

$$\triangle BOE \cong \triangle OEC \rightarrow BE = EC = \sqrt{a} \quad BA^2 = BE \times BC \rightarrow AB = \sqrt{10} \Rightarrow AE = \sqrt{a} \quad (1)$$

$$S_{ABE} = \sqrt{a} \times \sqrt{a} \times \frac{1}{2} = \boxed{\frac{1}{2}a}$$

$$BA^2 = BC^2 + AC^2 \rightarrow AB = \sqrt{9} \quad 9 \times \frac{1}{2} = \frac{1}{2} \times DC \rightarrow CD = \frac{9\sqrt{10}}{10} \quad (2)$$

$$9 = \frac{11}{10} + DA^2 \Rightarrow DA = \frac{4\sqrt{10}}{10} \rightarrow BD = \sqrt{9} - \frac{4\sqrt{10}}{10}$$

$$BD^2 = BE \times BC = \left(\sqrt{9} - \frac{4\sqrt{10}}{10}\right)^2 \Rightarrow BE \times 9 = \frac{119}{10} \rightarrow BE = \frac{11}{10}$$

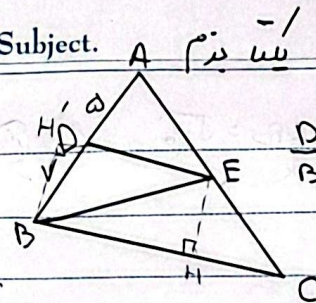
$$AC^2 = 204 + 144 \rightarrow AC = 20 \quad AB^2 = BH^2 + AH^2 \quad BC^2 = HC^2 + BH^2 \quad (10)$$

$$144 = HC^2 + BH^2$$

$$AB^2 = 144 - HC^2 + (20 - HC)^2 \Rightarrow 204 \geq 144 - HC^2 \rightarrow \boxed{HC = 10}$$

$$AE = \frac{20 - 10}{2} = 5, K$$

$$\triangle ABC \text{ مثلث قائم } \rightarrow \frac{AE}{AC} = \frac{DE}{BC} \Rightarrow \frac{5}{20} = \frac{DE}{12} \rightarrow \boxed{DE = \frac{3}{2}K}$$



$$\frac{DE}{BC} = \frac{5}{14} \quad \text{انواعها برابر هستند} \quad \frac{S_{\triangle BEC}}{S_{\triangle DEB}} = \frac{BC}{DE} = 14 \quad (1)$$

$$\triangle BDC \sim \triangle BDM \rightarrow DM \Rightarrow BM = MN = 14 \quad (2)$$

$$\frac{BM}{MN} = \frac{BE}{EC} = 1 \Rightarrow \frac{BM}{BN} = \frac{ME}{NC} = \frac{1}{14} \rightarrow \frac{1}{14} = \frac{\alpha}{14} \rightarrow \boxed{\alpha = 14}$$

$$\begin{aligned} \angle FED &= \hat{B} - \alpha + \alpha = \hat{B} \\ \angle DEF &= \hat{A} - \alpha + \alpha = \hat{A} \end{aligned} \quad \left. \begin{array}{l} \end{array} \right\} \Rightarrow \triangle ABC \sim \triangle DEF \rightarrow \frac{14}{14} = \frac{14}{\alpha} \rightarrow \boxed{\alpha = 14} \quad (3)$$

$$\begin{aligned} \angle E_1 &= \hat{E}_1 \\ \angle C_1 &= \hat{M}_1 \end{aligned} \quad \left. \begin{array}{l} \end{array} \right\} \Rightarrow \triangle C_1 E_1 \sim \triangle M_1 E_1 B \rightarrow \frac{EM}{EC} = \frac{1}{14} \quad (4)$$

$$\triangle MCB: CM^2 = MB^2 + BC^2 \rightarrow \alpha^2 = 14^2 + 14^2 \rightarrow \alpha = 14\sqrt{2}$$

$$\begin{aligned} \angle C &= \hat{M} \\ \angle A &= \hat{B} = 90^\circ \end{aligned} \quad \left. \begin{array}{l} \end{array} \right\} \Rightarrow \triangle FAM \sim \triangle CBM \rightarrow \frac{AM}{BC} = \frac{FM}{MC} \rightarrow FM = \frac{14\sqrt{2}}{2}$$

$$S_{FME} = \frac{1}{2} FM \times ME = \frac{1}{2} \times \frac{14\sqrt{2}}{2} \times \sqrt{2} = \frac{14}{2}$$

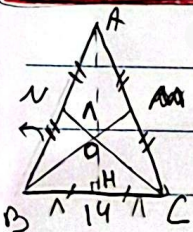
$$\begin{aligned} \angle E_1 &= \hat{E}_1 \\ \angle A &= \hat{A} \end{aligned} \quad \left. \begin{array}{l} \end{array} \right\} \Rightarrow \triangle AED \sim \triangle ACE \quad \frac{AE}{10+m} = \frac{AD}{AC} = \frac{10}{\alpha} \rightarrow \alpha^2 = 10(10+m) \quad (5)$$

$$BE = DC = m$$

$$(m-10)(m-14) = 0 \quad m \rightarrow 14$$

$$\triangle DEC: EF^2 = DF \times FC \rightarrow FC = 14 \quad (6)$$

$$\triangle ABC: BC^2 = CF \times AC \rightarrow BC = 14\sqrt{2}$$



$$14^2 = \alpha^2 \rightarrow \alpha^2 = 14^2 \rightarrow \alpha = 14\sqrt{2} \rightarrow AM = MC = 14\sqrt{2}$$

$$\triangle AMB: MB^2 = (14\sqrt{2})^2 + (14\sqrt{2})^2 = 140 \rightarrow \boxed{MB = 14\sqrt{2}}$$