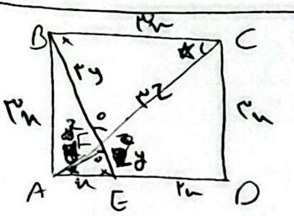
۱)




$ED = ۲AE$

$BC \parallel AD,\ AC / \rightarrow \hat{C} = \hat{A}$
$BC \parallel AD,\ BE / \rightarrow \hat{B} = \hat{E}$ $\Big\} \xrightarrow{زز} B\hat{F}C \sim E\hat{F}A$

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

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

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

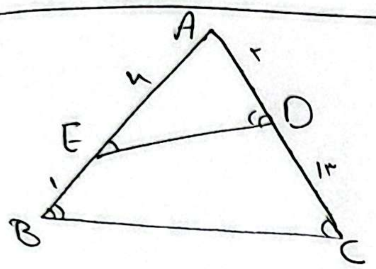
$BE = \sqrt{۹x^۲ + x^۲} = x\sqrt{۱۰}$

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

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

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

۲)




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

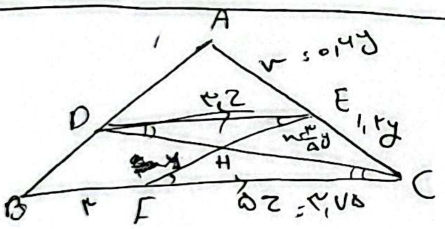
$\hat{B} = \hat{D}$
$\hat{E} = \hat{C}$ $\Big\} \xrightarrow{زز} A\hat{E}D \sim A\hat{C}B$

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

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

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

۳)




$۳y = ۵x$

$BF = ۳$

$\hat{E} = \hat{F}$
$\hat{D} = \hat{C}$ $\Big\} \xrightarrow{زز} D\hat{E}H \sim C\hat{F}H$

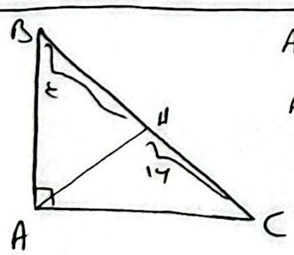
$\frac{FC}{ED} = \frac{FH}{EH} = \frac{۵}{۳} \rightarrow \frac{FC}{ED} = \frac{۵}{۳}$

$BC = ۳ + ۳,۷۵ = \boxed{۶,۷۵}$

$DE \parallel BC \rightarrow \frac{۰,۹\cancel{y}}{۱,۸\cancel{y}} = \frac{۳z}{۵z+۳}$

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

۴)

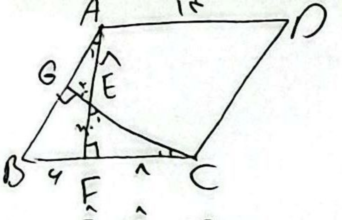



$AC^۲ = ۱۶ \times ۲۰ \rightarrow AC = ۸\sqrt{۵}$

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

$\frac{۸\sqrt{۵}}{۴\sqrt{۵}} = ۲$

۵)



$AD=14$

$BF=6$

$AE=8$

$\hat{E}_1+\hat{C}_1=90$

$\hat{E}_2+\hat{A}_1=90$ } $\rightarrow \hat{C}_1=\hat{A}_1$

متقابل به راس $\hat{E}_1=\hat{E}_2$

$\hat{A}=\hat{C}_1$, $\hat{F}=\hat{F}=90$ } $\xrightarrow{\text{زز}} A\overset{\triangle}{B}F \sim C\overset{\triangle}{E}F$

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

$x^2+8x-48=0$ → $x=-12$ غ ق ق , $\boxed{x=4}$

$AF=8+4=(12)$

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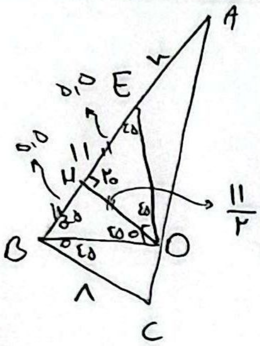
۶)



$2\theta=90$

$\theta=45^\circ$

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

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

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

$\boxed{AE=6.6}$

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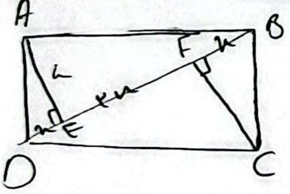
۷)



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

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

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

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

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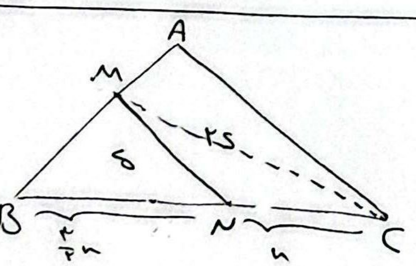
۸)

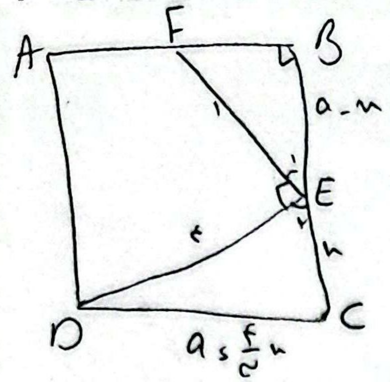


$\frac{S_{BMN}}{S_{MNC}}=\frac{3}{2} \Rightarrow \frac{5}{2}S_{BMN}=S_{MBC}$

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

$\frac{BM}{AB}=\frac{5}{9} \rightarrow \frac{BM}{AM}=\boxed{\frac{5}{4}}$

(۹




$\hat{E}_1+\hat{E}_2=90$
$\hat{E}_2+\hat{D}=90$ $\Big\} \rightarrow \hat{D}=\hat{E}_1$

$\hat{D}=\hat{E}_1$
$\hat{B}=\hat{C}=90$ $\Big\} \Rightarrow 4=\frac{x}{a-x}$

$4a-4x=a \rightarrow 3a=4x \rightarrow a=\frac{4}{3}x$

$x^2+\frac{16}{9}x^2=16 \Rightarrow \frac{5}{3}x=4 \rightarrow x=\frac{12}{5}$

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

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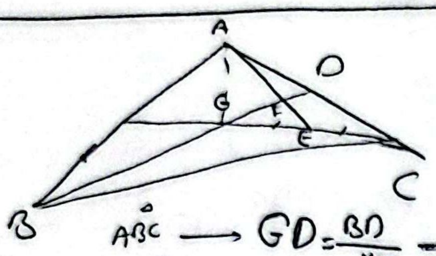
(۱۰




$GE=EC$

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

$\overset{\triangle}{ABC} \longrightarrow GD=\frac{BD}{3}$
$\overset{\triangle}{AGC} \rightarrow FD=\frac{GD}{3}$ $\Big\} \rightarrow 3FD=\frac{BD}{3} \rightarrow \frac{BD}{FD}=\boxed{9}$