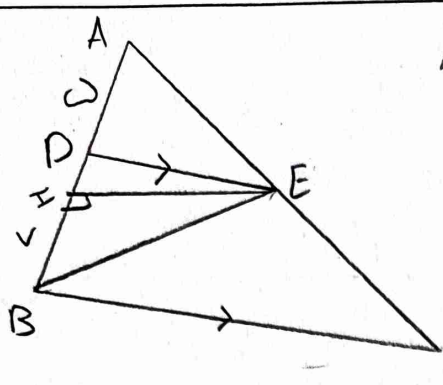
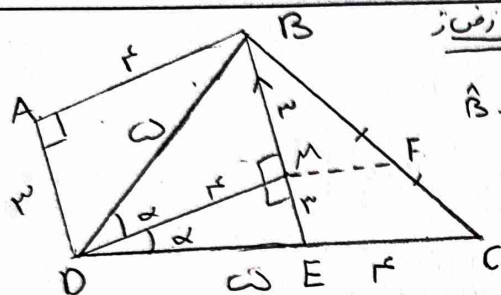




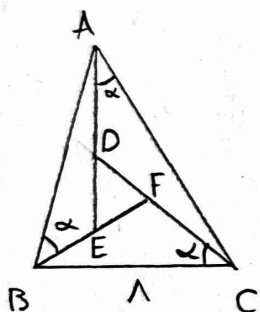
$$\begin{aligned} \triangle ADE &\sim \triangle ABC \rightarrow k = \frac{\omega}{12} \left\{ \frac{S_{BEC}}{S_{BDE}} = \frac{\frac{1}{12} S_{ABC}}{\frac{1}{12} S_{ABC}} = 1, f \right. \\ &\rightarrow S_{ADE} = k^2 S_{ABC} = \frac{\omega^2}{144} S_{ABC} \\ &\rightarrow S_{DECB} = \frac{119}{144} S_{ABC}, \quad \frac{S_{BDE}}{S_{ADE}} = \frac{v}{\omega} \\ &\rightarrow S_{ADE} = \frac{\omega^2}{144} S_{ABC} \rightarrow S_{BEC} = \frac{119 - \omega^2}{144} S_{ABC} = \frac{119 - \omega^2}{144} S_{ABC} \end{aligned}$$

1



$$\begin{aligned} \triangle BME &\sim \triangle BCF \rightarrow BM = ME = \frac{1}{2} BC \\ \hat{B} = \hat{B}, \quad \frac{BM}{BE} &= \frac{BF}{BC} \rightarrow \triangle BME \sim \triangle BCF \\ \rightarrow \frac{MF}{EC} &= \frac{1}{2} \rightarrow MF = \frac{1}{2} EC \end{aligned}$$

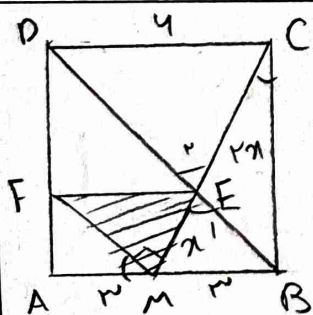
۲



$$\left. \begin{aligned} \hat{F} &= \alpha + \hat{B} - \alpha = \hat{B} \\ \hat{D} &= \alpha + \hat{C} - \alpha = \hat{C} \\ \hat{E} &= \alpha + \hat{A} - \alpha = \hat{A} \end{aligned} \right\} \Rightarrow \triangle ABC \sim \triangle EDF$$

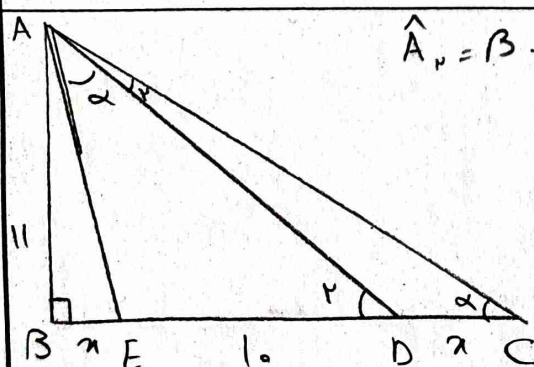
$$\frac{1}{4} = \frac{AB}{BC} \rightarrow AB = 9,4$$

۳



$$\begin{aligned} \hat{M} = \hat{C}, \hat{B} = \hat{A} &\rightarrow \triangle MCB \sim \triangle FAM \\ \rightarrow \frac{FA}{M} &= \frac{M}{4} \rightarrow FA = 11,4, AM = 3 \rightarrow FM = \frac{3}{4} \sqrt{2} \\ BM \parallel DC, \hat{F}_1 = \hat{F}_2 &\rightarrow \frac{ME}{FC} = \frac{1}{4}, CM = 3\sqrt{2} \\ \rightarrow MF = \sqrt{2} &\rightarrow S_{\triangle FME} = \frac{3}{4} \sqrt{2} \times \sqrt{2} \div 2 = \frac{1,5}{2} \end{aligned}$$

۴



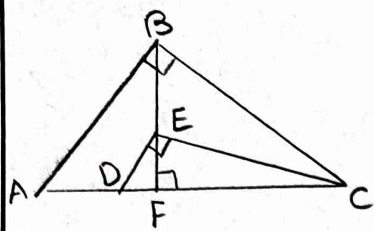
$$\left. \begin{aligned} \hat{A}_1 = \hat{B} \rightarrow \hat{D}_1 = \alpha + \hat{B} &\rightarrow \hat{D}_1 = \hat{EAC} \\ \hat{C} = \hat{EAD} &\end{aligned} \right\} \Rightarrow \triangle AEC \sim \triangle AED$$

$$\rightarrow \frac{AE}{10 + x} = \frac{10}{AE} \rightarrow AE^2 = 100 + 10x$$

$$AE^2 = AB^2 + BE^2 = 141 + x^2 \rightarrow 141 + x^2 = 100 + 10x$$

$$\rightarrow x^2 - 10x + 41 = 0 \rightarrow x = 5, 6$$

۵



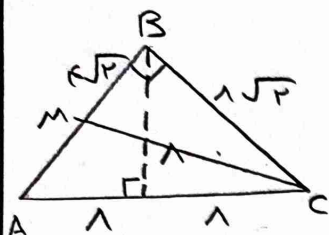
$$EF^2 = DF \cdot FC \rightarrow FC = 14$$

$$BF^2 = AF \cdot FC \rightarrow BF = 8$$

$$BC^2 = FC \cdot AC = 14 \times 20$$

$$\rightarrow BC = 8\sqrt{5}$$

6



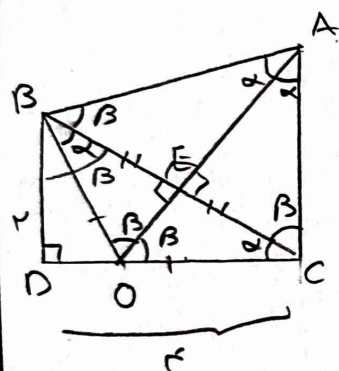
مثلاً قائم الزاویه است زیرا بیانه نصف ضلع دارد بر آن است

در مثلث مساوی الساقین بیانه دارد بر ماقدها آن ارتفاع است

$$AB = \sqrt{128} = 8\sqrt{2}$$

$$CM = \sqrt{(4\sqrt{2})^2 + (8\sqrt{2})^2} = \sqrt{140} = 2\sqrt{35}$$

7



در مثلث مساوی الساقین بیانه دارد بر ماقدها آن ارتفاع است

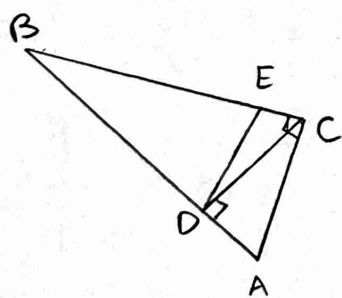
$$\rightarrow BE = EC, \hat{\alpha} + \hat{\beta} = 90^\circ, \hat{\gamma} = 90^\circ \rightarrow \hat{\gamma}_1 = \hat{\beta}$$

$$\left. \begin{array}{l} CE = EB \\ AE = EA \\ \hat{E}_1 = \hat{E}_2 = 90^\circ \end{array} \right\} \xrightarrow{\text{من نصف}} \triangle ABE \cong \triangle ACE$$

$$\hat{\beta}_1 = \hat{\beta}_2, \hat{\alpha}_1 = \hat{\gamma}_1 \rightarrow \triangle ABE \sim \triangle BDC$$

$$\rightarrow \frac{\sqrt{2}}{2} = k, S_{ABE} = k S_{BDC} = \frac{2}{2} \times 2 = 2$$

8



$$AC \cdot BC = AB \cdot CD \rightarrow AB = 3\sqrt{10}, CD = \frac{9}{\sqrt{10}}$$

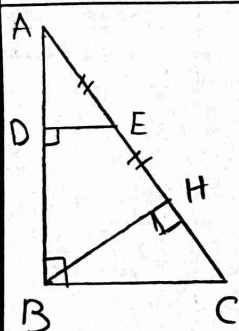
$$ACD \rightarrow CD^2 + AD^2 = AC^2 \rightarrow AD^2 = 0.9$$

$$BCD \rightarrow BD^2 + CD^2 = BC^2 \rightarrow BD^2 = 72.9$$

$$DE \perp BC, AC \perp BC \rightarrow DE \parallel AC$$

$$\frac{BD}{DA} = \frac{BE}{EC} \rightarrow \frac{\sqrt{72.9}}{\sqrt{0.9}} = \frac{x}{9-x} \rightarrow \frac{x}{9-x} = 9 \rightarrow x = 8, BE = 8$$

9



$$BC^2 = CH \cdot AC \rightarrow CH = 12.8 \rightarrow AH = 12.8 \rightarrow AE = EH = 4.8$$

$$DE \parallel BC \rightarrow \frac{AE}{AC} = \frac{DE}{BC} \rightarrow \frac{4.8}{20} = \frac{DE}{12} \rightarrow DE = 3.6$$

$$AC = \sqrt{AB^2 + BC^2} \rightarrow AC = 20$$

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