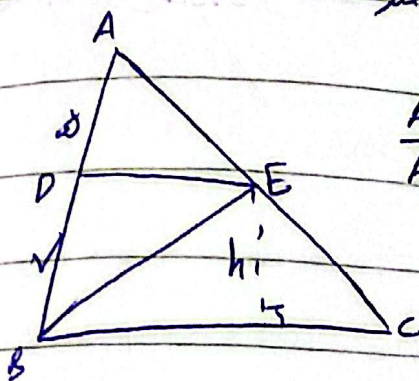


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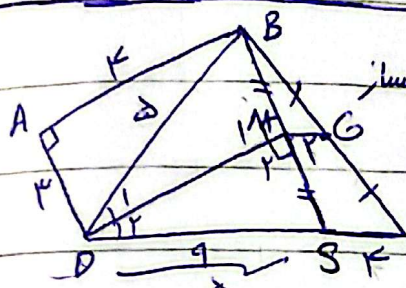
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$$\frac{AD}{AB} = \frac{DE}{BC} = \frac{h'}{h} \quad (1)$$

$$\frac{S_{\triangle BCE}}{S_{\triangle BDE}} = \frac{BC \times h}{DE \times h'} = \frac{BC}{DE} = \frac{12}{8}$$



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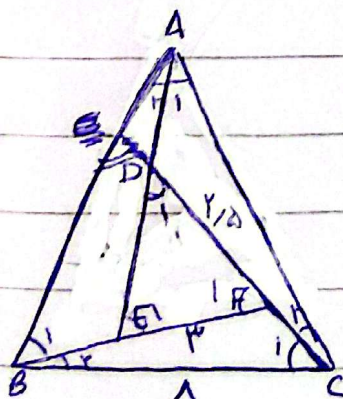
$$\begin{aligned} \hat{M}_1 &= \hat{M}_2 = 90^\circ \\ \hat{D}_1 &= \hat{D}_2 \\ DM &= DM \end{aligned} \Rightarrow \triangle DMS \cong \triangle DMB \Rightarrow BM = MS, BD = DS, BG = GC$$

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

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

$$\frac{BM}{MS} = \frac{BG}{GC} \Rightarrow MG \parallel SC$$

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

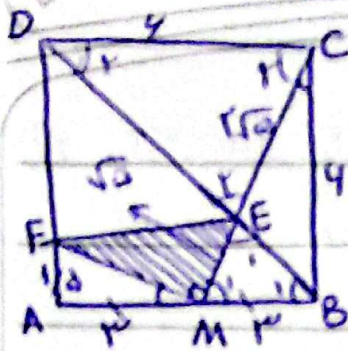


$$\begin{aligned} \hat{D}_1 &= \hat{A}_1 + \hat{C}_1 \\ \hat{A}_1 &= \hat{B}_1 = \hat{C}_1 \end{aligned} \Rightarrow \hat{D}_1 = \hat{C}_1$$

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

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

$$\frac{3}{AB} = \frac{4}{9} \Rightarrow \boxed{AB = 9/4}$$



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

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

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

$$\left. \begin{array}{l} AD \parallel BC \\ \hat{E}_1 = \hat{E}_2 \end{array} \right\} \Rightarrow \left. \begin{array}{l} \hat{D}_1 = \hat{B}_1 \\ \hat{C}_1 = \hat{M}_1 \\ \hat{E}_1 = \hat{E}_2 \end{array} \right\} \rightarrow \triangle DCE \sim \triangle BME$$

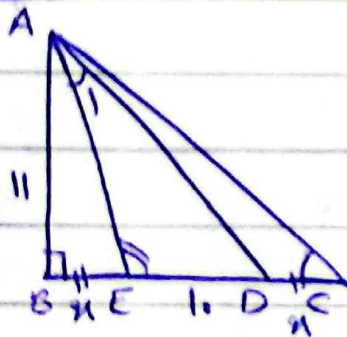
$$\frac{DC}{MB} = \frac{CE}{ME} = 1$$

$$MC = \sqrt{4+9} = 5$$

$$CE + ME = 5 \rightarrow ME = 1$$

$$CE = 4$$

$$S_{FEM} = \frac{ME \times FM}{1} = \frac{1 \times 1.5}{1} = 1.5$$



$$\left. \begin{array}{l} \hat{A}_1 = \hat{C} \\ \hat{E} = \hat{E} \end{array} \right\} \rightarrow \triangle AED \sim \triangle CEA \quad (2)$$

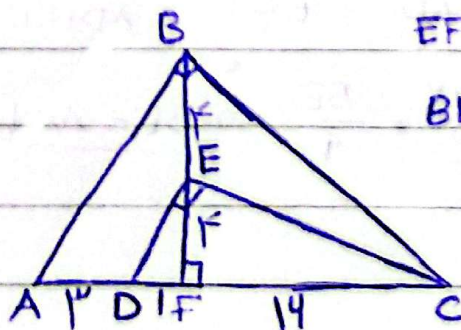
$$\frac{ED}{AE} = \frac{AE}{EC} \rightarrow AE^2 = ED \times EC$$

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

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

$$\underline{11 = 11}$$

$$\underline{1 = 1}$$

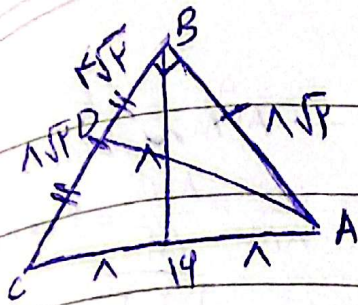


$$EF^2 = DF \times FC \rightarrow FC = 14 \quad (3)$$

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

$$BE = 1$$

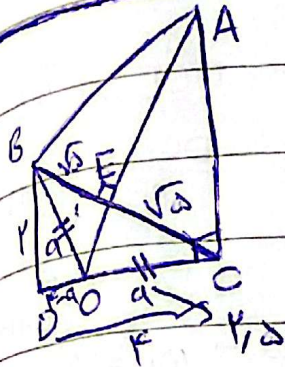
$$BC^2 = BF^2 + FC^2 \rightarrow \underline{BC = 1\sqrt{15}}$$



⑤ منکت مورد نظر قائم الزاویه است.

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

$$AD = 4\sqrt{10}$$



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

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

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

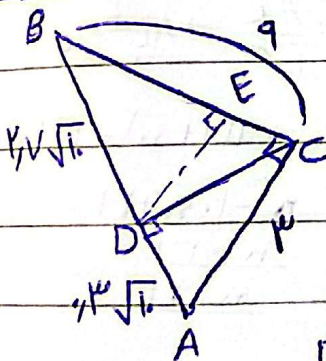
$$BC^2 = BD^2 + DC^2 \rightarrow BC = 2\sqrt{5}$$

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

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

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

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



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

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

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

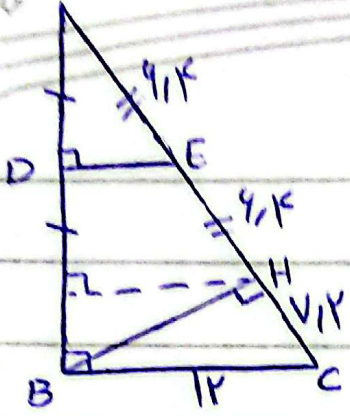
$$BD = 3\sqrt{10} \rightarrow 3\sqrt{10} = 2 \times \frac{3\sqrt{10}}{2}$$

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

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



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$$AC^2 = AB^2 + BC^2 \rightarrow AC = 20$$

$$BC^2 = AC \times HC \rightarrow HC = 6.4$$

$$\frac{AE}{AC} = \frac{DE}{BC} \rightarrow \frac{4.8}{20} = \frac{DE}{12} \rightarrow DE = \frac{4.8 \times 12}{20} = 2.88$$

(10)

