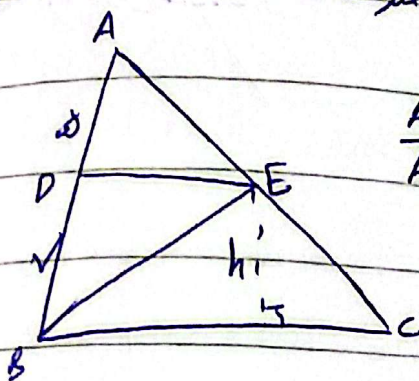


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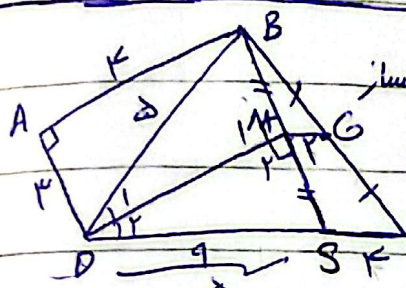
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$$\frac{AD}{AB} = \frac{DE}{BC} = \frac{h_1}{h} \quad (1)$$

$$\frac{S_{\triangle BCE}}{S_{\triangle BDE}} = \frac{BC \times h}{DE \times h_1} = \frac{BC}{DE} = \frac{12}{5}$$



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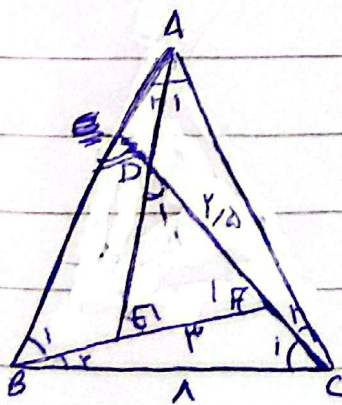
$$\begin{aligned} \hat{M}_1 &= \hat{M}_2 = 90^\circ \\ \hat{D}_1 &= \hat{D}_2 \\ DM &= DM \end{aligned} \Rightarrow \triangle DMS \cong \triangle DMB \Rightarrow BM = MS, BD = DS, BG = GC$$

$$BD = \sqrt{3^2 + 4^2} = 5$$

$$BD = DS = 5 \Rightarrow SC = 9 - 5 = 4$$

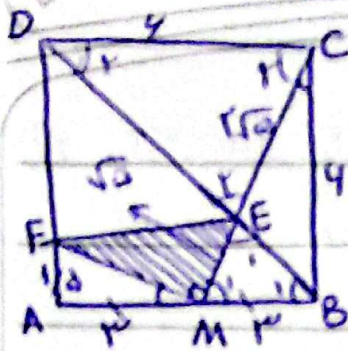
$$\frac{BM}{MS} = \frac{BG}{GC} \Rightarrow MG \parallel SC \quad (2)$$

$$\frac{BM}{BS} \cdot \frac{BG}{BC} = \frac{MG}{SC} = \frac{1}{4} \Rightarrow \boxed{MG = 1}$$



$$\begin{aligned} \hat{D}_1 &= \hat{A}_1 + \hat{C}_1 \\ \hat{A}_1 &= \hat{B}_1 = \hat{C}_1 \end{aligned} \Rightarrow \hat{D}_1 = \hat{C}_1$$

$$\begin{aligned} \hat{D}_1 &= \hat{C}_1 \\ \hat{F}_1 &= \hat{B}_1 \end{aligned} \Rightarrow \triangle DEF \sim \triangle CAB \rightarrow \frac{DF}{BC} = \frac{EF}{AB} \rightarrow \frac{3}{AB} = \frac{4}{9} \Rightarrow \boxed{AB = 9/4}$$



$$\left. \begin{array}{l} \hat{C} = \hat{M} \\ \hat{A} = \hat{B} = 90^\circ \end{array} \right\} \rightarrow \triangle AFM \sim \triangle BME \quad (1)$$

$$\frac{GL}{AM} = \frac{MB}{AF} = 1 \rightarrow AF = 1$$

$$FM = \frac{1.5}{1}$$

$$AD \parallel BC \Rightarrow \left. \begin{array}{l} \hat{D}_1 = \hat{B}_1 \\ \hat{C}_1 = \hat{M}_1 \\ \hat{E}_1 = \hat{E}_1 \end{array} \right\} \rightarrow \triangle DCE \sim \triangle BME \quad (2)$$

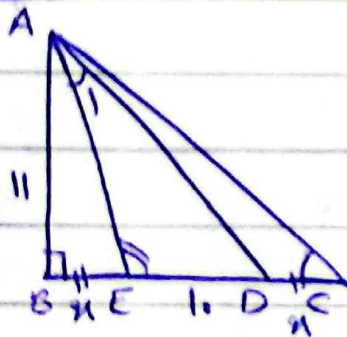
$$\frac{DC}{MB} = \frac{CE}{ME} = 1$$

$$MC = \sqrt{1^2 + 9} = \sqrt{10}$$

$$CE + ME = \sqrt{10} \rightarrow ME = \sqrt{10}$$

$$CE = \sqrt{10}$$

$$S_{\triangle FEM} = \frac{ME \times FM}{1} = \frac{\sqrt{10} \times 1.5\sqrt{10}}{1} = 15$$



$$\left. \begin{array}{l} \hat{A}_1 = \hat{C} \\ \hat{E} = \hat{E} \end{array} \right\} \rightarrow \triangle AED \sim \triangle CEA \quad (3)$$

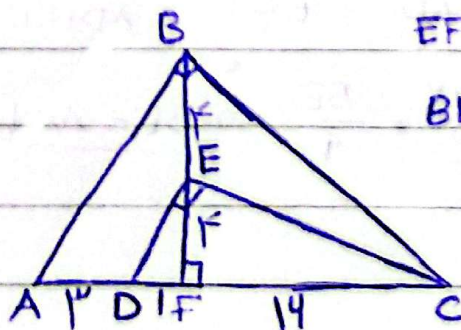
$$\frac{ED}{AE} = \frac{AE}{EC} \rightarrow AE^2 = ED \times EC$$

$$AE^2 = 11^2 + n^2 \rightarrow 11^2 + n^2 = 1 \cdot (11 + 1)$$

$$n^2 - 1 \cdot n + 11 = 0$$

$$\underline{n = 11}$$

$$\underline{n = 1}$$

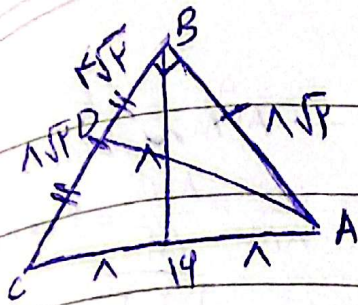


$$EF^2 = DF \times FC \rightarrow FC = 14 \quad (4)$$

$$BF^2 = AF \times FC \rightarrow BF = 1$$

$$BE = 1$$

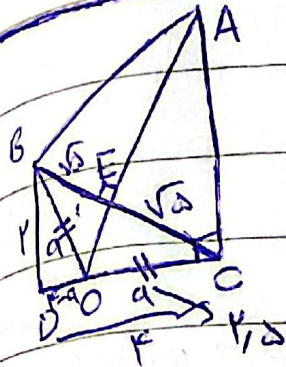
$$BC^2 = BF^2 + FC^2 \rightarrow BC = 1\sqrt{15}$$



⑤ نکته مورد نظر قائم الزاویه است.

$$AD^2 = BD^2 + AB^2$$

$$AD = \sqrt{10}$$



$$a^2 = (f-a)^2 + f$$

$$a^2 = a^2 - 2af + f^2$$

$$2af = f^2 \rightarrow a = f/2$$

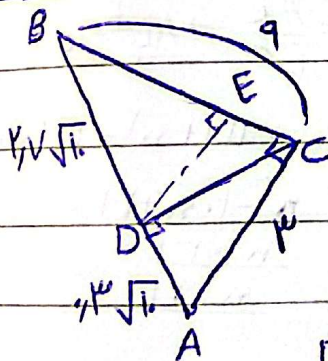
$$BC^2 = BD^2 + DC^2 \rightarrow BC = \sqrt{10}$$

$$OE^2 = OC^2 - EC^2 \rightarrow BE = \frac{\sqrt{10}}{2} = \sqrt{5}$$

$$9/4 - 5 = 1/4 \rightarrow OE = \frac{\sqrt{5}}{2}$$

$$EC^2 = OE \times EA \rightarrow 5 = \frac{\sqrt{5}}{2} \times AE \rightarrow AE = \sqrt{10}$$

$$S_{\triangle ABE} = \frac{\sqrt{5} \times \sqrt{10}}{2} = \frac{5}{2}$$



$$AB^2 = AC^2 + BC^2$$

$$AB = 3\sqrt{10}$$

$$AC^2 = AD \times AB \rightarrow AD = \frac{3\sqrt{10}}{2}$$

$$BD = 3\sqrt{10} - \frac{3\sqrt{10}}{2} = \frac{3\sqrt{10}}{2}$$

$$DE \parallel AC \Rightarrow \frac{BD}{AD} = \frac{BE}{EC} \rightarrow \frac{BD}{AD+BD} = \frac{BE}{BE+EC}$$

$$\frac{3/2}{3} = \frac{BE}{9} \rightarrow BE = 1/2$$



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