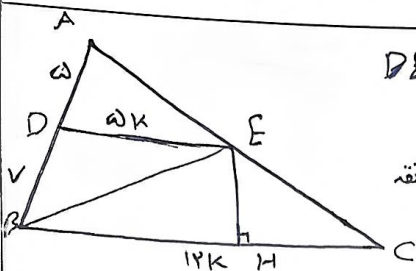


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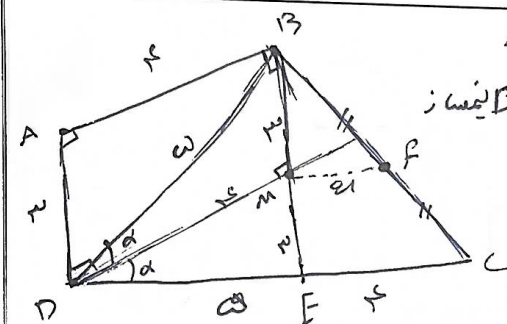


$$DE \parallel BC \rightarrow \frac{AD}{AB} = \frac{DE}{BC} = \frac{5}{12} \rightarrow DE = 5k, BC = 12k$$

$$\text{از آنجا که } DE \perp BC \rightarrow \frac{S_{\triangle BCE}}{S_{\triangle BDE}} = \frac{\frac{1}{2} \times EH \times 12k}{\frac{1}{2} \times EH \times 5k} = \frac{12}{5} = 2,4 \quad \checkmark$$

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$$AD \perp AB, AB \parallel DM \rightarrow \triangle BMD \text{ متساوی الساقین است}$$

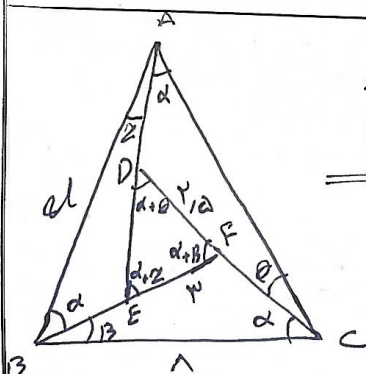
$$DM \parallel AB \rightarrow \triangle DMB \cong \triangle DME \rightarrow DE = DB = 5, EC = 9 - 5 = 4, BM = ME = 3$$

$$\frac{BM}{ME} = \frac{BF}{FC} \quad \text{متناسبی} \rightarrow MF \parallel EC$$

$$\rightarrow \frac{MF}{EC} = \frac{BM}{BF} \rightarrow \frac{3}{4} = \frac{3}{4} \Rightarrow 4 = 4 \quad \checkmark$$

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$$\triangle ABC \sim \triangle FED$$

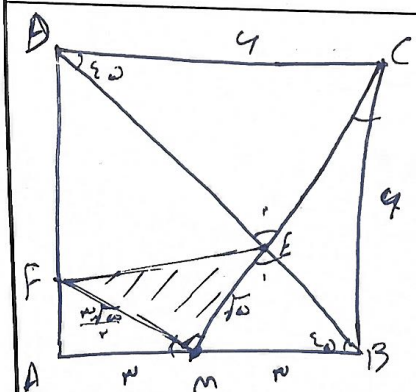
با استفاده از تناسبی ضلعی شد ما :

$$\Rightarrow \frac{BC}{DF} = \frac{AB}{EF} \Rightarrow \frac{9}{4} = \frac{3}{x} \Rightarrow x = 1,3$$

$$\rightarrow 4 = 1,3 \quad \checkmark$$

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$$\hat{A} = \hat{B} = 90^\circ, \hat{M} = \hat{C} \rightarrow \triangle AMF \sim \triangle BCM \rightarrow \frac{4}{5} = \frac{MF}{3} \rightarrow MF = \frac{12}{5}$$

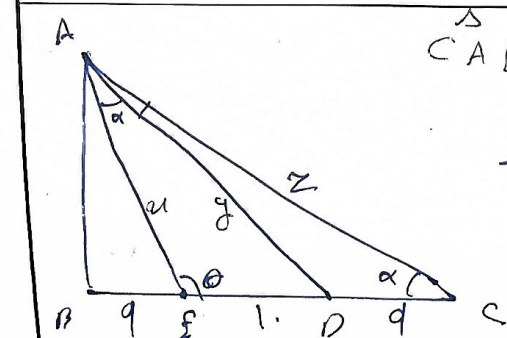
$$CM = \sqrt{4^2 + 9} = 5$$

$$\hat{F}_1 = \hat{E}, \hat{B}_1 = \hat{D} = 90^\circ \rightarrow \triangle MEB \sim \triangle DEC \rightarrow \frac{4}{5} = \frac{ME}{EC} \rightarrow ME = k, EC = 3k$$

$$\rightarrow 3k = 5 \rightarrow k = \frac{5}{3} \Rightarrow S_{\triangle MEF} = \frac{1}{2} \times \frac{12}{5} \times \frac{5}{3} = \frac{12}{3} = 4 \quad \checkmark$$

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$$\triangle CAE \sim \triangle PAE$$

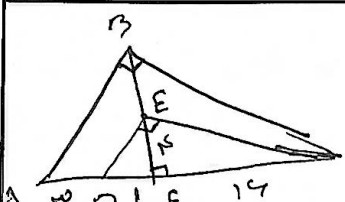
$$\frac{4}{1} = \frac{1}{x} = \frac{1}{1+x} \Rightarrow 4(1+x) = 1 \Rightarrow 4 + 4x = 1 \Rightarrow 4x = -3 \Rightarrow x = -\frac{3}{4}$$

$$\Rightarrow 4 - 1 \cdot 4 + 1 = 0 \rightarrow (4-1)(4-1) = 0$$

$$\Rightarrow 4 = 3, 4 = 1 \quad \checkmark$$

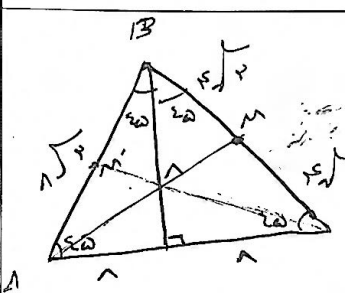
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$EF^2 = DF \times FC \rightarrow EF = \sqrt{DF \times FC} \rightarrow EF = \sqrt{1 \times 4} \rightarrow EF = 2$
 $BC^2 = FC \times AC \rightarrow BC = \sqrt{4 \times 2} = 2\sqrt{2}$ ✓

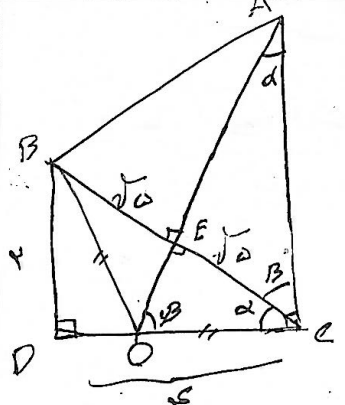
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در مثلث متساوی الساقین همیشه دارد برتاوه همان ارتفاع است. همچنین در مثلث قائم الزامی
 همیشه دارد برتاوه نصف و تقاطع است. $\triangle ABC \leftarrow$ قائم الزامی متساوی الساقین است.

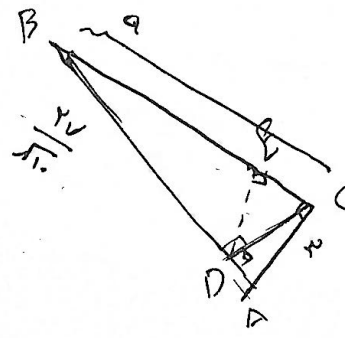
 $AB = BC = \sqrt{4^2 + 4^2} = 4\sqrt{2}$
 $AM = CM' = \sqrt{(4\sqrt{2})^2 + (4\sqrt{2})^2}$
 $= \sqrt{128 + 128} = \sqrt{256} = 16$ ✓

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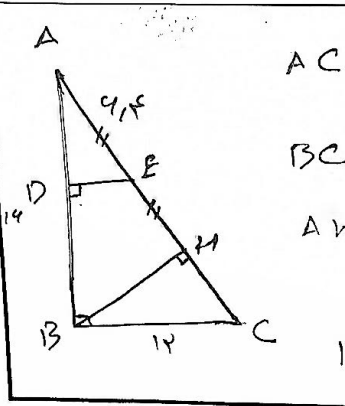
$BC = \sqrt{4^2 + 4^2} = 4\sqrt{2}$
 $BO = OC \Rightarrow \triangle BOE \cong \triangle COE \Rightarrow BE = EC = \frac{BC}{2} = 2\sqrt{2}$
 $\hat{C}_1 = \hat{A}_1 = \alpha \Rightarrow \triangle DBE \sim \triangle AEO \Rightarrow \frac{EC}{BD} = \frac{AE}{DC} \rightarrow \frac{2\sqrt{2}}{2} = \frac{AE}{4}$
 $\hat{D} = \hat{C} = 90^\circ \Rightarrow AE = 4\sqrt{2} \Rightarrow S_{ABE} = \frac{1}{2} \times 4 \times 4\sqrt{2} = 8\sqrt{2}$ ✓

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$AB = \sqrt{1 + 9} = \sqrt{10} = 3\sqrt{10}$
 $BC^2 = BD \times AB \rightarrow 11 = BD \times 3\sqrt{10} \rightarrow BD = \frac{11}{3\sqrt{10}}$
 $BD^2 = BE \times BC \rightarrow 11, 9 = BE \times 9 \rightarrow BE = 11$ ✓

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$AC = \sqrt{14^2 + 12^2} = \sqrt{340 + 144} = \sqrt{484} = 22$
 $BC^2 = CH \times CA \rightarrow 144 = CH \times 22 \rightarrow CH = \frac{144}{22} = \frac{72}{11}$
 $AH = 22 - \frac{72}{11} = \frac{254}{11} \rightarrow AE = EH = \frac{AH}{2} = \frac{127}{11}$
 $DE \perp AB$
 $BC \perp AB \Rightarrow DE \parallel BC \Rightarrow \frac{AE}{AC} = \frac{DE}{BC} \rightarrow \frac{127/11}{22} = \frac{DE}{12} \rightarrow DE = \frac{1524}{254}$ ✓

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