - x = 14$
 $HC = x \rightarrow$ $\frac{AH}{BH} = \frac{BH}{BC} \Rightarrow \frac{AH}{14} = \frac{14}{25} \Rightarrow AH = \frac{196}{25}$

$AH^2 = HC \times BH \Rightarrow AH^2 = x \times 14 \Rightarrow AH = \frac{14}{5}$

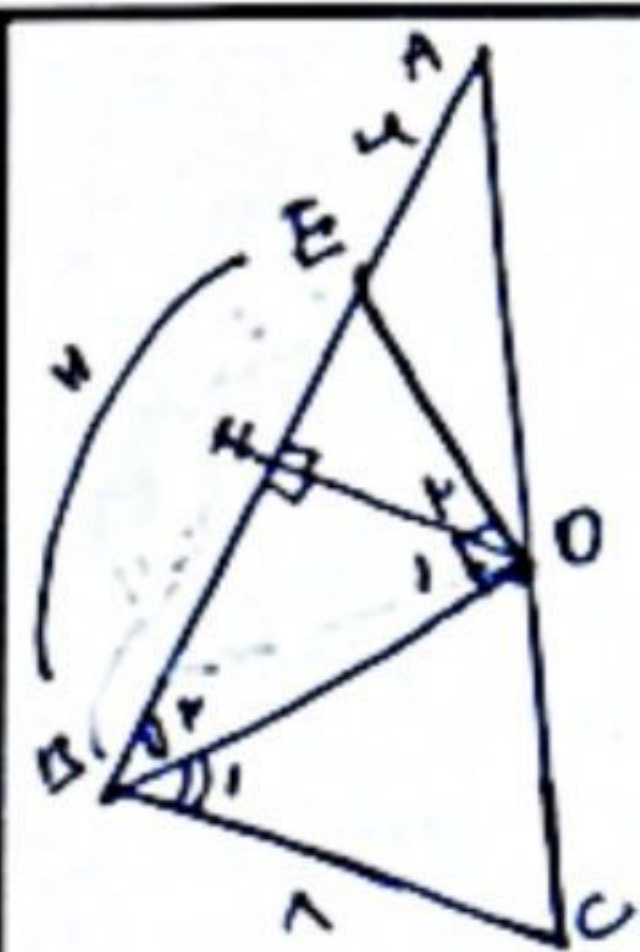
$\triangle AHB \sim \triangle AHC \Rightarrow \frac{AB}{AC} = \frac{BH}{AH} \Rightarrow \frac{4}{3} = \frac{14}{AH} \Rightarrow AH = \frac{14}{3}$ (۵)



$\triangle AEF \sim \triangle CEF \Rightarrow \frac{BF}{EF} = \frac{AB}{EC} = \frac{AE}{CF} \Rightarrow \frac{4}{u} = \frac{u+1}{1} \Rightarrow u^2 + u = 4$

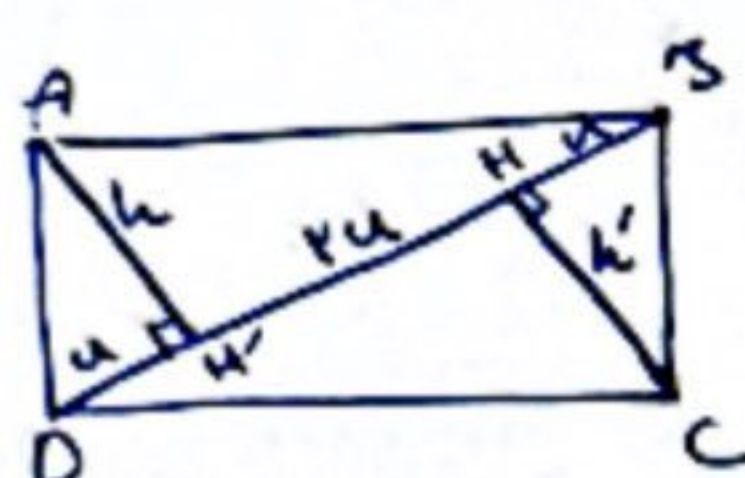
$\Rightarrow u^2 + u - 4 = 0 \Rightarrow (u-1)(u+5) = 0 \Rightarrow u = 1$ (۵)

$\Rightarrow AF = u + 1 \Rightarrow 2 + 1 = 3$



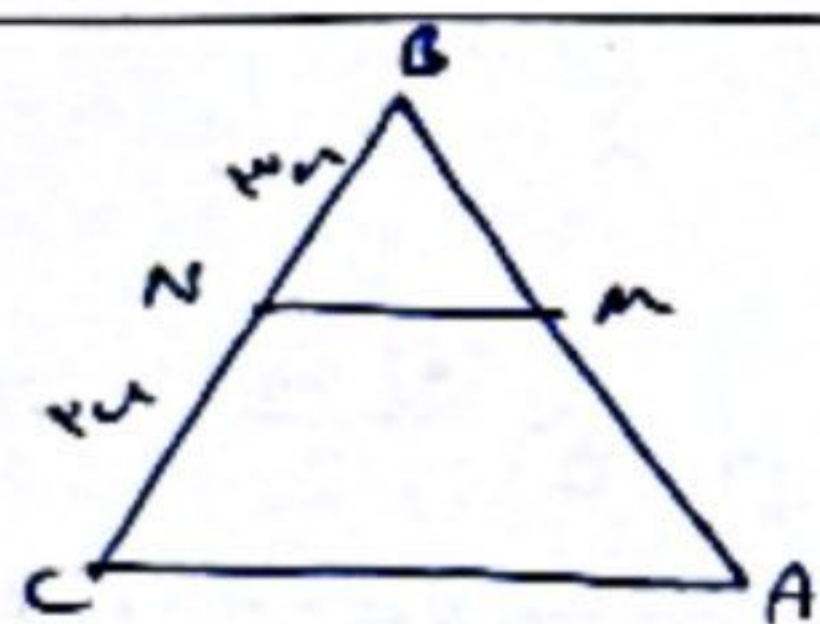
$\hat{B}_1 = \hat{B}_2$
 $HO \parallel BC \Rightarrow \hat{B}_1 = \hat{B}_2 \Rightarrow \hat{B}_2 = \hat{O}_1 \Rightarrow HO = BH$, $\hat{A} = 90^\circ \Rightarrow \frac{180-90}{2} = 45^\circ \Rightarrow \hat{B}_1 = \hat{B}_2 = 45^\circ$
 $\hat{B}_2 = \hat{B}_1 = 45^\circ$
 60E است: $EH \times BH = DH^2$ $\Rightarrow EH \times BH = BH^2 \Rightarrow EH = BH = \frac{11}{2} = HO$
 $HO \parallel BC \Rightarrow \frac{AH}{AB} = \frac{HO}{BC} \Rightarrow \frac{u + \frac{11}{2}}{u + 11} = \frac{\frac{11}{2}}{11}$
 $\Rightarrow \frac{u + \frac{11}{2}}{u + 11} = \frac{11}{22} \Rightarrow 11u + 11 \cdot \frac{1}{2} = 11u + 11 \Rightarrow u = \frac{11}{2}$

6



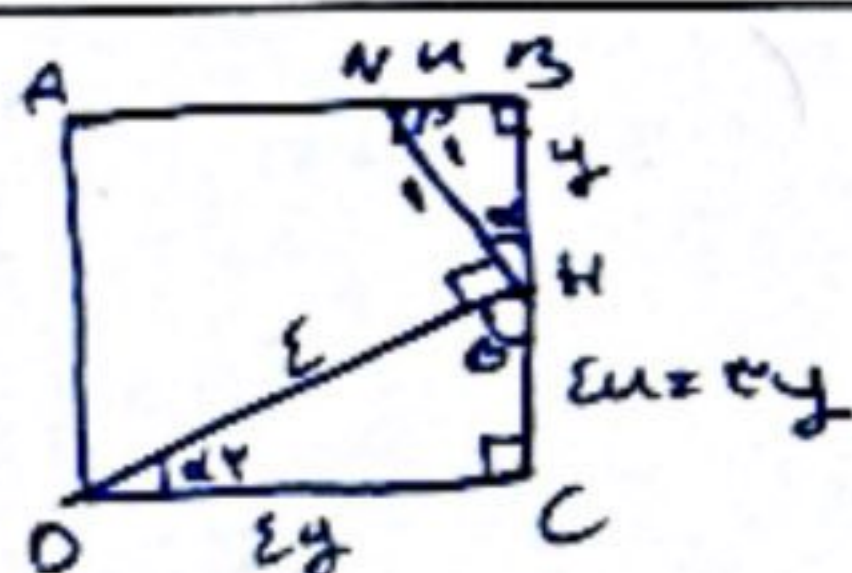
AOB در $h \Rightarrow h^2 = OH \times H'B \Rightarrow h^2 = u \times v \Rightarrow h^2 = uv \Rightarrow h = \sqrt{uv}$
 BOC در $h' \Rightarrow h'^2 = BH \times HO \Rightarrow h'^2 = v \times u \Rightarrow h'^2 = uv \Rightarrow h' = \sqrt{uv}$ $\Rightarrow h = h'$
 $S = S_{ABD} + S_{BDC} \Rightarrow 2 \times S_{ABD} = 2 \times \frac{\sqrt{uv} \times u \times v}{2} = \sqrt{uv} \times uv$
 $S_{ABD} = S_{BDC} \Rightarrow \frac{h \times u}{2} = \frac{\sqrt{uv} \times u \times v}{2}$
 $h = \sqrt{uv}$
 $u = HB = OH$

7



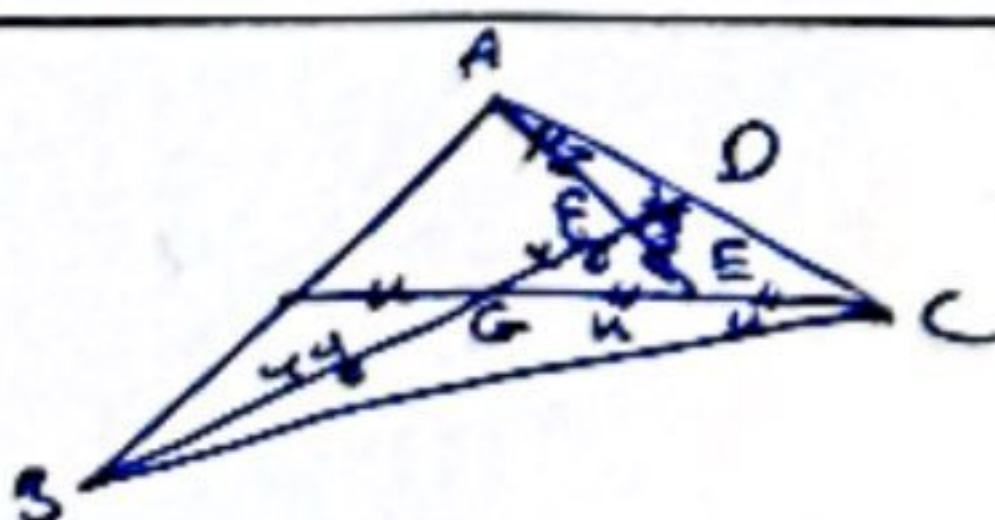
$\frac{S_{ABC}}{S_{BMN}} = 4 \Rightarrow \frac{BC \times AB \times \sin \hat{B}}{BN \times MB \times \sin \hat{B}} = 4 \Rightarrow \frac{w \times u \times AB}{v \times w \times MB} = 4 \Rightarrow \frac{AB}{MB} = \frac{4}{w}$
 $\Rightarrow \frac{BM}{AB} = \frac{1}{4} \Rightarrow \frac{BM}{AM} = \frac{1}{3}$

8



$\alpha + \beta + 90 = 180 \Rightarrow \alpha + \beta = 90$
 - در مثل NHB : $90 + \alpha + \hat{N}_1 = 180 \Rightarrow \hat{N}_1 = 90 - \alpha = \beta$
 - در مثل HCO : $90 + \beta + \hat{O}_1 = 180 \Rightarrow \hat{O}_1 = 90 - \beta = \alpha$
 $\Rightarrow \hat{B} = \hat{C}$, $\hat{H}_1 = \hat{O}_1 = \alpha$, $\hat{A}_1 = \hat{N}_1 = \beta \Rightarrow NHB \sim OHC \Rightarrow \frac{BN}{CH} = \frac{BH}{CO} = \frac{1}{2}$
 $\Rightarrow BC = CD \Rightarrow EG = y + eu \Rightarrow eu = wy$
 در مثل AHC : $(OH)^2 = (CH)^2 + (CD)^2 \Rightarrow (OH)^2 = (wy)^2 + (ey)^2$
 $\Rightarrow OH = wy = e \Rightarrow y = \frac{e}{w} \Rightarrow CD = ex \frac{e}{w} = \frac{14}{w}$
 $S_{OHC} = (\frac{14}{w})^2 = \frac{196}{w^2}$

9



$\frac{BD}{FO} = 9$, $GE = EC$, G مرکز ثقل $\triangle ABC$
 G مرکز ثقل $\triangle ABC$ $\Rightarrow G$ مرکز ثقل $\triangle ABC$
 CM میانه AB $\Rightarrow AB$ میانه AC است
 $BD = 2GO = 2 \times wy = 2y$
 $\frac{BD}{FO} = \frac{2y}{y} = 2$

10