

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

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وسط BC، N می نامیم، DC، BM، را در E قطع می کنند.

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

$\triangle BED \Rightarrow$ نیم سازهان (ارتفاع) $\Rightarrow$ متساوی الساقین $\Rightarrow \begin{cases} BM = ME \\ DE = 5 \Rightarrow EC = 4 \end{cases}$ $\xrightarrow{\text{میانگین}} MN \parallel EC$

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

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

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

$\frac{AB}{BC} = \frac{\sin \angle ACB}{\sin \angle BAC} = \frac{\sin \angle EDF}{\sin \angle DEF} = \frac{EF}{DF} \Rightarrow AB = \frac{1 \times 4}{2/5} = \boxed{9.4}$

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قوانین

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

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

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

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

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

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

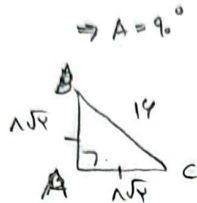
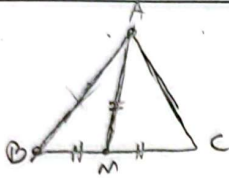
$(x-5)(x-11) = 0 \Rightarrow \boxed{x = 5 \text{ و } 11}$

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

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

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



$$AM = \frac{12}{\sqrt{5}} = \frac{12\sqrt{5}}{5}$$

$$CM = BM = \sqrt{(12\sqrt{5})^2 + (\frac{12}{\sqrt{5}})^2} = \sqrt{144 + 42} = \sqrt{186} = \boxed{\sqrt{186}}$$

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

$$\frac{AE}{BE} = \frac{DC}{BD} = \frac{1}{2} \quad (1)$$

$$BE = \frac{BC}{2} = \frac{\sqrt{1^2 + 4^2}}{2} = \frac{\sqrt{17}}{2} = \boxed{\frac{\sqrt{17}}{2}}$$

$$\Rightarrow AE = \frac{\sqrt{17}}{4}$$

$$S_{ABE} = \frac{AE \cdot BE}{2} = \frac{\frac{\sqrt{17}}{4} \cdot \frac{\sqrt{17}}{2}}{2} = \boxed{\frac{17}{16}}$$

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

$$BA^2 = BC^2 + AC^2 = 11 + 9 = 20 \Rightarrow BA = \sqrt{20} = 2\sqrt{5}$$

$$BC^2 = BD \cdot BA \Rightarrow 11 = 2\sqrt{5} \cdot BD \Rightarrow BD = \frac{11}{2\sqrt{5}}$$

$$\Rightarrow \frac{BE}{9} = \frac{\frac{11}{2\sqrt{5}}}{2\sqrt{5}} \Rightarrow BE = \frac{11}{20} = \boxed{\frac{11}{20}}$$

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

$$AC^2 = AB^2 + BC^2 = 16 + 9 = 25 \Rightarrow AC = 5$$

$$AC \cdot BH = AB \cdot BC \Rightarrow BH = \frac{12}{5}$$

$$AH \cdot AC = AB^2 \Rightarrow AH = \frac{16}{5} \Rightarrow AE = \frac{4}{5}$$

$$\Rightarrow \frac{4/5}{12} = \frac{DE}{9/5} \Rightarrow \boxed{DE = 1/15}$$