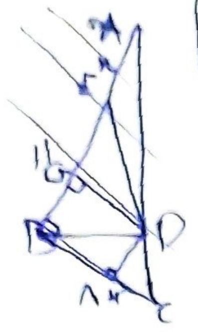
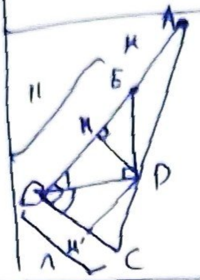
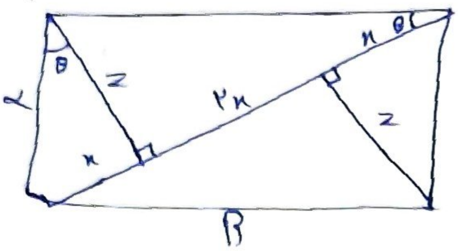


~~GD = DH'~~



DH = DH'

۶



$\sin\theta = \frac{x}{\alpha} = \frac{\alpha}{۴x} \rightarrow \alpha^۲ = ۴x^۲ \rightarrow \alpha = ۲x$

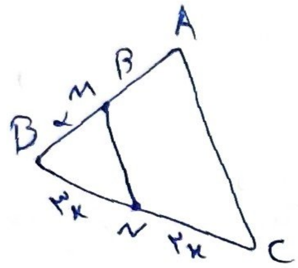
$\cos\theta = \frac{z}{\alpha} = \frac{\beta}{۴x} = \frac{۳x}{\beta} \rightarrow ۱۲x^۲ = \beta^۲ \rightarrow \beta = ۲\sqrt{۳}x$

$\rightarrow z = \frac{۲x \times ۳x}{۲\sqrt{۳}x} = \sqrt{۳}x$

$S_{\square} = ۲\left(\frac{\alpha\beta}{۲}\right) = \alpha\beta = ۶\sqrt{۳}x^۲$

$S_{\Delta} = \frac{xz}{۲} = \frac{x \times \sqrt{۳}x}{۲} = \frac{\sqrt{۳}x^۲}{۲} \rightarrow \frac{S_{\square}}{S_{\Delta}} = \frac{۶\sqrt{۳}x^۲}{\frac{\sqrt{۳}x^۲}{۲}} = \boxed{۱۲}$

۷



$S_{BMN} = \frac{\alpha \times ۳x \times \sin B}{۲}$

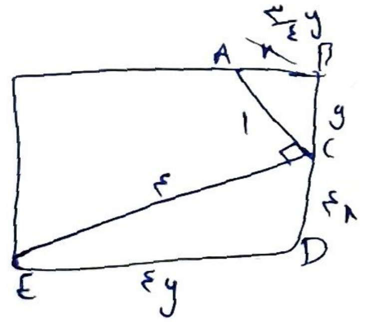
$S_{ABC} = \frac{(\alpha+\beta) \times ۵x \times \sin B}{۲}$

$\rightarrow \frac{S_{ABC}}{S_{BMN}} = \frac{(\beta+\alpha)\times ۵}{(\alpha \times ۳)} = ۳ \rightarrow ۵\alpha = ۳\alpha + ۵\beta$

$\rightarrow ۴\alpha = ۵\beta$

$\rightarrow \frac{BM}{AM} = \frac{\alpha}{\beta} = \boxed{\frac{۵}{۴}}$

۸



$۱^۲ = (\frac{۳}{۴}y)^۲ + (y)^۲ \rightarrow ۱ = \frac{۲۵}{۱۶}y^۲ \rightarrow y = \frac{۴}{۵} , x = \frac{۳}{۵}$

$\rightarrow S = (۴y)^۲ = ۱۶y^۲ = ۱۶ \times \frac{۱۶}{۲۵} = \frac{۲۵۶}{۲۵}$

$ADC \simeq EDC \rightarrow \frac{۱}{۴} = \frac{AB}{DC} = \frac{BC}{ED}$

$۴x + y = ۴y \rightarrow ۴x = ۳y \rightarrow x = \frac{۳}{۴}y$

۹

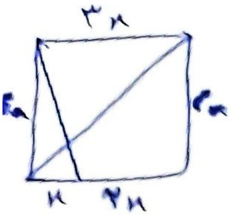
ACG,د: $GE = EC \rightarrow G\hat{A}E = E\hat{A}C$

$GAC = BAG \Longrightarrow BAG = ۲EAC$ $\rightarrow BAC = ۴EAC \Rightarrow ۴FAD = BAD$

$\rightarrow BD = ۴FD \rightarrow \boxed{\frac{BD}{FD} = ۴}$

۱۰

ماکان رحیمی زاده



۱

$\left.\begin{array}{l} E\hat{A}D = C\hat{A}D \text{ مشترک} \\ E_1 = C \end{array}\right\} \xrightarrow{\text{ز ز}} AED \simeq ABC \Rightarrow \frac{x}{15} = \frac{2}{x+1}$

$\rightarrow x^2 + x - 30 = 0 \rightarrow (x+6)(x-5) = 0 \rightarrow \boxed{x = 5}$

۲

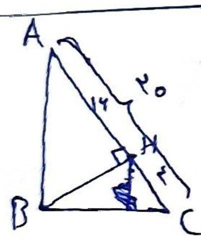
$\boxed{\text{متوازی الاضلاع } DEFB \rightarrow DE = BF = 3}$

$\left.\begin{array}{l} H_1 = H_2 \\ DE \parallel FC \text{ , مورب } EF \\ \rightarrow E = F \end{array}\right\} \xrightarrow{\text{دو زاویه}} D\hat{E}H \sim FHC \Rightarrow$

$\frac{DE}{FC} = \frac{x}{y} \xrightarrow{3y = 5x} \frac{DE}{FC} = 0{,}6$ $\Big]$ $DE \parallel BC \xrightarrow{\text{تالس}} \frac{AE}{AC} = \frac{DE}{\frac{BC}{BF+FC}} \Rightarrow \frac{0{,}6y}{\frac{1}{x_1}y} \Rightarrow \frac{BF+FC}{DE} = 2$

$\frac{10}{6} + \frac{\overset{3}{BF}}{DE} = 2 \rightarrow DE = 9 \rightarrow FC = 15 \rightarrow BC = 3+15 = 18$

۳

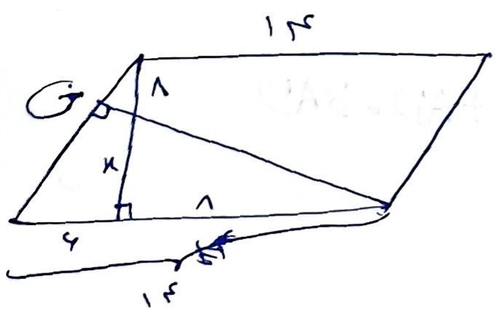


$AB^2 = \cancel{AC}\ AH \times 20$

$BC^2 = CH \times 20$

$\boxed{\frac{AB}{BC} = 2}$

۴



~~$BE \times FC = AF^2$~~

~~$x \times 8 = AF^2$~~

۵

$ECF \simeq AEG \simeq ABF \rightarrow \frac{\overset{8}{\cancel{FC}}}{\underset{x+8}{AF}} = \frac{\overset{x}{\cancel{EF}}}{\underset{6}{\cancel{BF}}} \rightarrow \begin{array}{l} x^2 + 8x - 48 = 0 \\ (x-4)(x+12) = 0 \\ \rightarrow \boxed{x = 4} \end{array} \rightarrow \boxed{AF = 12}$