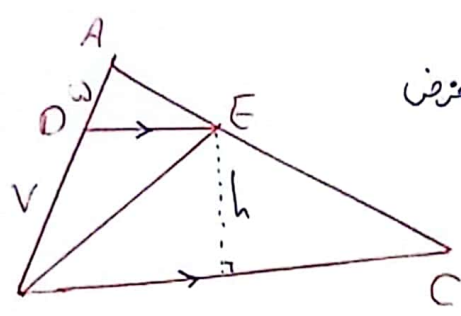


٢٥

سؤال ٢٢ كلاس درسیها

سوال (١)

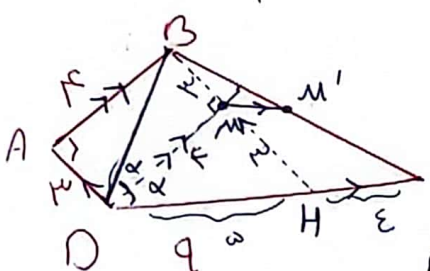


فرض $BC \parallel DE \rightarrow$ حل: $\frac{S_{BCE}}{S_{BDE}} = ?$

$DE \parallel BC \rightarrow \frac{AD}{AB} = \frac{DE}{BC} = \frac{AE}{AC}$

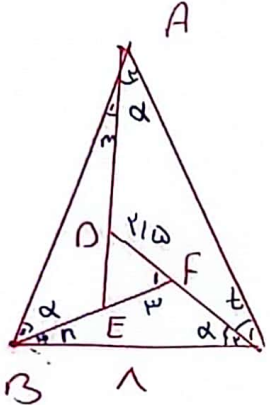
$\rightarrow \frac{\omega}{12} = \frac{DE}{BC} \Rightarrow \omega_{BCE} = 12 \cdot \frac{\omega}{12} \Rightarrow S_{BCE} = \frac{BC \times h}{2} = \frac{12 \times h}{2}$

$S_{BDE} = \frac{DE \times h}{2} = \frac{\omega \times h}{2}$ $\frac{S_{BCE}}{S_{BDE}} = \frac{\frac{12 \times h}{2}}{\frac{\omega \times h}{2}} = \frac{12}{\omega}$ ✓



$\hat{BDM} = \hat{CDM}$
 $\hat{M}_1 = \hat{M}_2 = 90^\circ$
 $DM = MD$
 $\Rightarrow BDM \cong DMH$ (سوال ٢)

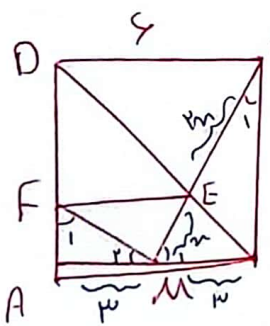
$BM' = CM'$
 $BM = MH$
 $\frac{BM}{BM} = \frac{MM'}{HC} = \frac{BM'}{BC} \Rightarrow \frac{2}{6} = \frac{MM'}{6} \Rightarrow MM' = 2$ ✓



فرض: $\hat{ABF} = \hat{CAE} = \hat{BCD}$
 $EF = 2$ $DF = 2/\omega$
 $\rightarrow$ حل: $AB = ?$

سوال (٣) (٢)

$\left. \begin{aligned} \hat{BFC} = \hat{B} + \hat{C} = n + \alpha \\ \hat{ADC} = \hat{A} + \hat{C} = t + \alpha \\ \hat{AEB} = \hat{A} + \hat{B} = m + \alpha \end{aligned} \right\} \Rightarrow \left\{ \begin{aligned} \hat{F} &= \hat{B} \\ \hat{E} &= \hat{A} \\ \hat{D} &= \hat{C} \end{aligned} \right. \Rightarrow \triangle ABC \sim \triangle EDF$
 $\frac{AB}{2} = \frac{1}{2/\omega} \Rightarrow AB = \frac{2\omega}{2/\omega} = \frac{4\omega}{1} = 4\omega$ ✓



$AB \parallel DC \Rightarrow MB = MA \Rightarrow 2MA = AB = 6 \Rightarrow MA = 3$

سوال (٤)

$MB \parallel DC \Rightarrow \frac{MB}{CD} = \frac{ME}{CE} = \frac{BE}{DE} \Rightarrow \frac{3}{6} = \frac{ME}{CE} \Rightarrow \frac{ME}{ME+CE} = \frac{1}{1+2}$

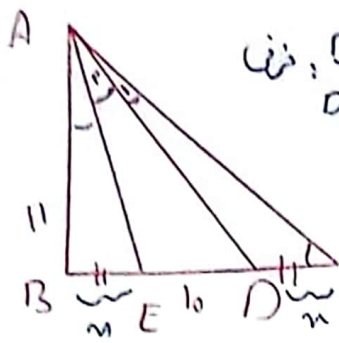
$\Rightarrow \frac{ME}{MC} = \frac{1}{3} = \frac{2}{6}$

$MB^2 + BC^2 = MC^2$
 $MC^2 = 3^2 + 6^2 = 45 \Rightarrow MC = 3\sqrt{5} \Rightarrow ME = \frac{MC}{3} = \frac{3\sqrt{5}}{3} = \sqrt{5}$

$\begin{cases} \hat{C}_1 + \hat{M}_1 = 90^\circ \\ \hat{C}_2 + \hat{F}_1 = 90^\circ \\ \hat{C}_1 + \hat{C}_2 = 90^\circ \end{cases} \Rightarrow \hat{M}_1 = \hat{C}_2 \Rightarrow \hat{F}_1 = \hat{C}_1$

$BCM \sim AMF$
 $\frac{MF}{MC} = \frac{AM}{BC} = \frac{AF}{MB}$
 $\frac{MF}{3\sqrt{5}} = \frac{3}{6} \Rightarrow MF = \frac{3\sqrt{5}}{2} \Rightarrow S = \frac{MF \times ME}{2} = \frac{\frac{3\sqrt{5}}{2} \times \sqrt{5}}{2} = \frac{15}{4}$ ✓

(۲)



فرض: $BE = DC \rightarrow DC = ?$

$$\angle BAE = \angle ACD$$

زاویه خارجی $\hat{D} = \hat{A}_1 + \hat{C}$
 مثلث $\hat{ADC}$

$$\angle EAC = \hat{A}_1 + \hat{A}_2$$

$$\left. \begin{aligned} \hat{A}_2 &= \hat{C} \\ \hat{D} &= \angle EAC \\ \hat{A}_2 &= \hat{C} \end{aligned} \right\} \text{ نز }$$

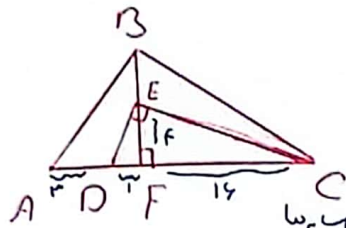
$$\triangle ADC \sim \triangle EAC \xrightarrow[\text{متناظر]}{\text{تناسب اجزای}} \frac{AD}{AC} = \frac{ED}{AE} = \frac{AE}{EC} \Rightarrow \frac{1}{AE} = \frac{AE}{1+n}$$

$$AE^2 = 1 \cdot (1+n) \quad (I) \quad \text{طبق سینوس} \quad AB^2 + BE^2 = AE^2 \quad AE^2 = 1^2 + n^2 \quad II$$

$$\xrightarrow{I \text{ و } II} 1 + n = 1 + n^2 \quad n^2 - n + 1 = 0 \quad (n-3)(n-1) = 0 \quad \left\{ \begin{aligned} n &= 3 \checkmark \\ n &= 1 \checkmark \end{aligned} \right.$$

سوال (۶)

(۲)



فرض: $\angle BDC = \angle EDC = 90^\circ$

$$AD = 3 \quad EF = 2 \quad DF = 1$$

$$\text{طبق تانژانت: } EF^2 = DF \times FC \Rightarrow 2^2 = 1 \times FC \Rightarrow FC = 4$$

$$BC^2 = CF \times AC \Rightarrow BC^2 = 4 \times 10 \Rightarrow BC = \sqrt{40} = 2\sqrt{10} \checkmark$$



المثلث ABC متساوی الساقین
 ضلع آن ضلع است
 مثلث قائم الزاویه است

$$AM \Rightarrow BM = CM = \frac{BC}{2} = 1$$

$$AM = \frac{BC}{2} = \frac{1}{2} = 1$$

سوال (۷)

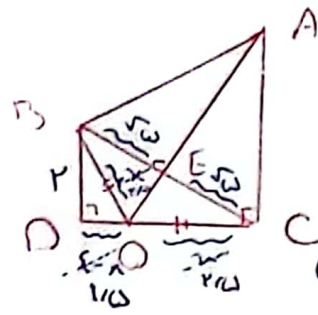
(۲)

طبق راجع سینوس
 در مثل $\hat{AMC}$

$$AM^2 + MC^2 = AC^2 \Rightarrow 1^2 + 1^2 = 1^2 \Rightarrow AC = \sqrt{2} = \sqrt{2}$$

$$M' \Rightarrow AB^2 + AM'^2 = BM'^2 \Rightarrow (1\sqrt{2})^2 + (2\sqrt{2})^2 = (2\sqrt{2})^2 (k+1) \Rightarrow BM' = 2\sqrt{2} \times \sqrt{2} = 4 \checkmark$$

سوال (۸)
(۲)



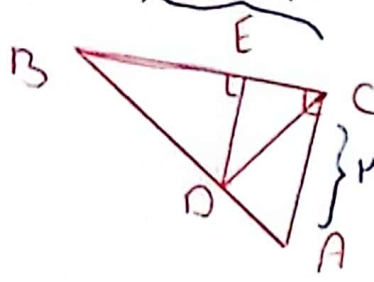
فرض : $\hat{ACD} = 90^\circ$: حل
 $CD = 4$
 $BD = 2$

طبق رابطه میثاقوری : $BD^2 + DO^2 = BO^2$
 $(2)^2 + (4-x)^2 = (6x)^2 \Rightarrow 4 + 16 - 8x + 16 = 36x^2$

طبق رابطه میثاقوری : $BO = CO$
 $EO = OE$
 $\hat{E} = \hat{E}$
 $\Rightarrow \triangle BEO \cong \triangle CEO$
 $\Rightarrow BE = CE = \frac{BC}{2} = \frac{2\sqrt{5}}{2} = \sqrt{5}$

طبق رابطه میثاقوری : $BO^2 = EO^2 + BE^2 \Rightarrow OE^2 = \frac{15}{4} - 5 = \frac{15-20}{4} = -\frac{5}{4}$
 $\Rightarrow OE = \frac{\sqrt{5}}{2}$
 $BE^2 = OE \times AE \Rightarrow 5 = \frac{\sqrt{5}}{2} \times AE \Rightarrow AE = 2\sqrt{5}$

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



فرض : $AC = 3$ $BC = 9$: حل
 $BE = ?$

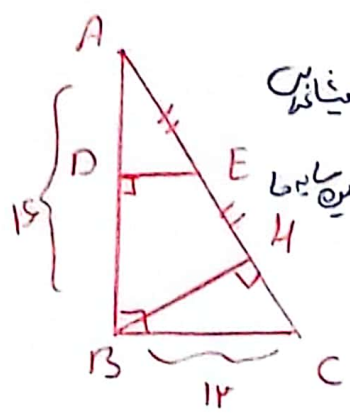
طبق رابطه میثاقوری : $AB^2 = AC^2 + BC^2 = 3^2 + 9^2 = 90 \Rightarrow AB = 3\sqrt{10}$

طبق میثاقوری : $BD \times AB = BC^2 \Rightarrow BD \times 3\sqrt{10} = 81$
 $BD = \frac{27}{\sqrt{10}}$

$DE \parallel AC \Rightarrow \frac{BD}{BA} = \frac{BE}{BC} = \frac{DE}{CA} \Rightarrow \frac{\frac{27}{\sqrt{10}}}{3\sqrt{10}} = \frac{BE}{9} \Rightarrow BE = \frac{9 \times 9}{10}$

$BE = 8.1$ ✓

سوال (۱۰)
(۲)



طبق میثاقوری : $AC^2 = AB^2 + BC^2$
 $AC^2 = (14)^2 + (12)^2 = 400 \Rightarrow AC = 20$

طبق میثاقوری : $AH \times AC = AB^2 \Rightarrow AH \times 20 = 14 \times 14 \Rightarrow AH = \frac{4 \times 14}{5} = 11.2$

$AE = \frac{AH}{2} = \frac{11.2}{2} = 5.6$

$DE \parallel BC \Rightarrow \frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC} \Rightarrow \frac{DE}{12} = \frac{5.6}{20} \Rightarrow DE = \frac{19.2}{5} = 3.84$ ✓