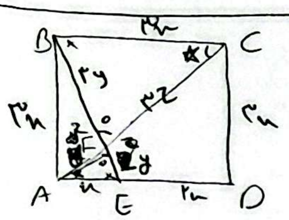
۱)



$ED = ۲AE$

$\left.\begin{array}{l} BC \parallel AD , AC \text{ مورب} \rightarrow \hat{C} = \hat{A} \\ BC \parallel AD , BE \text{ مورب} \rightarrow \hat{B} = \hat{E} \end{array}\right\} \xrightarrow{\text{زز}} B\hat{F}C \sim E\hat{F}A$

$\frac{AF}{CF} = \frac{AE}{BC} = \frac{۱}{۳} \rightarrow \frac{AF}{CF} = \frac{۱}{۳}$

$\frac{EF}{BF} = \frac{AE}{BC} = \frac{۱}{۳} \rightarrow \frac{EF}{BF} = \frac{۱}{۳}$

$BE = \sqrt{۹x^۲ + x^۲} = x\sqrt{۱۰}$

$x\sqrt{۱۰} = ۴y \rightarrow y = \frac{x\sqrt{۱۰}}{۴}$

$AC = \sqrt{۹x^۲ + ۹x^۲} = ۳x\sqrt{۲}$

$۳\sqrt{۲}x = ۴z \rightarrow z = \frac{۳\sqrt{۲}x}{۴}$

$\frac{EF}{AF} = \frac{\frac{x\sqrt{۱۰}}{۴}}{\frac{x\sqrt{۲}}{۴}} = \boxed{\frac{\sqrt{۵}}{۳}}$

۵

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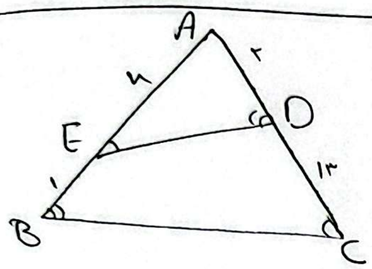
۲)



$\hat{E} = \hat{C} \rightarrow ۱۸۰ - \cancel{A} - D = \cancel{۱۸۰} - \cancel{A} - B$

$\rightarrow \hat{B} = \hat{D}$

$\left.\begin{array}{l} \hat{B} = \hat{D} \\ \hat{E} = \hat{C} \end{array}\right\} \xrightarrow{\text{زز}} A\hat{E}D \sim A\hat{C}B$

$\frac{AE}{AC} = \frac{AD}{AB} \rightarrow \frac{x}{۱۵} = \frac{۲}{x+۱}$

$x^۲ + x = ۳۰ \rightarrow x^۲ + x - ۳۰ = ۰$

$(x+۶)(x-۵) = ۰$ → $\boxed{x = ۵}$ ، $x = -۶$ غ ق ق

۵

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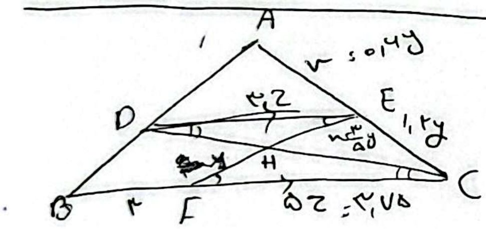
۳)



$۳y = ۵x$

$BF = ۳$

$\left.\begin{array}{l} \hat{E} = \hat{F} \\ \hat{D} = \hat{C} \end{array}\right\} \xrightarrow{\text{زز}} D\hat{E}H \sim C\hat{F}H$

$\frac{FC}{ED} = \frac{FH}{EH} = \frac{۵}{۳} \rightarrow \frac{FC}{ED} = \frac{۵}{۳}$

$DE \parallel BC \rightarrow \frac{۰,۶y}{۱,۸y} = \frac{۳z}{۵z + ۳}$

$۳z + ۱,۸ = ۵,۴z \rightarrow ۲,۴z = ۱,۸ \rightarrow z = ۰,۷۵$

$BC = ۳ + ۳,۷۵ = \boxed{۶,۷۵}$

۵

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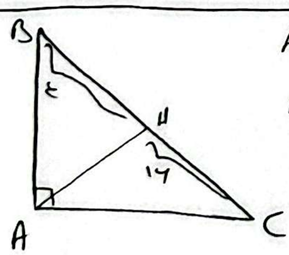
۴)



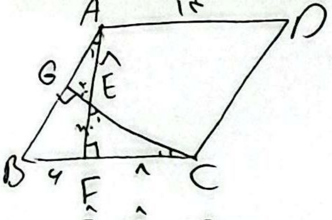
$AC^۲ = ۱۶ \times ۲۰ \rightarrow AC = ۸\sqrt{۵}$

$AB^۲ = ۴ \times ۲۰ \Rightarrow AB = ۴\sqrt{۵}$

$\frac{۸\sqrt{۵}}{۴\sqrt{۵}} = ۲$

۵

(۵



$AD=14$

$BF=6$

$AE=8$

$$\left.\begin{array}{l}\hat{E}_1+\hat{C}_1=90\\ \hat{E}_2+\hat{A}_1=90\\ \text{متقابل به راس}\ \hat{E}_1=\hat{E}_2\end{array}\right\}\to \hat{C}_1=\hat{A}_1$$

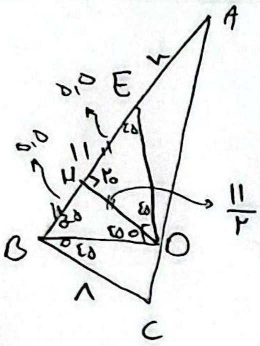
$$\left.\begin{array}{l}\hat{A}=\hat{C}_1\\ \hat{F}=\hat{F}=90\end{array}\right\}\xrightarrow{\text{زز}} A\hat{B}F\sim C\hat{E}F$$

$$\frac{EF}{BF}=\frac{FC}{AF}\to\frac{x}{6}=\frac{8}{8+x}\qquad 48=8x+x^2$$

$$x^2+8x-48=0\quad\begin{cases}x=-12\ \text{غ ق ق}\\ \boxed{x=4}\end{cases}$$

$AF=8+4=12$

(۶



$2\alpha=90$

$\alpha=45°$

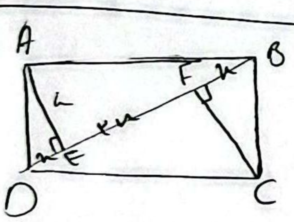
$\frac{11}{2}=5.5$

$$\frac{x+5.5}{x+11}=\frac{5.5}{8}\to 8x+44=5.5x+60.5$$

$$\Rightarrow 2.5x=16.5\Rightarrow x=6.6$$

$$\boxed{AE=6.6}$$

(۷



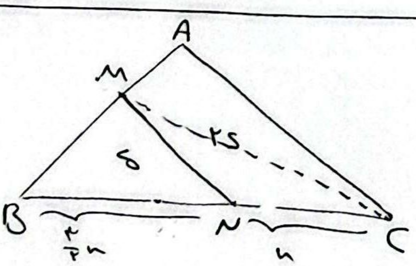
$B\hat{F}C$, $A\hat{D}E$ قائم‌الزاویه متشابه هستند.

$$S_{A\hat{D}E}=\frac{1}{2}xh$$

$$S_{ABCD}=2\left(\frac{1}{2}h\times 4x\right)$$

$$\frac{S_{ABCD}}{S_{A\hat{D}E}}=\frac{2(\cancel{\tfrac{1}{2}}\cancel{h}\times 4\cancel{x})}{\frac{1}{2}\cancel{x}\cancel{h}}=2\times4=\boxed{8}$$

(۸

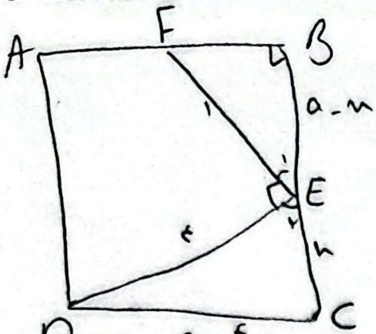


$$\frac{S_{BMN}}{S_{MBC}}=\frac{2}{5}\Rightarrow\frac{5}{2}S_{BMN}=S_{MBC}$$

$$\frac{S_{BMC}}{S_{ABC}}=\frac{BM}{AB}\Rightarrow\frac{\frac{5}{2}S_{BMN}}{S_{ABC}}=\frac{BM}{AB}\qquad S_{BMN}=\frac{1}{4}\times S_{ABC}$$

$$\frac{BM}{AB}=\frac{5}{8}\to\frac{BM}{AM}=\boxed{\frac{5}{3}}$$

۹)



$a = \frac{۵}{۴} x$

$\left.\begin{array}{l}\hat{E}_1 + \hat{E}_2 = ۹۰ \\ \hat{E}_2 + \hat{D} = ۹۰\end{array}\right\} \to \hat{D} = \hat{E}_1$

$\left.\begin{array}{l}\hat{D} = \hat{E}_1 \\ \hat{B} = \hat{C} = ۹۰\end{array}\right\} \Rightarrow ۴ = \frac{x}{a-x}$

د

$۴a - ۴x = a \to ۴a = ۵x \to a = \frac{۵}{۴} x$

$x^۲ + \frac{۱۶}{۹} x^۲ = ۱۶ \Rightarrow \frac{۵}{۳} x = ۴ \to x = \frac{۱۲}{۵}$

مساحت مربع $= ۳,۲ \times ۳,۲ = \boxed{۱۰,۲۴}$

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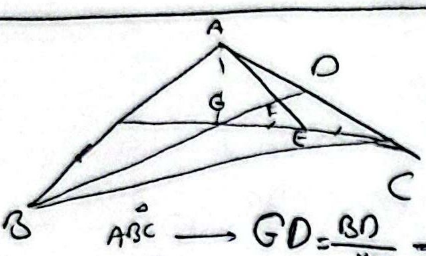
۱۰)



$GE = EC$

$\frac{BD}{FD} = ?$

د

$\left.\begin{array}{l}A\hat{B}C \longrightarrow GD = \frac{BD}{۳} \\ A\hat{G}C \to FD = \frac{GD}{۳}\end{array}\right\} \to ۳FD = \frac{BD}{۳} \to \frac{BD}{FD} = \boxed{۹}$