

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

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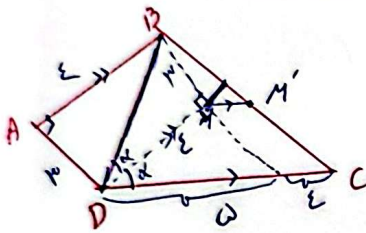
$$DE \parallel BC \rightarrow \frac{AD}{AB} = \frac{DE}{BC} = \frac{AE}{AC}$$

$$\rightarrow \frac{\Delta}{12} = \frac{DE}{BC} \Rightarrow \Delta BC = 12 DE$$

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

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

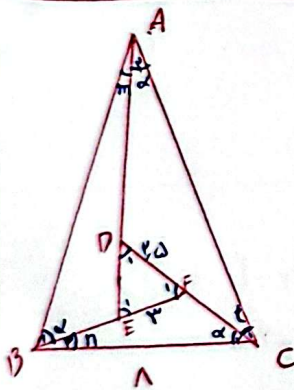
$$S_{BDE} = \frac{DE \cdot h}{2} = \frac{\Delta \times h}{2}$$



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

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$$\left. \begin{array}{l} BM' = CM' \\ BM = MH \end{array} \right\} \Rightarrow \frac{BM}{BH} = \frac{MM'}{HC} = \frac{BM'}{BC} \Rightarrow \frac{3}{6} = \frac{MM'}{6} \Rightarrow MM' = 2 \checkmark$$



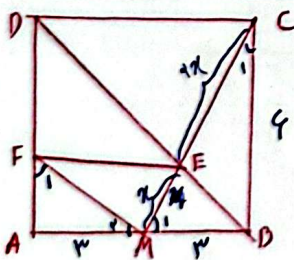
فرض: $\hat{ADF} = \hat{CAE} = \hat{BCD} \rightarrow$ حکم: $AB = ?$

$$EF = 3 \quad DF = 2, 5$$

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

$$\frac{AB}{3} = \frac{1}{2,5} \Rightarrow AB = \frac{3}{2,5} = \frac{6}{5} = 1,2 \checkmark$$



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

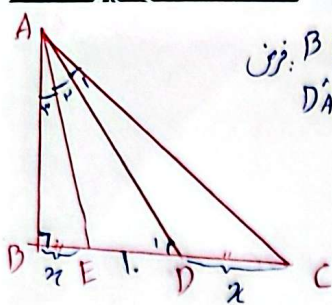
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$$MB \parallel DC \Rightarrow \frac{MB}{CD} = \frac{ME}{CE} = \frac{BE}{DE} \Rightarrow \frac{2}{4} = \frac{ME}{CE} \Rightarrow \frac{ME}{ME+EC} = \frac{1}{1+2} \Rightarrow \frac{ME}{MC} = \frac{1}{3} \Rightarrow \frac{2}{MC} = \frac{1}{3} \Rightarrow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

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

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

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



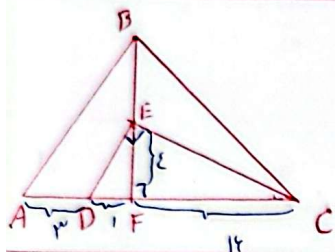
فرض: $BE = DC \rightarrow DC?$
 $\hat{DAE} = \hat{ACD}$

$\hat{D}_1 = \hat{A}_1 + \hat{C}$
 $\hat{EAC} = \hat{A}_1 + \hat{A}_2$
 $\hat{A}_2 = \hat{C}$
 $\hat{D} = \hat{EAC}$
 $\hat{A}_2 = \hat{C}$
 $\therefore \triangle ADE \sim \triangle CEA$

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

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

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

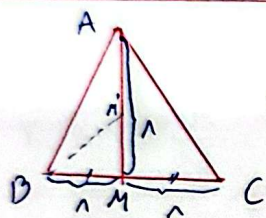


فرض: $\hat{ABC} = \hat{CED} = 90^\circ$

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

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

$BC^2 = CF \times AC \Rightarrow BC^2 = 4 \times 2 \Rightarrow BC = \sqrt{8} = 2\sqrt{2}$



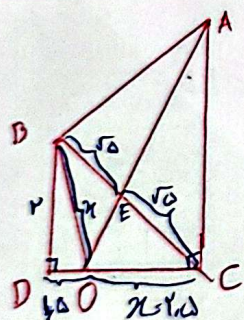
در مثلث ابرمیان وارد
 برضلع ضلع یکی ضلع
 باشد مثلث قائم الزامی است

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

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

$AM^2 + MC^2 = AC^2 \Rightarrow \sqrt{2}^2 + \sqrt{2}^2 = 2 \Rightarrow AC = \sqrt{4} = 2$

$AM^2 + MC^2 = AC^2 \Rightarrow (\sqrt{2})^2 + (\sqrt{2})^2 = 2 \Rightarrow AC = \sqrt{4} = 2$



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

$CD = 2$

$BD = 2$

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

$\Rightarrow 4 = 2x^2 - x \Rightarrow x = 2.5$

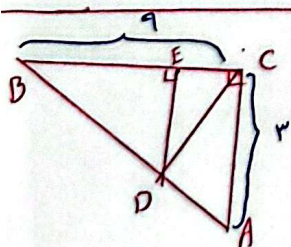
$BC^2 = BD^2 + CD^2 \Rightarrow 2^2 + 2^2 = BC^2 \Rightarrow BC = 2\sqrt{2}$

$BO = CO$
 $EO = OE$
 $\hat{E} = \hat{E}$
 $\Rightarrow \triangle BEO \cong \triangle CEO \Rightarrow BE = CE \Rightarrow \frac{BC}{2} = \frac{2\sqrt{2}}{2} = \sqrt{2}$

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

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

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

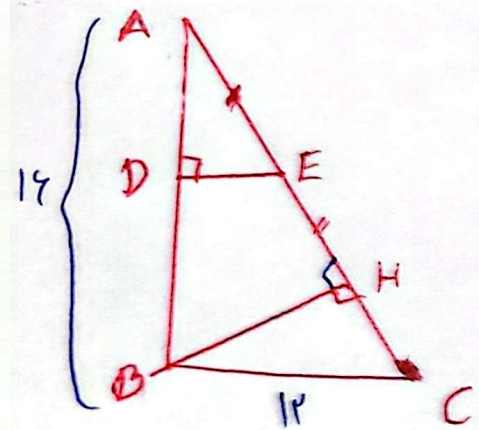


فرض: $AC = 3$
 $BC = 9 \rightarrow$ حکم: $DE = ?$

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

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

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



$$AC^2 = AB^2 + BC^2 \Rightarrow AC^2 = 14^2 + 12^2 = 340 \Rightarrow AC = \sqrt{340}$$

$$AH \times AC = AB^2 \Rightarrow AH \times \sqrt{340} = 14^2 \Rightarrow AH = \frac{14^2}{\sqrt{340}} = 12,1$$

$$AE = \frac{AH}{\sqrt{2}} = \frac{12,1}{\sqrt{2}} = 8,6$$

$$DE \parallel BC \Rightarrow \frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC} \Rightarrow \frac{DE}{12} = \frac{8,6}{\sqrt{340}} \Rightarrow DE = \frac{12 \times 8,6}{\sqrt{340}} = 12,1$$

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