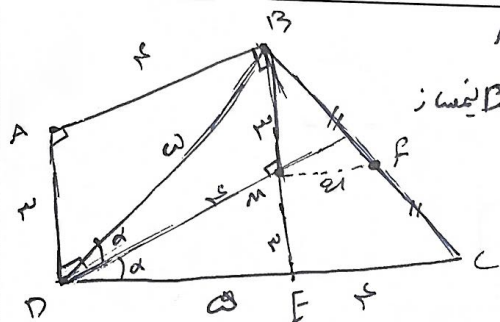


$$DE \parallel BC \rightarrow \frac{AD}{AB} = \frac{DE}{BC} = \frac{2k}{12k} \rightarrow DE = 2k, BC = 12k$$

$$\text{از آنجا که } DE \perp BC \rightarrow \frac{S_{\triangle BCE}}{S_{\triangle BDE}} = \frac{\frac{1}{2} \times EH \times 12k}{\frac{1}{2} \times EH \times 2k} = \frac{12}{2} = 6$$

۱



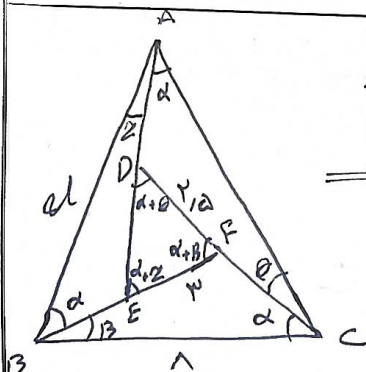
$$AD \perp AB, AB \parallel DM \rightarrow \triangle BMD \text{ قائم الزامی است}$$

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

$$\frac{BM}{ME} = \frac{BF}{FC} \xrightarrow{\text{مکعبی‌تاس}} MF \parallel EC$$

$$\rightarrow \frac{MF}{EC} = \frac{BM}{BF} \rightarrow \frac{2}{4} = \frac{3}{6} \Rightarrow 2 = 3$$

۲



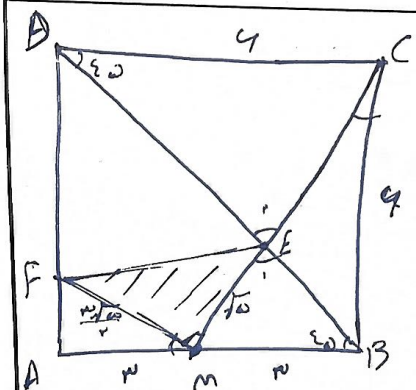
$$\triangle ABC \sim \triangle FED$$

با استفاده از زاویه‌های مشترک ما:

$$\Rightarrow \frac{BC}{DF} = \frac{AB}{EF} \Rightarrow \frac{1}{2 \times 5} = \frac{2}{3}$$

$$\rightarrow 2 = 10$$

۳



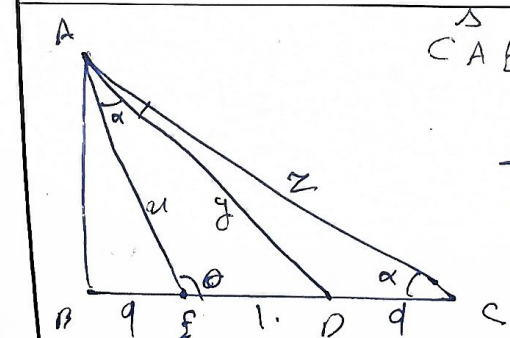
$$\left. \begin{matrix} \hat{A} = \hat{B} = 90^\circ \\ \hat{M} = \hat{C} \end{matrix} \right\} \triangle AMF \sim \triangle BCM \rightarrow \frac{3}{9} = \frac{MF}{3\sqrt{5}} \rightarrow MF = \frac{3\sqrt{5}}{3}$$

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

$$\left. \begin{matrix} \hat{F}_1 = \hat{E}_1 \\ \hat{B}_1 = \hat{D}_1 = 90^\circ \end{matrix} \right\} \triangle MEB \sim \triangle DEC \rightarrow \frac{3}{9} = \frac{ME}{EC} \rightarrow ME = k, EC = 2k$$

$$\rightarrow 2k = 5 \rightarrow k = 2.5 \Rightarrow S_{\triangle MEF} = \frac{1}{2} \times \frac{3\sqrt{5}}{3} \times 2.5 = \frac{15}{4} = 3.75$$

۴



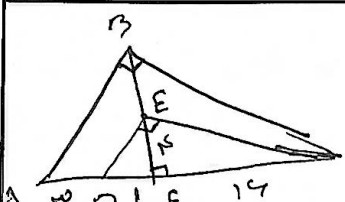
$$\triangle CAE \sim \triangle BAE$$

$$\frac{3}{2} = \frac{1}{2} = \frac{1}{1+2} \Rightarrow 2 = 1 \text{ (ممتنع)}$$

$$\Rightarrow 2 - 1 = 1 \rightarrow (2-1)(2-1) = 0$$

$$\Rightarrow 2 = 1, 2 = 1$$

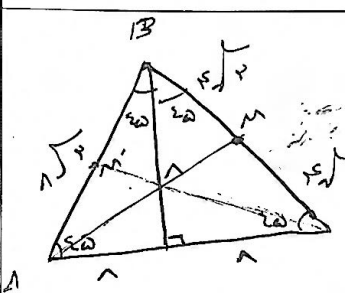
۵



$$EF^2 = DF \times FC \rightarrow EF = \sqrt{DF \times FC} \rightarrow EF = \sqrt{14 \times 2} \rightarrow FC = 14$$

$$BC^2 = FC \times AC \rightarrow BC = \sqrt{14 \times 2} = 1\sqrt{28}$$

6



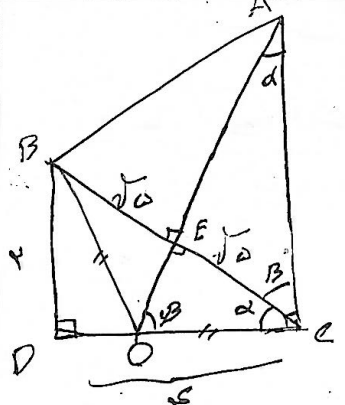
در مثلث متساوی الساقین همیشه دارد برتاوه همان ارتفاع است. همچنین در مثلث قائم الزامی دارد برتاوه داشته باشد. $\triangle ABC \leftarrow$ قائم الزامی متساوی الساقین است.

$$AB = BC = \sqrt{4^2 + 4^2} = 1\sqrt{32}$$

$$AB = BC \rightarrow AM = CM' = \sqrt{(1\sqrt{2})^2 + (4\sqrt{2})^2}$$

$$= \sqrt{128 + 32} = \sqrt{160} = 4\sqrt{10}$$

7



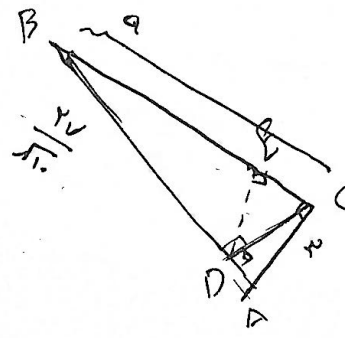
$$BC = \sqrt{4^2 + 4^2} = \sqrt{32} = 2\sqrt{8}$$

$$BO = OC \rightarrow \triangle BOE \cong \triangle COE \Rightarrow BE = EC = \frac{BC}{2} = \sqrt{8}$$

$$\hat{C}_1 = \hat{A}_1 = \alpha \rightarrow \triangle DBE \sim \triangle AEO \Rightarrow \frac{EC}{BD} = \frac{AE}{DC} \rightarrow \frac{\sqrt{8}}{2} = \frac{AE}{4}$$

$$\hat{D} = \hat{C} = 90^\circ \Rightarrow AE = 2\sqrt{8} \Rightarrow S_{ABE} = \frac{1}{2} \times 4 \times 2\sqrt{8} = 4\sqrt{8}$$

8

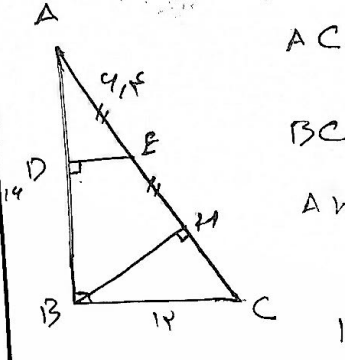


$$AB = \sqrt{11 + 9} = \sqrt{20} = 2\sqrt{5}$$

$$BC^2 = BD \times AB \rightarrow 11 = BD \times 2\sqrt{5} \rightarrow BD = \frac{11}{2\sqrt{5}}$$

$$BD^2 = BE \times BC \rightarrow 11, 9 = BE \times 9 \rightarrow BE = 11$$

9



$$AC = \sqrt{14^2 + 12^2} = \sqrt{340 + 144} = \sqrt{484} = 22$$

$$BC^2 = CH \times CA \rightarrow 144 = CH \times 22 \rightarrow CH = \frac{144}{22} = \frac{36}{5.5}$$

$$AH = 22 - \frac{36}{5.5} = 12.18 \rightarrow AE = EH = \frac{AH}{2} = 6.09$$

$$\left. \begin{matrix} DE \perp AB \\ BE \perp AB \end{matrix} \right\} DE \parallel BE \Rightarrow \frac{AE}{AC} = \frac{DE}{BC} \rightarrow \frac{6.09}{22} = \frac{DE}{12} \rightarrow DE = \frac{3.14}{11}$$

10