

BC || DE

$$\frac{S_{\triangle BCE}}{S_{\triangle BDE}} = \frac{AE}{ED} = \frac{12}{3} = 4$$

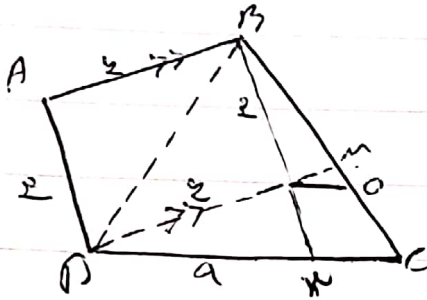
سوال ۱

$V_{SABE} = 2 \times V_{BDE}$

$$\frac{S_{\triangle ADE}}{S_{\triangle ABC}} = \left(\frac{2}{3}\right)^2 = \frac{4}{9}$$

(نسبت قاعده تقسیم شود)

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$\hat{D}C = 2 \times \hat{B}M$

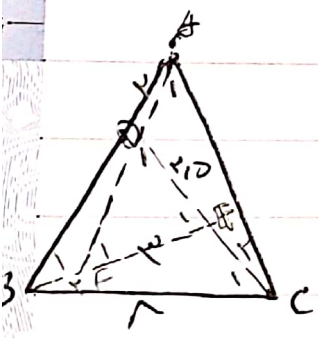
$\hat{D}_1 = \hat{D}_2$
 $\hat{M}_1 = \hat{M}_2 = 90^\circ$

$\rightarrow \triangle DMB \cong \triangle DMN \Rightarrow MN = 2$
 $DM = 2$

سوال ۲

$\rightarrow \text{موسط } AB \text{ در } M \rightarrow \text{نسبت } 9:4:1 \rightarrow 2$

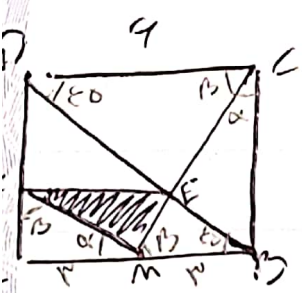
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$\hat{D}_1 = \hat{A}_1 + \hat{C}_1$
 $\hat{C}_1 + \hat{A}_1$
 $\rightarrow \hat{D}_1 = \hat{C} \Rightarrow \hat{F}_1 = \hat{B}$
 $\hat{E} = \hat{A} \Rightarrow \triangle DEF \sim \triangle CBA$

$$\rightarrow \frac{EF}{BA} = \frac{FD}{CB} = \frac{ED}{CA} \Rightarrow \frac{1}{BA} = \frac{2}{10} \Rightarrow BA = \frac{5}{1} = 5$$

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$$\tan \beta = \frac{AM}{AF} = \frac{BC}{MB} \rightarrow \frac{3}{AF} = 2 \rightarrow AF = \frac{3}{2}$$

سوال ۳

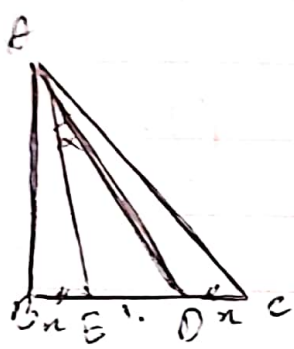
$$\sqrt{\left(\frac{3}{2}\right)^2 + 3^2} = \sqrt{\frac{9}{4} + 9} = \frac{3\sqrt{5}}{2}$$

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$\hat{E}_1 = \hat{E}_2$
 $\hat{DCE} = \hat{BME} \rightarrow \triangle DCE \sim \triangle MEB \rightarrow \frac{DE}{ME} = \frac{9}{3} = 3$

$$\rightarrow OM = y = \sqrt{4^2 + 3^2} = 5 \Rightarrow y = 5$$

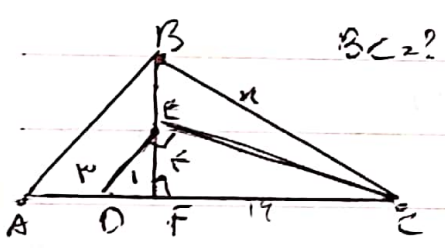
$$S_{FEM} = \frac{1}{2} \times MF \times EM = \frac{1}{2} \times \frac{3\sqrt{5}}{2} \times 5 = \frac{15\sqrt{5}}{4} = 11.25$$



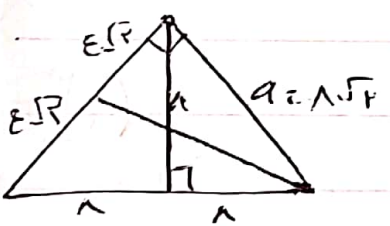
$$\left. \begin{array}{l} \angle A \cong \angle A \\ \hat{E} \cong \hat{E} \\ \hat{D}_1 \cong \hat{A}_1 \end{array} \right\} \rightarrow \triangle ADE \sim \triangle ADE \rightarrow \frac{AE}{ED} = \frac{CE}{AE} \rightarrow$$

$$\frac{\sqrt{n^2+11^2}}{n+1} = \frac{10}{\sqrt{11^2+n^2}} \Rightarrow 11^2+n^2 = 1 \cdot n+1$$

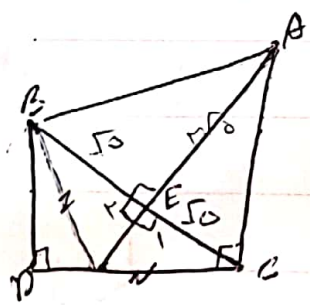
$$\Rightarrow n^2 - 1 \cdot n + 1 = 0 \rightarrow (n-4)(n-1) = 0 \rightarrow n = \boxed{4 \text{ or } 1}$$



$$\begin{aligned} EF \parallel DF \propto CF &\rightarrow 14 \propto CF \rightarrow CF = 14 \\ n^2 \propto CF \propto AC &\rightarrow n^2 = 14 \times 2 \\ n &= \sqrt{28} = 2\sqrt{7} \end{aligned}$$



$$\begin{aligned} 14^2 &= 14^2 \rightarrow a^2 = 14 \times 14 \rightarrow a = 14 \\ n^2 &= \sqrt{(14\sqrt{2})^2 - (4\sqrt{2})^2} = \sqrt{14 \cdot 2 \cdot 2} = \sqrt{56} \end{aligned}$$



$$\left. \begin{array}{l} \overline{CO} = \overline{BO} \\ \hat{E}_1 \cong \hat{E}_2 \cong 90^\circ \\ \text{OE is common} \end{array} \right\} \xrightarrow{\text{RHS}} \triangle OEB \cong \triangle OEC \Rightarrow CE = BE = \sqrt{50}$$

Using Pythagoras

$$\left. \begin{array}{l} \hat{E}_1 \cong \hat{D} \cong 90^\circ \\ \hat{A} \cong \hat{A} \end{array} \right\} \xrightarrow{\text{AA}} \triangle OEC \sim \triangle ODB \Rightarrow OE = \frac{1}{2} OB = \frac{\sqrt{50}}{2}$$

$$CE^2 = OE - AE \Rightarrow 2 = \frac{\sqrt{50}}{2} \times EA \rightarrow EA = 2\sqrt{2}$$

$$\Rightarrow \triangle ABC = \frac{\sqrt{50} \times 2\sqrt{2}}{2} = 5$$



$$BC^2 = BD \cdot AC \rightarrow 9^2 = BD \cdot 9$$

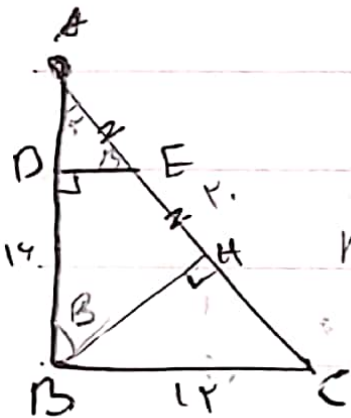
$$\rightarrow BD = \frac{81}{9} = 9$$

$$BD^2 = BE \cdot BC \rightarrow (9)^2 = BE \cdot 9$$

$$BE = \frac{81}{9} = 9$$

(س ۹)

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$$AC = 14$$

$$BH \cdot AC = AB \cdot BC \rightarrow BH \cdot 14 = 12 \cdot 9 \rightarrow BH = \frac{108}{14} = 9,4$$

$$AH = \sqrt{14^2 - 9,4^2} = 12,1 \rightarrow AE = 9,6$$

$$\left. \begin{matrix} \hat{A} = \hat{A} \\ H = D \end{matrix} \right\} \rightarrow \triangle ADE \sim \triangle AHB \rightarrow \frac{DE}{BH} = \frac{AE}{AB} \rightarrow \frac{DE}{9,4} = \frac{9,6}{14} \rightarrow DE = \frac{94}{15} = 6,27$$

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