

Subject:

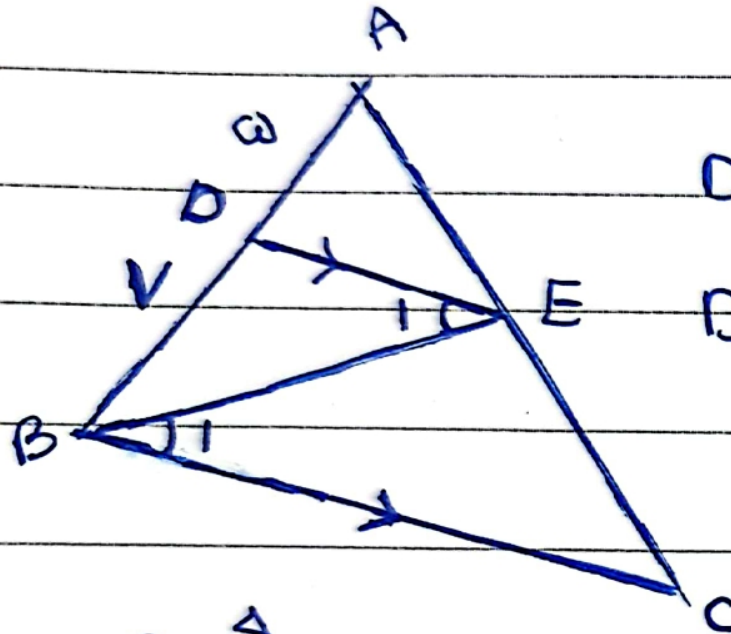
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ترانه طاهریان - تالیف ۲۲ - یازدهم و دوازدهم

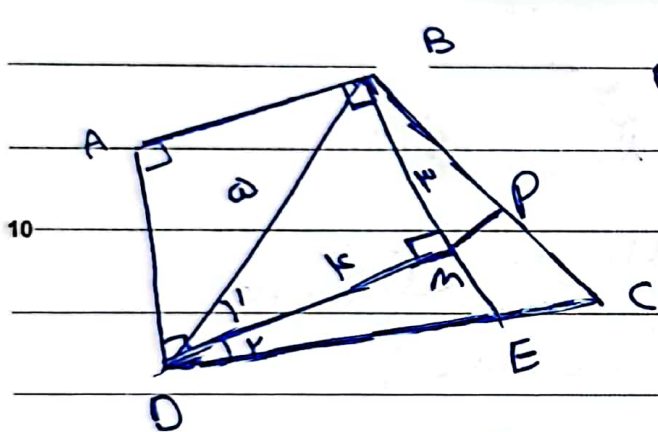


$$DE \parallel BC, EB/ \Rightarrow \angle E_1 = \angle B_1 \quad (1)$$

$$DE \parallel BC \xrightarrow{\text{مساوی}} \frac{DE}{BC} = \frac{AD}{AB} = \frac{9}{14} \quad (2)$$

$$\Rightarrow \frac{S_{\triangle BDE}}{S_{\triangle BCE}} = \frac{12}{9} = \boxed{4/3}$$

$$\frac{S_{\triangle BCE}}{S_{\triangle BDE}} = \frac{\frac{1}{2} \times DE \times BE \times \sin \angle E_1}{\frac{1}{2} \times BC \times BE \times \sin \angle B_1} = \frac{9}{12}$$



$$BD = \sqrt{w^2 + \epsilon^2} = w$$

$$AB \parallel BC, BD \perp \Rightarrow \hat{B} = \hat{D}_1$$

$$\hat{B} + \hat{D}_1 = \hat{D}$$

$$BD = BD$$

$$\hat{B} = \hat{D} \Rightarrow \triangle ADB \cong \triangle BDE$$

$$\Rightarrow \triangle ABD \cong \triangle BDE \Rightarrow M = 90^\circ$$

$$\left. \begin{array}{l} \text{DM} \\ \hat{D}_1 = \hat{D}_2 \\ M = 90^\circ \end{array} \right\}$$

$$\triangle DMB \cong \triangle DME \rightarrow DE = w, CE = \epsilon, ME = BM$$

$$BM = ME, \text{ * } \hat{B} = \hat{D}$$

$$EC \parallel MP$$

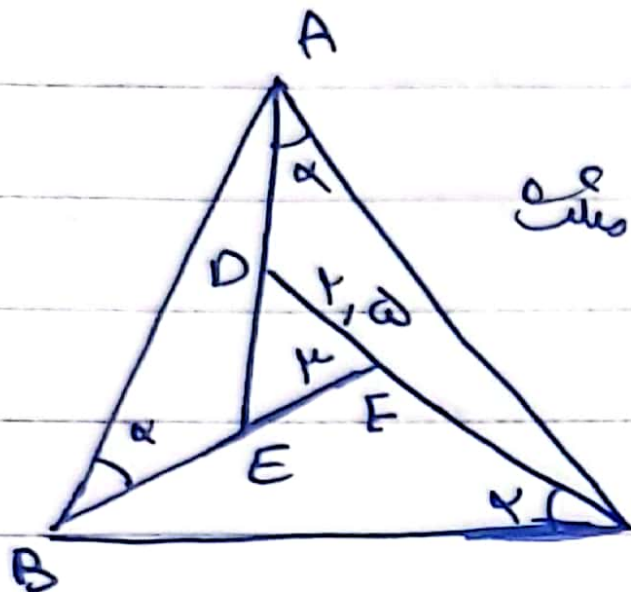
$$\left. \begin{array}{l} BP = PC \\ ME = MB \end{array} \right\}$$

$$\Rightarrow \frac{MP}{CE} = \frac{BP}{BC} = \frac{BM}{BE} = \frac{1}{2}$$

$$\Rightarrow MP = \frac{1}{2} \times \epsilon = \boxed{\frac{\epsilon}{2}}$$

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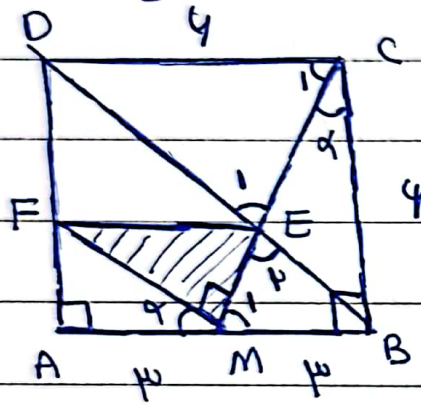
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$$\begin{array}{c} \triangle EFB \\ \text{مساوية الزوايا} \end{array} \Rightarrow \angle EFB = \angle B - \alpha + \alpha = \angle B \quad (14)$$

$$\begin{array}{c} \triangle FBC \\ \text{مساوية الزوايا} \end{array} \Rightarrow \angle FDE = \angle A - \alpha + \alpha = \angle A \quad (15)$$

$$\Rightarrow \triangle ABC \sim \triangle DEF \Rightarrow \frac{DE}{BC} = \frac{EF}{AB} \Rightarrow AB = \boxed{9.4}$$



$$(MC)^2 = (MB)^2 + (BC)^2 = 9 + 16 = 25$$

$$\Rightarrow MC = 5$$

$$\left. \begin{array}{l} DC \parallel AB, \quad CM \parallel \Rightarrow \hat{C}_1 = \hat{M}_1 \\ \hat{E}_1 = \hat{E}_2 \end{array} \right\} \Rightarrow$$

$$\frac{DC}{MB} = \frac{CE}{ME} \Rightarrow \frac{CE}{ME} = \frac{3}{4} = \frac{3}{4} \Rightarrow CE = 3ME$$

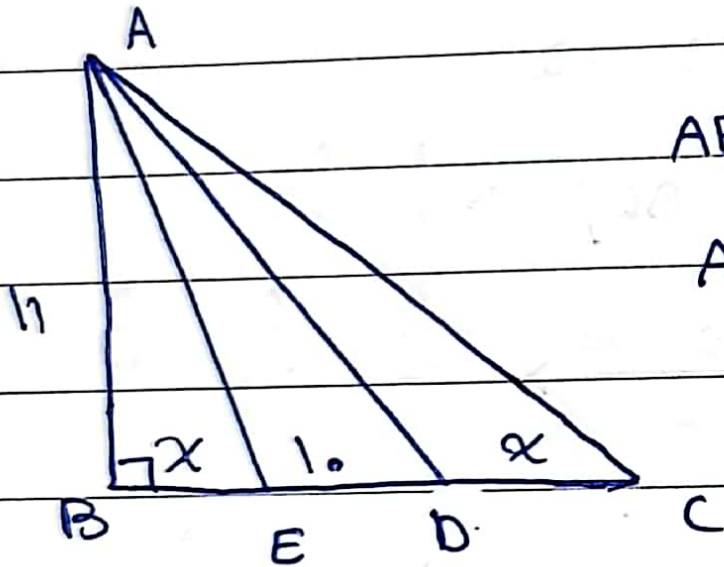
$$CE + ME = 5 \Rightarrow CE = 3ME \Rightarrow ME = 1, \quad CE = 4$$

$$\left. \begin{array}{l} \hat{C}_1 = \hat{M}_1 = \alpha \\ \hat{A} = \hat{B} = 90^\circ \end{array} \right\} \Rightarrow \triangle CBM \sim \triangle FMA \Rightarrow \frac{MB}{AF} = \frac{MC}{MF} = \frac{BC}{AM}$$

$$\Rightarrow \frac{5}{MF} = \frac{4}{4} \Rightarrow MF = 5$$

$$S_{MFE} = \frac{FM \times ME}{2} = \frac{5 \times 4}{2} = 10$$

$$5, 4$$



$$AE = \sqrt{11^2 + x^2} = \sqrt{x^2 + 121}$$

$$AEC \sim ACD \Rightarrow \frac{AE}{ED} = \frac{EC}{AE}$$

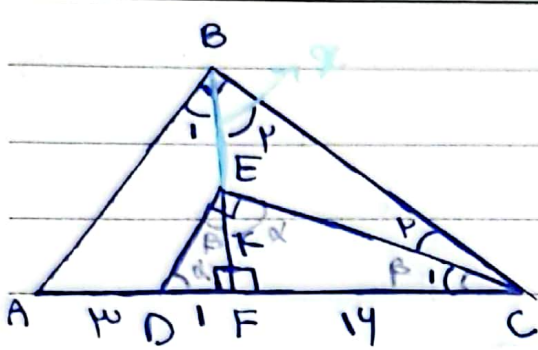
$$\Rightarrow AE^2 = ED \times EC$$

$$\Rightarrow 121 + x^2 = 10(x + 10) = 10x + 100$$

$$x^2 - 10x + 21 = 0 \Rightarrow x = 10 \quad x = 7$$

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$$\left. \begin{array}{l} \hat{C}_1 = \hat{E}_2 = \beta \\ \hat{D} = \hat{E}_1 = \alpha \\ \hat{F}_1 = \hat{F}_2 = \gamma \end{array} \right\} \Rightarrow \triangle EFD \sim \triangle EFC \quad (4)$$

$$\Rightarrow \frac{EF}{DF} = \frac{FC}{EF} \Rightarrow \frac{K}{1} = \frac{FC}{K} \Rightarrow FC = 14$$

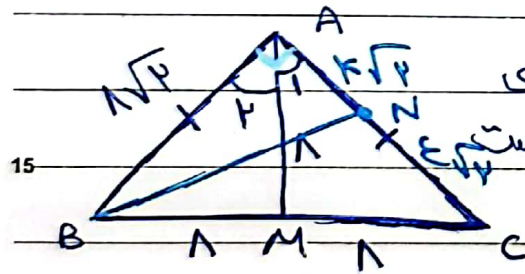
$$\left. \begin{array}{l} \hat{B}_1 = \hat{C} \\ \hat{B}_2 = \hat{A} \\ \hat{F}_1 = \hat{F}_2 \end{array} \right\} \Rightarrow \triangle ABF \sim \triangle CBF$$

$$\Rightarrow \frac{BF}{FC} = \frac{AF}{BF} \Rightarrow \frac{x+k}{14} = \frac{k}{x+k}$$

$$\Rightarrow x^2 + 14x + 14 = 14k \Rightarrow x^2 + 14x - 14k = 0$$

$$\Rightarrow (x+14)(x-14) = 0 \Rightarrow x = 14$$

$$\Rightarrow BC^2 = \sqrt{4E + 254} = \sqrt{320} = 16\sqrt{5}$$



$$\hat{B} = \hat{C} \Rightarrow \hat{A}_1 = \hat{C}$$

$$AM = MC = 14 \Rightarrow \hat{A}_1 = \hat{C}$$

($\triangle AMN$ مستوی الساقین است)

$$AM = BM = 14 \Rightarrow \hat{A}_2 = \hat{B} \quad (\triangle AMN \text{ مستوی الساقین است})$$

$$\textcircled{1}, \textcircled{2}, \textcircled{3} \Rightarrow \hat{A}_1 = \hat{A}_2 = \hat{B} = \hat{C} = \frac{180^\circ}{4} = 45^\circ$$

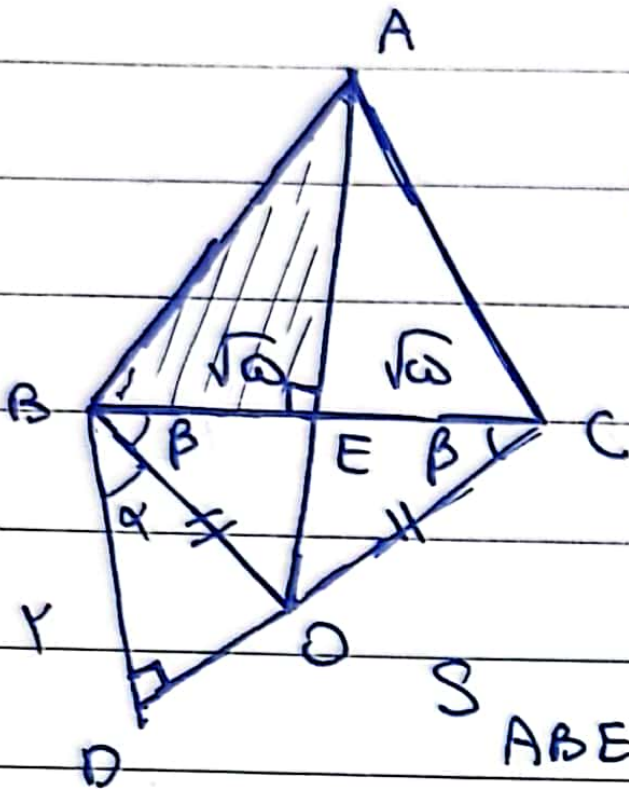
$$AB = AC = \sqrt{14^2 + 14^2} = 14\sqrt{2}$$

$$\triangle ABN : (BN)^2 = (AN)^2 + (AB)^2 \Rightarrow (BN)^2 = 14^2 + 14^2$$

$$= 14^2 \Rightarrow BN = 14$$

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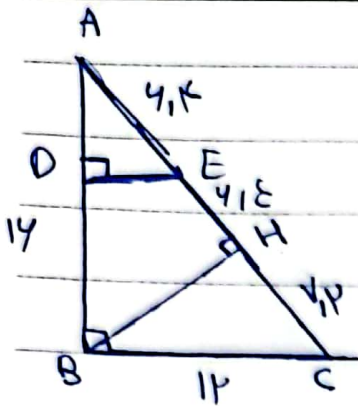


Calculation of Equilibrium forces F_D (A)

$$BC = \sqrt{14 + E} = 2\sqrt{\omega} \quad BE = BC = \sqrt{\omega}$$

$$\frac{\gamma}{\sqrt{\omega}} = \frac{\kappa}{AE} \Rightarrow AE = 2\sqrt{\omega}$$

$$S_{ABE} = \frac{AE \times BE}{\gamma} = \frac{2\sqrt{\omega} \times \sqrt{\omega}}{\gamma} = \boxed{\omega}$$



$$(AC)^2 = (AB)^2 + (BC)^2 = (14)^2 + (14)^2 = 392 \quad (1)$$

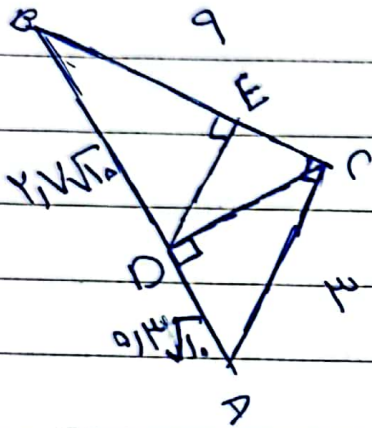
$$\Rightarrow AC = 14$$

$$(BC)^2 = CH \times AC \Rightarrow (14)^2 = 14 \times CH$$

$$\Rightarrow CH = \frac{196}{14} = 14 \quad AH = 14 - 14 = 0$$

$$\Rightarrow AE = EH = 4,16$$

$$DE \parallel BC \xrightarrow{\text{CWB}} \frac{AE}{AC} = \frac{DE}{BC} \Rightarrow \frac{4,16}{14} = \frac{DE}{14} \Rightarrow DE = 4,16$$



$$(AB)^2 = (AC)^2 + (BC)^2 = 9 + 11 \quad (2)$$

$$= 20 \Rightarrow AB = \sqrt{20}$$

$$(AC)^2 = AD \times AB \Rightarrow 9 = \sqrt{20} \times AD$$

$$\Rightarrow AD = \frac{9}{\sqrt{20}} \times \frac{\sqrt{10}}{\sqrt{10}} = 0,9\sqrt{10}$$

$$\Rightarrow BD = \sqrt{20} - 0,9\sqrt{10} = 1,1\sqrt{10}$$

$$\left. \begin{array}{l} DE \perp BC \\ AC \perp BC \end{array} \right\} \Rightarrow DE \parallel AC \xrightarrow{\text{CWB}} \frac{BE}{BC} = \frac{BD}{AB}$$

$$\frac{BE}{9} = \frac{1,1\sqrt{10}}{\sqrt{20}} = \frac{9}{10} \Rightarrow BE = 1,1$$