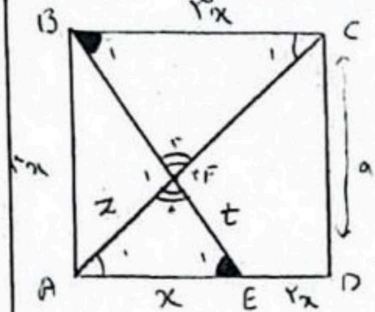
نام و نام خانوادگی: [illegible] کلاس: یازدهم دختر تکلیف شماره: ۲۱



$\hat F_3=\hat F_4$ متقابل به رأس، $\hat B_1=\hat E_1$ $\Big\}\Rightarrow B\hat FC\sim A\hat FE \Rightarrow \frac{BC}{AE}=\frac{BF}{FE}=\frac{CF}{FA}=3$

$\Rightarrow CF=3\underbrace{AF}_{z}\ ,\ BF=3\underbrace{FE}_{t}$

$AC=CF+AF=3z+z=4z \to (AC)^2=9x^2+9x^2=16z^2 \Rightarrow z=\frac{3\sqrt2}{4}x$

$BE=BF+EF=3t+t=4t \to (BE)^2=9x^2+x^2=16t^2 \Rightarrow t=\frac{\sqrt{10}}{4}x$

$\Rightarrow \frac{EF}{AF}=\frac{t}{z}=\frac{\frac{\sqrt{10}}{4}x}{\frac{3\sqrt2}{4}x}=\frac{\sqrt5}{3}$]

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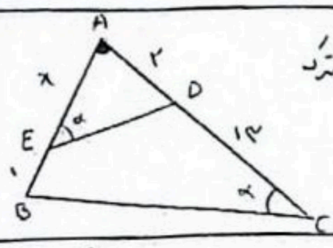

$\hat A=\hat A$ مشترک، $A\hat ED=D\hat CB$ $\Rightarrow A\hat ED\sim A\hat BC \Rightarrow \frac{AE}{AC}=\frac{AD}{AB}\Rightarrow \frac{x}{15}=\frac{2}{x+1}$

$\Rightarrow x^2+x=30 \to x^2+x-30=0 \Rightarrow (x+6)(x-5)=0$ $\begin{cases} x=-6 & \text{غ ق ق} \\ x=5 & \checkmark \end{cases}$

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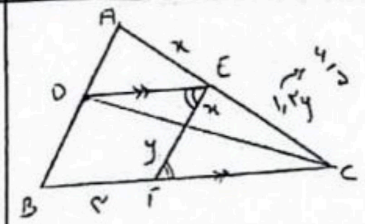

$3y=5x \Rightarrow x=\frac35 y$

$DE\parallel FC \Rightarrow \frac{DE}{FC}=\frac{x}{y} \Rightarrow \frac{DE}{FC}=\frac{\frac35 y}{y} \Rightarrow DE=\frac35 FC$

$DE\parallel BC \Rightarrow \frac{DE}{BC}=\frac{AE}{AC} \Rightarrow \frac{\frac35 FC}{3+FC}=\frac{x}{x+1.2y} \to \frac{\frac35 FC}{3+FC}=\frac{\frac35 y}{\frac35 y+\frac65 y} \Rightarrow FC=\frac{15}{4}$

$\to BC=3+\frac{15}{4}=\frac{12+15}{4}=\frac{27}{4}=6.75$]

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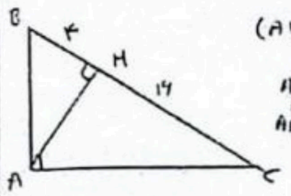

$(AH)^2=4\times 16 \Rightarrow AH=8$

$A\hat HC: \sqrt{16^2+8^2}=8\sqrt5 \to AC$

$A\hat BH: \sqrt{4^2+8^2}=4\sqrt5 \to AB$ $\xrightarrow{\text{نسبت}} 2$]

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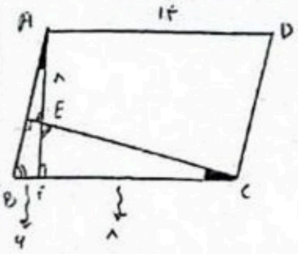

$A\hat BF\sim C\hat EF \to \frac{EF}{BF}=\frac{FC}{AF} \to EF\times(8+EF)=48$

$\Rightarrow (EF)^2+8EF-48=0 \Rightarrow (EF+12)(EF-4)=0 \Rightarrow$ $\begin{cases} EF=-12 & \text{غ ق ق} \\ EF=4 & \checkmark \end{cases}$

$AF=4+8=12$]

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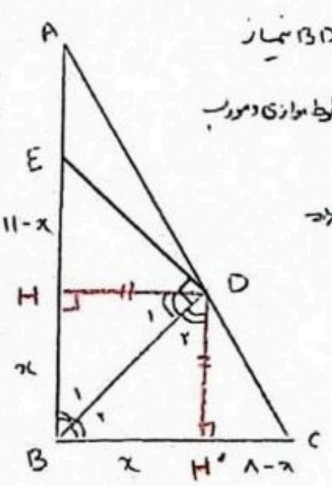

نیمساز BD $\xrightarrow{\text{ویژگی نیمساز}}$ $DH=DH' \Rightarrow BH=BH'=x$

نتیجه خطوط موازی و مورب: $\hat D_1=\hat B_2$ و $\hat D_2=\hat B_1$ ، $\hat D_1+\hat B_2=90$ ، $\hat D_2+\hat B_1=90$ $\Rightarrow \hat D_1=\hat B_1=\hat D_2=\hat B_2=45^\circ \Rightarrow HDH'B$ مربع است

$\Rightarrow DH=DH'=BH=BH'=x$

$A\hat DE: (DH)^2=BH\times HE \to x^2=x(11-x) \Rightarrow$ $\begin{cases} x=0 & \text{غ ق ق} \\ x=\frac{11}{2} & \checkmark \end{cases}$

$A\hat BC: HD\parallel BC \xrightarrow{\text{تعمیم تالس}} \frac{AH}{AB}=\frac{HD}{BC}$

$\Rightarrow \frac{AE+\frac{11}{2}}{AE+11}=\frac{\frac{11}{2}}{8} \Rightarrow 5AE=33 \Rightarrow AE=\frac{33}{5}$]

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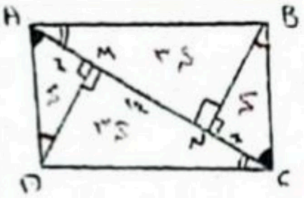

اگر $S_{ADM}=S$ ⇐ $S_{MDC}=3S$ ،

DM ارتفاع مشترک ⇐ $\frac{S_{MDC}}{S_{ADM}}=\frac{3x}{x}=3$

$\left.\begin{array}{l} M\hat{A}D=B\hat{C}N \\ B\hat{N}C=D\hat{M}A \\ AM=NC \end{array}\right\} \Rightarrow A\hat{M}D \cong B\hat{N}C$, $\left.\begin{array}{l} B\hat{A}N=M\hat{C}D \\ C\hat{M}D=A\hat{N}B \\ AN=CM \end{array}\right\} \Rightarrow A\hat{B}N \cong M\hat{D}C$

$\Rightarrow \frac{S_{ABCD}}{S_{NBC}}=\frac{(3+3+1+1)S}{S}=8$]

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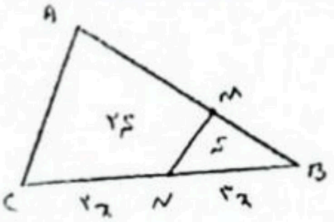

$\frac{S_{M\hat{N}B}}{S_{A\hat{B}C}}=\frac{\frac{1}{2}\times\sin\hat{B}\times BM\times BN}{\frac{1}{2}\times\sin\hat{B}\times BA\times BC} \Rightarrow \frac{1}{3}=\frac{3BM}{5BA} \Rightarrow \frac{BM}{BA}=\frac{5}{9}$

$\xrightarrow{\text{تفاضل نسبت}} \frac{BM}{AM}=\frac{5}{4}$]

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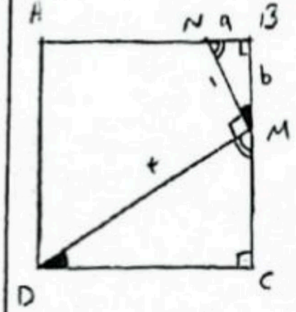

$\frac{MD}{MN}=\frac{DC}{BM}=\frac{MC}{NB} \longrightarrow \frac{4}{1}=\frac{DC}{b} \Rightarrow DC=4b$, $BC=b+MC=4b$
$\Rightarrow MC=3b$

$(4b)^2+(3b)^2=16b^2+9b^2=16 \Rightarrow b=\frac{4}{5}$

ضلع $DC=4\times\frac{4}{5}=\frac{16}{5} \longrightarrow S=(\frac{16}{5})^2=10/24$]

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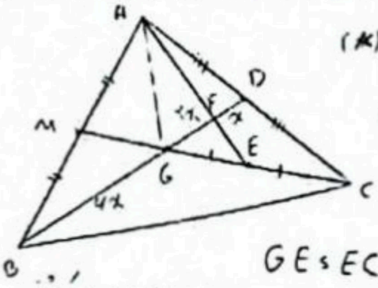

$(*)\ A\hat{G}C:\ \frac{AF}{FE}=\frac{GF}{FD}=2 \longrightarrow GF=2FD$

$A\hat{B}C:\ \frac{BD}{\underset{\hookrightarrow\, GF+FD}{GD}}=3 \longrightarrow \frac{BD}{3FD}=3 \longrightarrow \frac{BD}{FD}=9$]

$GE=EC \Rightarrow AE$ میانه است

G مرکز ثقل ⇐ CM و BD میانه ⇐ $AD=DC$ ⇐ GD میانه است } ⇐ F مرکز ثقل (*) برای $A\hat{G}C$