

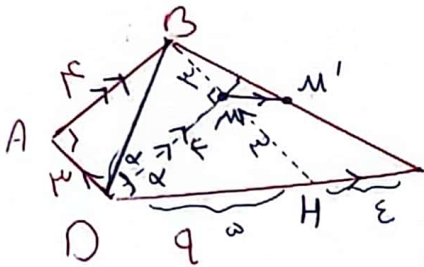
سوال (۱)

$$\frac{S_{BC^2E}}{S_{BD^2E}} = ?$$


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

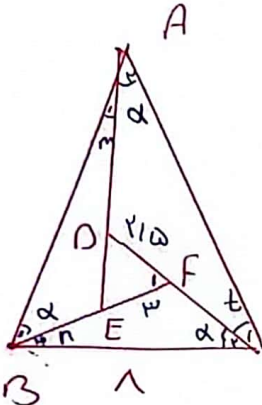
$$\rightarrow \frac{\omega}{1r} = \frac{DE}{BC} \Rightarrow \omega_{BC} = 1r \cdot \frac{\omega}{DE} \Rightarrow S_{BCDE} = \frac{BC \times h}{r} = \frac{1r \times h}{r}$$

$$S_{BPE} = \frac{DE \times h}{r} = \frac{\omega \times h}{r}$$



$$\left. \begin{aligned} \hat{B} \hat{D} M &= C \hat{D} M \\ \hat{M}_1 &= \hat{M}_2 = 1,0 \\ D M &= M D \end{aligned} \right\} \Rightarrow B \hat{D} M \approx D \hat{M} H$$

$$\left. \begin{array}{l} BM' = CM' \\ BM = MH \end{array} \right\} \xrightarrow{\text{قضيه}} \frac{BM}{BM} = \frac{MM'}{MC} = \frac{BM'}{BC} \Rightarrow \frac{r}{r} = \frac{MM'}{r} \Rightarrow \underline{\underline{MM' = r}}$$

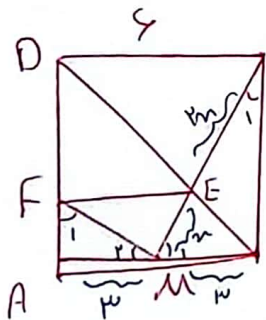


تنفی : $\hat{A}B F = \hat{C}A E = \hat{B}C D$
 $EF = ۳$ $DF = ۲/۵$

→ $AB = ?$

سوال ۲۷)

$$\left. \begin{aligned} \text{ABC} \text{ " " } F &= \hat{B}_r + \hat{C}_r = n + \alpha \\ \text{ADC} \text{ " " } D &= \hat{A}_r + \hat{C}_r = t + \alpha \\ \text{AEB} \text{ " " } E &= \hat{A}_r + \hat{B}_r = m + \alpha \end{aligned} \right\} \Rightarrow \left\{ \begin{aligned} \hat{F} &= \hat{B} \\ \hat{E} &= \hat{A} \\ \hat{D} &= \hat{C} \end{aligned} \right. \Rightarrow \text{ABC} \sim \text{EDF}$$


$$A_B \xrightarrow{M} M \Rightarrow M_B = M_A \Rightarrow \mu_{MA} - A_B = 0 \Rightarrow M_A = 0$$

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

$$\Rightarrow \frac{ME}{\mu C} = \frac{L}{\mu} = \frac{n}{\mu_n}$$

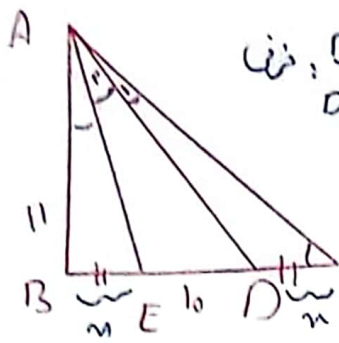
$\mu_B^r + RT \ln p_B = \mu_C^r$
 $\mu_C^r = \mu_B^r + RT \ln p_B$
 $\mu_C^r = \mu_B^r + RT \ln p_B$

$$mC^2 = \gamma^2 m_0^2 c^2 + p^2 c^2 = \gamma^2 m_0^2 c^2 \Rightarrow mC = \gamma m_0 c \Rightarrow mE = \frac{mC}{\gamma} = \frac{\gamma m_0 c}{\gamma} = m_0 c$$

$$\begin{cases} \hat{C}_1 + \hat{u}_1 = 9,^c \\ \hat{C}_r + \hat{F}_1 = 9,^c \\ \hat{C}_1 + \hat{C}_r = 9, \end{cases}$$

$$\Rightarrow \hat{M}_1 = \hat{C}_1 \Rightarrow \hat{F}_1 = \hat{C}_1$$

$\triangle BCM \sim \triangle AMF$ نسبت اجزای $\frac{MF}{MC} = \frac{AM}{BC} = \frac{AF}{MB}$ متناظر $\frac{15}{\sqrt{5}} = \frac{10}{x}$



فرض: $BE = DC \rightarrow DC = ?$
 $\angle BAE = \angle ACD$

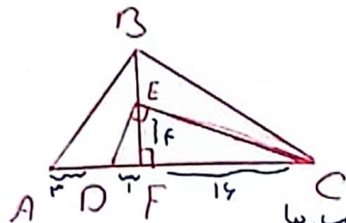
زاویه خارجی $\hat{D} = \hat{A}_1 + \hat{C}$
 مثلث $\hat{ADC}$
 $EAC = A_1 + \hat{A}_2$ } $\hat{A}_2 = \hat{C} \Rightarrow \hat{D} = \hat{EAC}$
 $\hat{A}_2 = \hat{C}$ } $\hat{D} = \hat{EAC}$ } $\hat{A}_2 = \hat{C}$ } $\hat{D} = \hat{EAC}$

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

$AE^2 = 1 \cdot (1+n)$ (I) $\xrightarrow[\text{در } \triangle ABE]{\text{طبق سینوس}}$ $AB^2 + BE^2 = AE^2$ $AE^2 = 1^2 + n^2$ (II)

$\xrightarrow{\text{I و II}} 1 + n = 1 + n^2 \Rightarrow n^2 - n + 1 = 0 \Rightarrow (n-3)(n-1) = 0$ $\begin{cases} n=3 \checkmark \\ n=1 \checkmark \end{cases}$

سوال (۶)

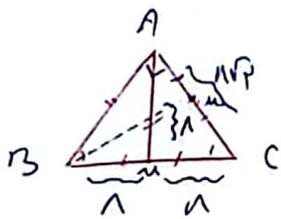


فرض: $\angle BAC = \angle EDC = 90^\circ$

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

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

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



المثلث ABC قائم الزاویه است و M نقطه آن است
 ضلع آن AC را به دو قسمت AM و MC تقسیم می کند

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

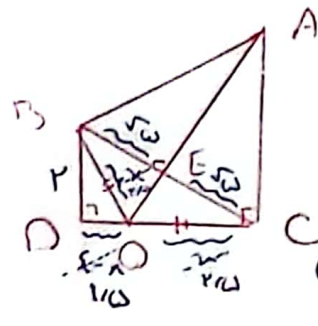
$AM = \frac{BC}{2} = \frac{14}{2} = 7$

سوال (۷)

طبق راجع، سینوس در مثل AMC : $AM^2 + MC^2 = AC^2 \Rightarrow 7^2 + 7^2 = 128 \Rightarrow AC = \sqrt{128} = 8\sqrt{2}$

$M' \Rightarrow AB^2 + AM'^2 = BM'^2 \Rightarrow (8\sqrt{2})^2 + (5\sqrt{2})^2 = (5\sqrt{2})^2 (k+1) \Rightarrow BM' = 5\sqrt{2} \times \sqrt{5} = 5\sqrt{10}$

سوال (۸)



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

طبق رابطه میثاقوری
 $\triangle BDO$ در

$$BD^2 + DO^2 = BO^2$$

$$(2)^2 + (4-x)^2 = (6x)^2 \Rightarrow 4 + 16 - 8x + x^2 = 36x^2$$

$$4x = 2 \Rightarrow x = \frac{1}{2}$$

$$\left. \begin{array}{l} BO = CO \\ EO = OE \\ \hat{E} = \hat{E} \end{array} \right\} \Rightarrow \triangle BEO \cong \triangle CEO$$

طبق رابطه میثاقوری
 $\triangle BOC$ در

$$BO^2 + CO^2 = BC^2 \Rightarrow (2)^2 + (4)^2 = BC^2 \Rightarrow BC = 2\sqrt{5}$$

$$\xrightarrow[\text{متناظر}]{\text{نسبت اجزای}} BE = CE = \frac{BC}{2} = \frac{2\sqrt{5}}{2} = \sqrt{5}$$

طبق موازی سایه ها

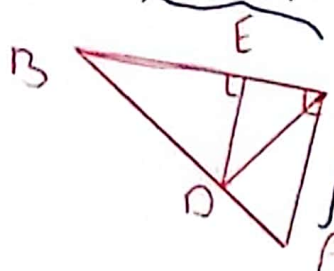
طبق رابطه میثاقوری
 $\triangle BOE$ در

$$BO^2 = EO^2 + BE^2 \Rightarrow OE^2 = \frac{15}{4} - 5 = \frac{15-20}{4} = -\frac{5}{4}$$

$$\Rightarrow OE = \frac{\sqrt{5}}{2}$$

$$BE^2 = OE \times AE \Rightarrow 5 = \frac{\sqrt{5}}{2} \times AE \Rightarrow AE = 2\sqrt{5}$$

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



فرض : $AC = 3$ $BC = 9$: حل
 $BE = ?$

طبق رابطه میثاقوری
 $\triangle ABC$ در

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

طبق موازی سایه ها

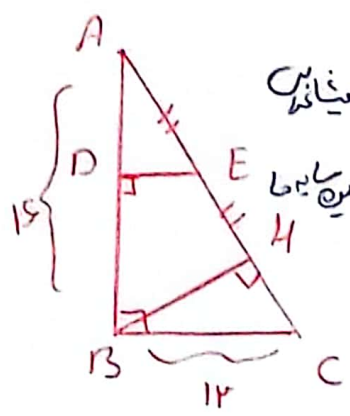
$$BD \times AB = BC^2 \Rightarrow BD \times 3\sqrt{10} = 81$$

$$BD = \frac{27}{\sqrt{10}}$$

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

$$BE = 8.1$$

سوال (۱۰)



طبق میثاقوری : $AC^2 = AB^2 + BC^2$

$$AC^2 = (14)^2 + (12)^2 = 400 \Rightarrow AC = 20$$

طبق موازی سایه ها

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

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

$$DE \parallel BC \Rightarrow \frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC} \Rightarrow \frac{DE}{12} = \frac{5.6}{20} \Rightarrow DE = \frac{16.8}{5}$$

$$\Rightarrow DE = \frac{19.2}{5} = 3.84$$