

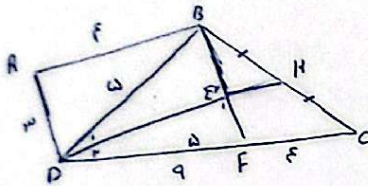
$$DE \parallel BC \rightarrow h_1 = h$$

$$\frac{S_{BCE}}{S_{BDE}} = \frac{\frac{1}{2} \cdot h_1 \cdot \frac{8}{5} \cdot n}{\frac{1}{2} \cdot h_1 \cdot \frac{5}{13} \cdot n} = \boxed{\frac{12}{5}}$$

$$\frac{AD}{AB} = \frac{DE}{BC} = \frac{5}{13} \rightarrow BC = n$$

$$\rightarrow DE = \frac{5}{13} n$$

1



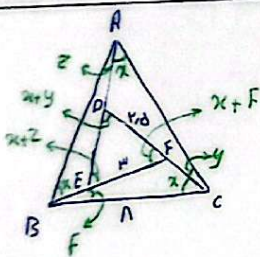
$$\left. \begin{array}{l} D_1 = D_2 \\ E_1 = E_2 \\ DE = DE \end{array} \right\} \triangle DBE \cong \triangle DFE \rightarrow DF = 5$$

$$\downarrow$$

$$FC = 5$$

$$\left. \begin{array}{l} BE = EF \\ BH = HC \end{array} \right\} EH \parallel FC \rightarrow \frac{BH}{BC} = \frac{1}{2} = \frac{EH}{FC} \rightarrow EH = \boxed{5}$$

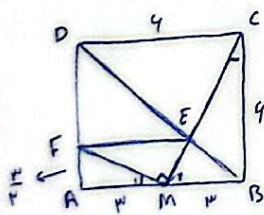
2



$$\left. \begin{array}{l} \hat{E} = \hat{A} \\ \hat{F} = \hat{B} \\ \hat{D} = \hat{C} \end{array} \right\} \triangle ABC \sim \triangle DEF$$

$$\frac{AB}{BC} = \frac{EF}{DF} = \frac{5}{5} = \frac{5}{n} = \frac{AB}{n} \rightarrow AB = \boxed{\frac{5n}{5}}$$

3



$$\left. \begin{array}{l} \hat{E}_1 = \hat{E}_2 \\ \hat{M}_1 = \hat{M}_2 \\ \hat{B} = \hat{B} \end{array} \right\} \triangle DCE \sim \triangle BMC \rightarrow \frac{MB}{DC} = \frac{1}{2} = \frac{ME}{EC} \rightarrow MC = 2\sqrt{5} \rightarrow ME = \sqrt{5}$$

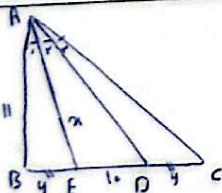
$$\downarrow$$

$$EC = \sqrt{5}$$

$$\left. \begin{array}{l} \hat{M}_1 = \hat{M}_2 \\ \hat{A} = \hat{B} \\ \hat{F} = \hat{M}_2 \end{array} \right\} \triangle AMF \sim \triangle BCM \rightarrow \frac{CB}{BM} = 2 = \frac{AM}{AF} \rightarrow AF = \frac{5}{2}$$

$$FE = \sqrt{\frac{9}{4} + 4} = \sqrt{\frac{25}{4}} = \frac{5}{2} \sqrt{5} \quad S_{MEF} = \frac{5\sqrt{5}}{2} \times \frac{5\sqrt{5}}{2} \times \frac{1}{2} = \boxed{\frac{125}{4}}$$

4



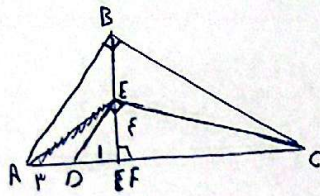
$$\left. \begin{array}{l} \hat{A}_1 = \hat{A}_2 \\ \hat{E} = \hat{E} \end{array} \right\} \triangle AED \sim \triangle AEC \rightarrow \frac{x}{10+y} = \frac{10}{x} \rightarrow x^2 = 100 + 10y$$

$$121 + y^2 = x^2 \rightarrow y^2 + 121 = 100 + 10y \rightarrow y^2 - 10y + 21 = 0$$

$$(y-3)(y-7) = 0$$

$$\boxed{y=3 \quad y=7}$$

5

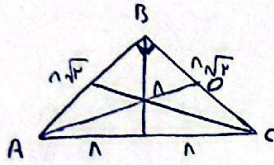


$$EF^2 = DF \times FC \rightarrow FC = \frac{19}{1} = 19$$

$$BF^2 = AF \times FC = 19 \times f \rightarrow BF = \sqrt{19 \times f} = 1$$

$$BC = \sqrt{1^2 + 19^2} = \sqrt{4 \times 5} = \boxed{1\sqrt{5}}$$

6

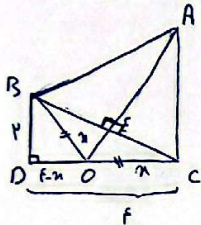


مثلث قائم الزاوية است زیرا میانه 1/2 وتر است

$$AD^2 = AB^2 + BD^2 = (1\sqrt{2})^2 + (f\sqrt{2})^2 = 4f \times 2 + 19 \times 2 = 190$$

$$AD = \sqrt{190} = \boxed{f\sqrt{10}}$$

7



$$(f-x)^2 + f = x^2 \rightarrow f + 19 + x^2 - 19x = x^2 \rightarrow 19x = 190$$

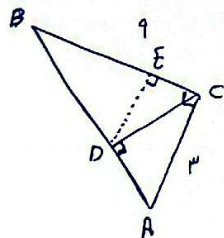
$$\rightarrow x = \frac{190}{19} = \frac{10}{1}$$

$$\left. \begin{array}{l} \hat{D} = \hat{O} \\ B = C \\ E = E \\ BO = OC \end{array} \right\} \Delta BOE \cong \Delta COE$$

$$BC = \sqrt{190} = 1\sqrt{10} \rightarrow BE = EC = \frac{1}{2}\sqrt{10}$$

8

$$\Delta AEC \sim \Delta CDB \rightarrow \frac{DC}{BD} = \frac{AC}{EC} = \frac{AC}{\frac{AC}{\sqrt{10}}} \rightarrow AC = 1\sqrt{10} \rightarrow S_{AEB} = \frac{1\sqrt{10} \times \sqrt{10}}{2} = \boxed{5}$$

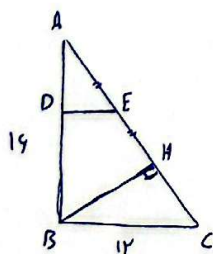


$$AB = \sqrt{11+9} = 1\sqrt{10}$$

$$BC^2 = BD \times AB \rightarrow 11 = 1\sqrt{10} \times BD \rightarrow BD = \frac{11}{1\sqrt{10}}$$

$$BD^2 = BC \times BE \rightarrow \frac{11^2}{10} = 9 \times BE \rightarrow BE = \frac{11}{10}$$

9



$$AB^2 + BC^2 = AC^2 \rightarrow AC = 10$$

$$AB^2 = AC \times AH \rightarrow AH = \frac{109}{10} = \frac{9}{10} \rightarrow AE = \frac{39}{10}$$

$$\frac{AE}{DE} = \frac{AC}{BC} \rightarrow \frac{\frac{39}{10}}{\frac{9}{10}} = \frac{10}{19} = \frac{10}{19} \rightarrow DE = \frac{39 \times 19}{190} = \boxed{\frac{99}{10}}$$

10