

$$\frac{S_{BCE}}{S_{BDE}} = \frac{\frac{1}{2} h \cdot BC}{\frac{1}{2} h \cdot DE} = \frac{BC}{DE} = \frac{AB}{AD} = \boxed{\frac{12}{5}} \checkmark$$

(۲)

وسط BC، N می‌نامیم، DC، BM، E وصل می‌کنیم.

ABDM متوازی الاضلاع $\Rightarrow \angle BMD = 90^\circ$

$\triangle BED \Rightarrow$ نیم‌ساز همان ارتفاع $\Rightarrow$ متساوی الساقین $\Rightarrow \begin{cases} BM = ME \\ DE = 5 \Rightarrow EC = 4 \end{cases} \xrightarrow{\text{نکته}} MN \parallel EC$

$\frac{MN}{EC} = \frac{BM}{BE} = \frac{1}{2} \Rightarrow \boxed{MN = 2} \checkmark$

(۲)

$\angle EDF = \angle DAC + \angle ACD = \angle DCB + \angle ACD = \angle ACB$ ①

نسبت سیمس: $\angle DEF = \angle BAC$ ②

$\frac{AB}{BC} = \frac{\sin \angle ACB}{\sin \angle BAC} = \frac{\sin \angle EDF}{\sin \angle DEF} = \frac{EF}{DE} \Rightarrow AB = \frac{1 \times 4}{2 \cdot 5} = \boxed{9,4} \checkmark$

(۲)

قانون

$\frac{CM}{DM} = \frac{DM}{CM} \Rightarrow \frac{ME}{EC} = \frac{MB}{DC} = \frac{1}{2}$

$MC^2 = 4^2 + 2^2 = 20 \Rightarrow ME + EC = 2ME = 2\sqrt{5} \Rightarrow ME = \sqrt{5}$

$\triangle BCM \sim \triangle FMA \Rightarrow \frac{MF}{MC} = \frac{MA}{BC} = \frac{1}{2} \Rightarrow MF = \frac{\sqrt{5}}{2}$

$S_{MFE} = \frac{ME \cdot MF}{2} = \frac{\sqrt{5} \cdot \frac{\sqrt{5}}{2}}{2} = \boxed{\frac{5}{4}} \checkmark$

(۱,۷۵)

$\triangle FAD \sim \triangle ECA \Rightarrow \frac{AE}{ED} = \frac{EC}{AE} \Rightarrow AE^2 = EC \cdot ED$

$BE = x \Rightarrow \begin{cases} AE^2 = x^2 + 11 \\ EC = 10 + x \end{cases} \Rightarrow x^2 + 11 = (10 + x) \cdot 10 \Rightarrow x^2 - 10x + 11 = 0$

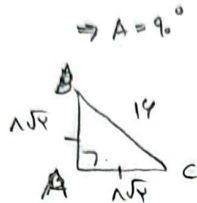
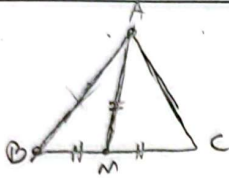
$(x-5)(x-11) = 0 \Rightarrow \boxed{x = 5 \text{ و } 11} \checkmark$

(۲)

$$EF^2 = DF \cdot FC \Rightarrow FC = 14$$

$$BF^2 = AF \cdot FC = 6 \cdot 14 = 42 \Rightarrow BF = \sqrt{42}$$

$$BC^2 = BF^2 + FC^2 = 42 + 14^2 = 194 \Rightarrow \boxed{BC = \sqrt{194}} \checkmark$$



$$AM = \frac{14}{2} = 7$$

$$CM^2 = BM^2 = \sqrt{(14)^2 + (7)^2} = \sqrt{196 + 49} = \sqrt{245} = 7\sqrt{5} \checkmark$$

$$\widehat{EAC} = 90^\circ - \widehat{ACE} = \widehat{ECO} \Rightarrow \widehat{EBO} = \widehat{EAB}$$

$$\frac{AE}{BE} = \frac{DC}{BD} = 1 \quad (1)$$

$$BE = \frac{BC}{2} = \frac{\sqrt{14^2 + 14^2}}{2} = \frac{\sqrt{392}}{2} = \sqrt{98} = 7\sqrt{2}$$

$$\Rightarrow AE = 7\sqrt{2}$$

$$S_{ABE} = \frac{AE \cdot BE}{2} = \frac{7\sqrt{2} \cdot 7\sqrt{2}}{2} = 49 \checkmark$$

$$DE \perp BC, AC \perp BC \Rightarrow DE \parallel AC \Rightarrow \frac{BE}{BC} = \frac{BD}{BA} \quad (1)$$

$$BA^2 = BC^2 + AC^2 = 14^2 + 14^2 = 392 \Rightarrow BA = \sqrt{392} = 14\sqrt{2}$$

$$BC^2 = BD \cdot BA \Rightarrow 14^2 = 14\sqrt{2} \cdot BD \Rightarrow BD = \frac{14}{\sqrt{2}} = 7\sqrt{2}$$

$$\Rightarrow \frac{BE}{9} = \frac{7\sqrt{2}}{14\sqrt{2}} \Rightarrow BE = \frac{9 \times 7\sqrt{2}}{14} = \frac{63\sqrt{2}}{14} = \frac{9\sqrt{2}}{2} \checkmark$$

$$\widehat{D} = \widehat{H} = 90^\circ \Rightarrow \triangle ADE \sim \triangle ABH \Rightarrow \frac{AE}{AB} = \frac{DE}{BH} \quad (1)$$

$$AC^2 = AB^2 + BC^2 = 196 + 196 = 392 \Rightarrow AC = \sqrt{392} = 14\sqrt{2}$$

$$AH \cdot AC = AB^2 \Rightarrow AH = \frac{196}{14\sqrt{2}} = \frac{14}{\sqrt{2}} = 7\sqrt{2}$$

$$\Rightarrow \frac{7\sqrt{2}}{14} = \frac{DE}{9\sqrt{2}} \Rightarrow DE = \frac{9\sqrt{2} \cdot 7\sqrt{2}}{14} = \frac{9 \cdot 7 \cdot 2}{14} = \frac{126}{14} = 9 \checkmark$$