

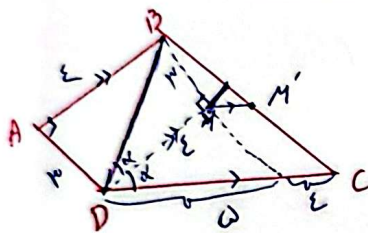
فرض:  $BC \parallel DE \rightarrow$  حکم:  $\frac{S_{BCE}}{S_{BDE}} = ?$

$DE \parallel BC \rightarrow \frac{AD}{AB} = \frac{DE}{BC} = \frac{AE}{AC}$

$\rightarrow \frac{\Delta}{12} = \frac{DE}{BC} \Rightarrow \Delta BC = 12 DE \Rightarrow S_{BCE} = \frac{BC \cdot h}{2} = \frac{12 \times h}{2}$

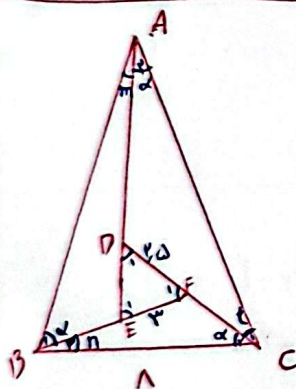
$\frac{S_{BCE}}{S_{BDE}} = \frac{\frac{12 \times h}{2}}{\frac{\Delta \times h}{2}} = \frac{12}{\Delta}$

$S_{BDE} = \frac{DE \cdot h}{2} = \frac{\Delta \times h}{2}$



$\left. \begin{array}{l} \hat{BDM} = \hat{CDM} \\ \hat{M}_1 = \hat{M}_2 = 90^\circ \\ DM = MD \end{array} \right\} \Rightarrow \triangle BDM \cong \triangle DMH$

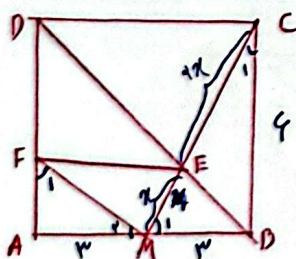
$\left. \begin{array}{l} BM = CM \\ BM = MH \end{array} \right\} \Rightarrow \frac{BM}{BH} = \frac{MH}{HC} = \frac{BM}{BC} \Rightarrow \frac{3}{6} = \frac{MH}{6} \Rightarrow MH = 3$



فرض:  $\hat{ADF} = \hat{CAE} = \hat{BCD} \rightarrow$  حکم:  $AB = ?$   
 $EF = 3, DF = 2, \Delta$

$\left. \begin{array}{l} \hat{F}_1 = \hat{B}_1 + \hat{C}_1 = n + \alpha \\ \hat{D}_1 = \hat{A}_1 + \hat{C}_1 = \alpha + t \\ \hat{E}_1 = \hat{A}_1 + \hat{B}_1 = m + \alpha \end{array} \right\} \Rightarrow \left\{ \begin{array}{l} \hat{F} = \hat{B} \\ \hat{E} = \hat{A} \\ \hat{D} = \hat{C} \end{array} \right. \Rightarrow \triangle ABC \sim \triangle EDF$

$\frac{AB}{3} = \frac{1}{2, \Delta} \Rightarrow AB = \frac{3}{2, \Delta} = \frac{3 \Delta}{2} = 9, 2$



$AB \parallel DC, M \Rightarrow MB = MA \Rightarrow 2MA = AB = 4 \Rightarrow MA = 2$

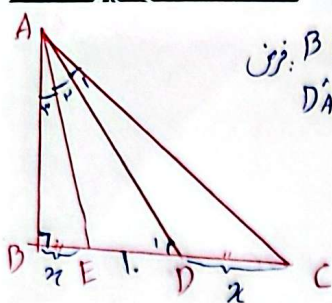
$MB \parallel DC \Rightarrow \frac{MB}{CD} = \frac{ME}{CE} = \frac{BE}{DE} \Rightarrow \frac{2}{4} = \frac{ME}{CE} \Rightarrow \frac{ME}{ME + EC} = \frac{1}{1+2} \Rightarrow \frac{ME}{MC} = \frac{1}{3} \Rightarrow \frac{2}{MC} = \frac{1}{3} \Rightarrow MC = 6$

$MB + DC = MC \Rightarrow MC = 2 + 4 = 6 \Rightarrow MC = \sqrt{20} + \sqrt{20} \Rightarrow ME = \frac{MC}{3} = \frac{\sqrt{20}}{3} = \sqrt{5}$

$\left. \begin{array}{l} \hat{C}_1 + \hat{M}_1 = 90^\circ \\ \hat{C}_1 + \hat{F}_1 = 90^\circ \\ \hat{C}_1 + \hat{C}_1 = 90^\circ \end{array} \right\} \Rightarrow \hat{M}_1 = \hat{C}_1 \Rightarrow \triangle BCM \sim \triangle AMF \rightarrow \frac{MF}{MC} = \frac{AM}{BC} = \frac{AF}{MD}$

$\frac{MF}{\sqrt{20}} = \frac{2}{4} \Rightarrow MF = \frac{\sqrt{20}}{2} \Rightarrow S = \frac{MF \times ME}{2} = \frac{10}{2} = 5$





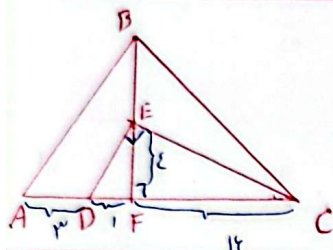
فرض:  $BE = DC \rightarrow DC?$   
 $\hat{DAE} = \hat{ACD}$

$$\left. \begin{array}{l} \hat{D}_1 = \hat{A}_1 + \hat{C} \\ \hat{EAC} = \hat{A}_1 + \hat{A}_2 \end{array} \right\} \Rightarrow \left. \begin{array}{l} \hat{A}_2 = \hat{C} \\ \hat{A}_2 = \hat{C} \end{array} \right\} \Rightarrow \hat{D} = \hat{EAC} \Rightarrow \triangle ADE \sim \triangle CEA$$

$$\Rightarrow \frac{AD}{AC} = \frac{ED}{AE} = \frac{AE}{EC} \Rightarrow \frac{1}{AE} = \frac{AE}{1+x} \Rightarrow AE^2 = 1 \cdot (1+x) = 1 + 1 \cdot x$$

$$AB^2 + BE^2 = AE^2 \Rightarrow AE^2 = 1^2 + x^2$$

$$\Rightarrow 1^2 + x^2 = 1 + 1 \cdot x \Rightarrow 1 = -x^2 + 1 \cdot x \Rightarrow \begin{cases} x = 2 \checkmark \\ x = 1 \checkmark \end{cases}$$

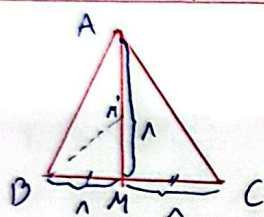


فرض:  $\hat{ABC} = \hat{CED} = 90^\circ$

$$AD = 3 \quad EF = 2 \quad DF = 1$$

$$EF^2 = DF \times FC \Rightarrow 2^2 = 1 \times FC \Rightarrow FC = 4$$

$$BC^2 = CF \times AC \Rightarrow BC^2 = 4 \times 2 \Rightarrow BC = \sqrt{4 \times 2} = 2\sqrt{2}$$



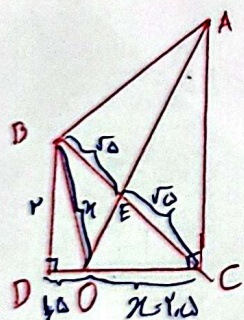
در مثلث ابرمیان وارد  
 برضلع ضلع یکی ضلع  
 باشد مثلث قائم الزامات

$$AM \Rightarrow BM = CM = \frac{BC}{2} = \frac{2\sqrt{2}}{2} = \sqrt{2}$$

$$AM = \frac{BC}{2} = \frac{2\sqrt{2}}{2} = \sqrt{2}$$

$$AM^2 + MC^2 = AC^2 \Rightarrow \sqrt{2}^2 + \sqrt{2}^2 = 2 \Rightarrow AC = \sqrt{2+2} = 2$$

$$AM^2 \Rightarrow AB^2 + AM^2 = BM^2 \Rightarrow (2\sqrt{2})^2 + (\sqrt{2})^2 = (\sqrt{2})^2 \Rightarrow BM^2 = 2 \times 2 + 2 = 6 \Rightarrow BM = \sqrt{6}$$



فرض:  $\hat{ACD} = 90^\circ$  حکم:  $S_{ABDE}?$

$$CD = 2 \rightarrow$$

$$BD = 2$$

$$BD^2 = DO^2 + OD^2 \Rightarrow x^2 = 2^2 + x^2 - 1 \cdot x$$

$$\Rightarrow 2^2 = 1 \cdot x \Rightarrow x = 4$$

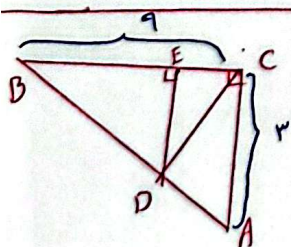
$$BCD: BD^2 + CD^2 = BC^2 \Rightarrow 2^2 + 2^2 = BC^2 \Rightarrow BC = 2\sqrt{2}$$

$$\left. \begin{array}{l} BO = CO \\ EO = OE \\ \hat{E} = \hat{E} \end{array} \right\} \Rightarrow \triangle BOE \cong \triangle COE \Rightarrow BE = CE \Rightarrow \frac{BC}{2} = \frac{2\sqrt{2}}{2} = \sqrt{2}$$

$$BO^2 = EO^2 + BE^2 \Rightarrow OE^2 = \frac{2^2}{2} - 2 = \frac{2}{2} \Rightarrow OE = \frac{\sqrt{2}}{2}$$

$$BE^2 = OE \times AE \Rightarrow 2 = \frac{\sqrt{2}}{2} \times AE \Rightarrow AE = 2\sqrt{2}$$

$$S_{ABDE} = \frac{AE \times BE}{2} = \frac{2\sqrt{2} \times \sqrt{2}}{2} = 2$$



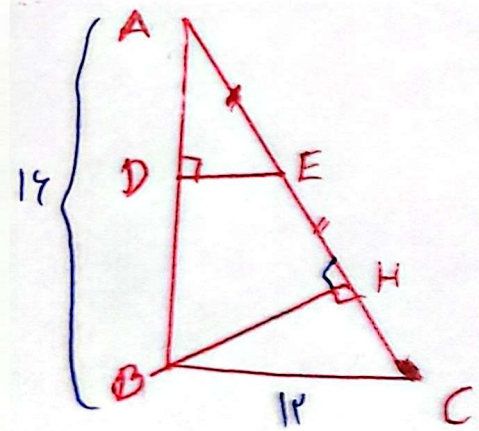
فرض:  $AC = 3$   
 $BC = 9 \rightarrow$  حکم:  $DE = ?$

$$AB^2 = AC^2 + BC^2 \Rightarrow 9 + 81 = 90 \Rightarrow AB = 3\sqrt{10}$$

$$BD \times AB = BC^2 \Rightarrow BD \times 3\sqrt{10} = 81 \Rightarrow BD = \frac{81}{3\sqrt{10}} = \frac{27}{\sqrt{10}}$$

$$DE \parallel AC \Rightarrow \frac{BD}{BA} = \frac{BE}{BC} = \frac{DE}{CA} \Rightarrow \frac{\frac{27}{\sqrt{10}}}{3\sqrt{10}} = \frac{DE}{9} \Rightarrow DE = \frac{9 \times 9}{10} = \frac{81}{10} = 8.1$$





$$AC^2 = AB^2 + BC^2 \Rightarrow AC^2 = (14)^2 + (12)^2 = 200 \Rightarrow AC = 10$$

$$AH \times AC = AB^2 \Rightarrow AH \times 10 = (14)^2 \Rightarrow AH = \frac{14 \times 14}{10} = 19.6$$

$$AE = \frac{AH}{AC} = \frac{19.6}{10} = 1.96$$

$$DE \parallel BC \Rightarrow \frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC} \Rightarrow \frac{DE}{12} = \frac{1.96}{10} \Rightarrow DE = \frac{12 \times 1.96}{10} = 2.352$$