22 C یازدهم ریاضی پنج شنبه

بهار رنجباری

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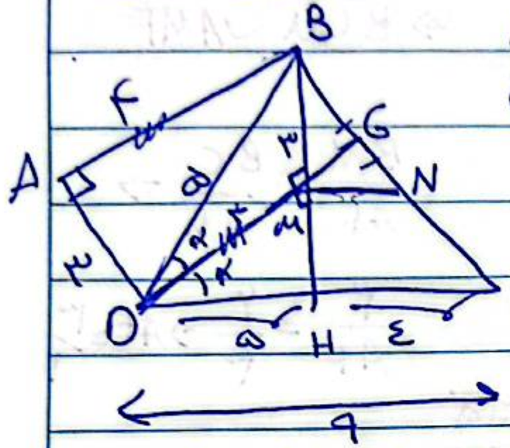
(1)

$$\frac{S_{B\hat{C}E}}{S_{B\hat{D}E}} = \frac{BC}{DE} \qquad \frac{AD}{AB} = \frac{DE}{BC} \Rightarrow \frac{۵}{۱۲} = \frac{DE}{BC} \Rightarrow \frac{BC}{DE} = \frac{۱۲}{۵} = \boxed{۲,۴}$$

(2)



ABMD مستطیل $\Rightarrow AD = BM$, $AB = DM$

$MH' = ۲$

$\frac{۱}{۲} = \frac{MH'}{۴}$

$\hat{M}_1 = \hat{M}_۲ = ۹۰$, $\hat{D}_1 = \hat{D}_۲ = \alpha$, $DM = DM$ $\Rightarrow D\hat{H}M \cong D\hat{M}B$

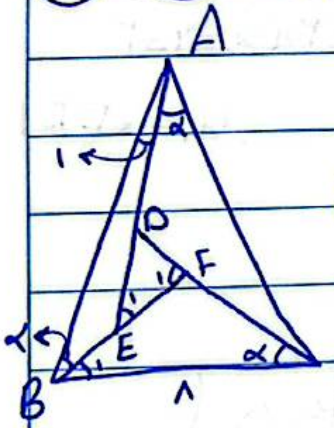
$HM = MB$

$OH = DB = ۵$

$HC = DC - DH \rightarrow ۹ - ۵ = ۴$

$\frac{BM}{MH} = \frac{BH'}{H'C} \longrightarrow MH' \parallel HC \rightarrow \frac{BM}{BH} = \frac{MH'}{HC}$

(3)



$\hat{F}_1 = \alpha + \hat{B}_1 = \hat{B} \ (1)$

$\hat{E}_1 = \hat{A}_1 + \alpha = \hat{A} \ (۲)$

$\xrightarrow{(1)} \hat{F}_1 = \hat{B}$, $\xrightarrow{(۲)} \hat{E}_1 = \hat{A}$ $\xrightarrow{زز} A\hat{B}C \sim D\hat{E}F \Rightarrow \frac{BC}{DF} = \frac{AB}{EF}$

$DE = ۲,۵ , EF = ۳ \Rightarrow \frac{۸}{۲,۵} = \frac{AB}{۳}$

$\boxed{AB = ۹,۶}$

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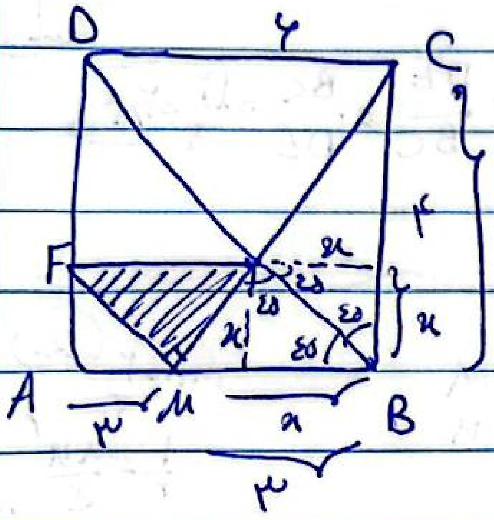
۴



$$\begin{cases} B\hat{C}M = A\hat{M}F \\ \hat{A} = \hat{B} = ۹۰ \end{cases} \Rightarrow \overset{\triangle}{BCM} \sim \overset{\triangle}{AMF}$$

$$\frac{BM}{AF} = \frac{BC}{AM} \Rightarrow$$

$$\frac{۳}{AF} = \frac{۶}{۳} \Rightarrow AF = \frac{۳}{۲}$$

$$MF^۲ = AM^۲ + AF^۲ \Rightarrow MF^۲ = ۹ + \frac{۹}{۴} \Rightarrow MF = \frac{۳\sqrt{۵}}{۲}$$

$$EK \parallel MB \Rightarrow \frac{CK}{BC} = \frac{EK}{MB} \Rightarrow \frac{۶-x}{۶} = \frac{x}{۳} \Rightarrow ۶-x = ۲x \Rightarrow x = ۲$$

$$MH = ۳-۲ = ۱$$

$$ME^۲ = EH^۲ + MH^۲ = ۲^۲ + ۱^۲ = ۵ \rightarrow ME = \sqrt{۵}$$

$$S_{\overset{\triangle}{EFM}} = \frac{۱}{۲} MF \times ME = \frac{۱}{۲} \times \frac{۳}{۲}\sqrt{۵} \times \sqrt{۵} \Rightarrow \boxed{\frac{۱۵}{۴} = ۳/۷۵}$$

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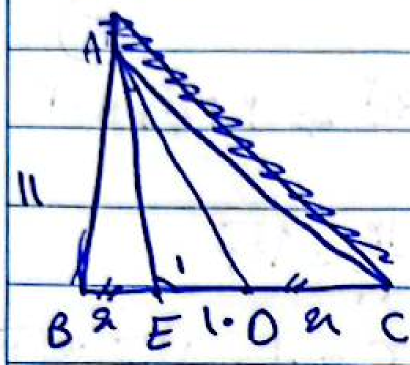

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$$\begin{cases} D\hat{A}E = A\hat{C}D \\ \hat{E}_۱ = \hat{E}_۱ \end{cases} \Rightarrow \overset{\triangle}{ADE} \sim \overset{\triangle}{AEC}$$

$$\frac{AD}{AC} = \frac{AE}{CE} = \frac{ED}{AE}$$

$$BE = DE = x$$

$$\frac{AE}{CE} = \frac{ED}{AE} \Rightarrow AE^۲ = ED \times CE = ۱۰(۱۰+x) = ۱۰۰ + ۱۰x$$

$$AE^۲ = ۱۰۰ + ۱۰x \quad ۱$$

$$AE^۲ = AB^۲ + BE^۲ \Rightarrow AE^۲ = ۱۱^۲ + x^۲ \xrightarrow{۱} ۱۲۱ + x^۲ = ۱۰۰ + ۱۰x$$

$$\hookrightarrow x^۲ - ۱۰x + ۲۱ = ۰$$

$$\hookrightarrow (x-۳)(x-۷) = ۰$$

$$\hookrightarrow \begin{cases} x = ۳ \\ x = ۷ \rightarrow \boxed{DC = ۷} \end{cases}$$

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$$EF^۲ = DF \times FC \Rightarrow ۴^۲ = ۱ \times FC \Rightarrow FC = ۱۶$$

$$BC^۲ = CF \times CA = ۱۶ \times (۱۶ + ۴) = ۱۶ \times ۲۰ \Rightarrow BC = ۴\sqrt{۲۰} = \boxed{۸\sqrt{۵}}$$

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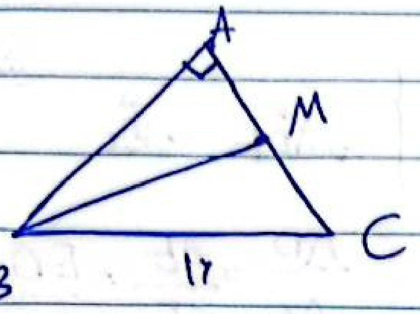

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$AB = AC \,,\, AB^2 + AC^2 = BC^2 \Rightarrow 2AC^2 = BC^2$

$AC\sqrt{2} = BC = 12 \Rightarrow AC = \frac{12}{\sqrt{2}} = 8\sqrt{2}$

$\hookrightarrow AB = 8\sqrt{2} \,,\, AM = \frac{1}{2}AC = \frac{1}{2} \times 8\sqrt{2} = 4\sqrt{2}$

$BM^2 = AB^2 + AM^2 \Rightarrow AM^2 = (8\sqrt{2})^2 + (4\sqrt{2})^2 = 64 \times 2 + 16 \times 2 = 160$

$\boxed{BM = 4\sqrt{10}}$

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$AE = 2BE \qquad DC = 2BD$

$BC^2 = BD^2 + CD^2 = 4 + 16 = 20 \longrightarrow BC = 2\sqrt{5} \longrightarrow BE = \frac{BC}{2} = \sqrt{5}$

$AE = 2\sqrt{5}$

$S_{ABE} = \frac{1}{2} BE \times AE = \frac{1}{2} \times \sqrt{5} \times 2\sqrt{5} = \boxed{5}$

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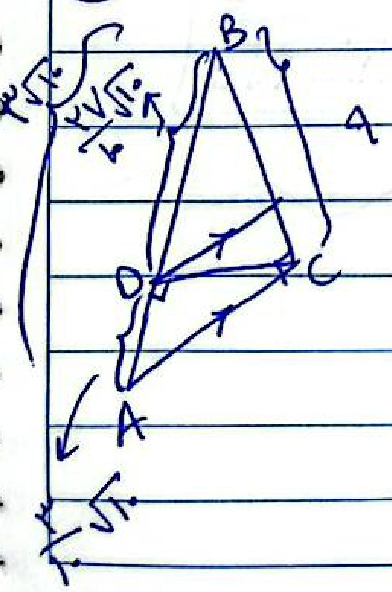

$3^2 = AD \times 3\sqrt{10} \Rightarrow AD = \frac{9}{3\sqrt{10}} = \frac{3}{\sqrt{10}} = \frac{3}{10}\sqrt{10}$

$\frac{BE}{9} = \frac{\frac{27}{10}\sqrt{10}}{3\sqrt{10}} \Rightarrow \frac{BE}{3} = \frac{27}{10} \Rightarrow$

$BE = 8{,}1$

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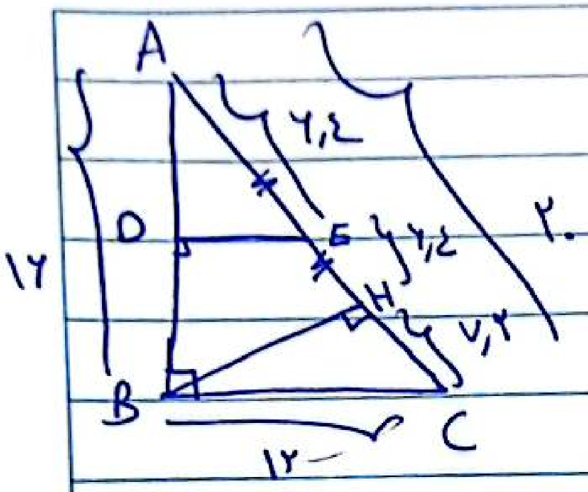

$(۱۲)^۲ = CH \times ۲۰ \Rightarrow CH = ۷,۲$

$\frac{۶,۴}{۲۰} = \frac{DE}{۱۲} \Rightarrow \boxed{DE = ۳,۸۴}$