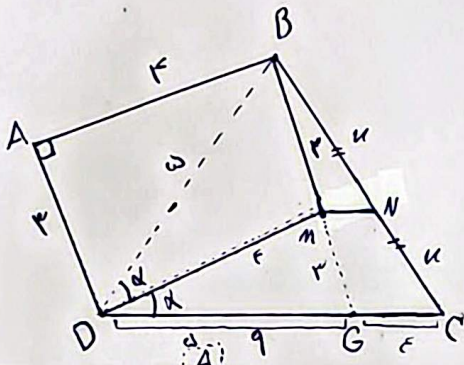


$$DE \parallel BC \rightarrow \frac{AD}{AB} = \frac{DE}{BC} = \frac{5}{12}$$

(1)

$$S_{\Delta} = \frac{\text{ارتفاع} \times \text{طول}}{2}$$

$$\frac{S_{\Delta BCE}}{S_{\Delta BDE}} = \frac{\frac{h \times BC}{2}}{\frac{h \times DE}{2}} = \left(\frac{12}{5} \right)$$

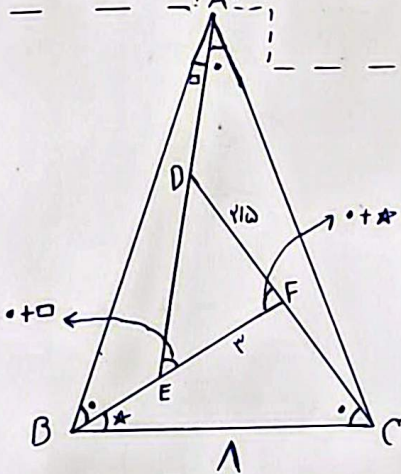


$$\triangle BDM \cong \triangle DGM \xrightarrow{\text{مقطع موازی}} MG = 3$$

$$DG = 4$$

(2)

$$MN \parallel GC \rightarrow \frac{BN}{BC} = \frac{MN}{GC} \Rightarrow \boxed{MN = 2}$$



$$\triangle DEF \sim \triangle ABC \quad \text{بنا بر «موازی» و «مماس»}$$

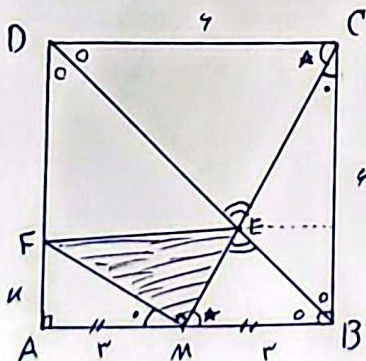
(3)

$$\frac{AC}{DE} = \frac{BC}{DF} = \frac{AB}{EF} \Rightarrow \frac{1}{\sqrt{5}} = \frac{AB}{3} \rightarrow \boxed{AB = 9/\sqrt{5}}$$

$$\frac{r}{u} = \frac{y}{z} \Leftrightarrow \triangle AMF \sim \triangle BCM \xrightarrow{\text{بنا بر «موازی»}} \frac{AM}{BF} = \frac{BF}{CM}$$

(4)

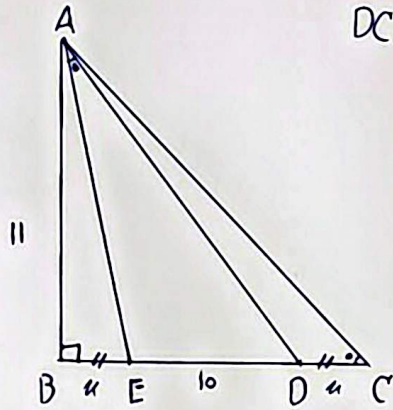
$$\rightarrow \boxed{u = AF = \frac{y}{z}}$$



$$FM^2 = AF^2 + AM^2 \rightarrow \sqrt{\frac{9}{5} + \frac{16}{5}} = \left[\frac{5}{\sqrt{5}} \right]$$

$$\triangle DCE \sim \triangle BEM \rightarrow \begin{cases} ME = \frac{1}{2} CE \\ MC = 2\sqrt{5} \end{cases} \Rightarrow \boxed{ME = \sqrt{5}}$$

$$S_{\triangle FME} = \frac{ME \times FM}{2} = \frac{\sqrt{5} \times \frac{5}{\sqrt{5}}}{2} = \boxed{\frac{5}{2} = 2,5}$$



$$DC = BE = x$$

$$\hat{E} = \hat{E} \Rightarrow \triangle AED \sim \triangle AEC$$

(4)

$$\frac{AE}{10+x} = \frac{AD}{AC} = \frac{10}{AE} \rightarrow AE^2 = 10(10+x) \quad (I)$$

$$\triangle ADE \Rightarrow 11^2 + x^2 = AE^2 \quad (II)$$

$$(I), (II) \Rightarrow 11^2 + x^2 = 10(10+x) \rightarrow x^2 - 10x + 21 = 0$$

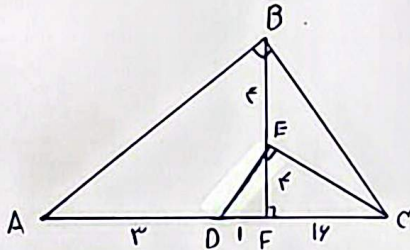
$$(x-7)(x-3) = 0$$

$$EF^2 = DF \times FC \rightarrow 14^2 = 1 \times FC$$

$$\Rightarrow FC = 196$$

$$BF^2 = AF \times FC \rightarrow 4 \times 196 = BF^2 \Rightarrow BF = 28$$

$$FB^2 + FC^2 = BC^2 \rightarrow 4^2 + 196^2 = BC^2 \Rightarrow BC = \sqrt{3920} = 14\sqrt{20}$$



$$CH \times HB = AH^2 \rightarrow 1 \times 1 = AH^2 \Rightarrow AH = 1$$

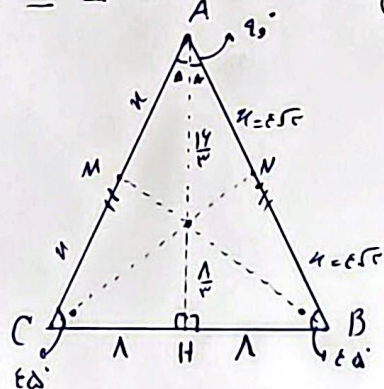
$$AB^2 = AH^2 + HB^2 \rightarrow AB = \sqrt{1+1} = \sqrt{2} \rightarrow x = \sqrt{2}$$

(V)

$$HB = AH \rightarrow \star = 0 \Rightarrow \hat{A} + \hat{B} + \hat{C} = 180$$

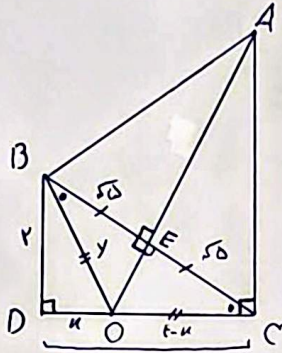
$$20 + 0 + 0 = 180$$

$$0 = 160$$



$$CN = BM$$

$$CN^2 + BM^2 = 2AH^2 \rightarrow \begin{cases} CN^2 = 140 \\ BM^2 = 140 \end{cases} \rightarrow CN \perp BM = 4\sqrt{6}$$



$$\hat{C} = 90^\circ$$

$$BD^2 + DC^2 = BC^2 \rightarrow 10 = BC^2 \rightarrow \boxed{BC = \sqrt{10}}$$

$$BD + k = y \rightarrow \boxed{f + k = y}$$

$$f - k = y \rightarrow \boxed{y = 14k - 11k}$$

$$\left. \begin{aligned} f + k &= y \\ f - k &= y \end{aligned} \right\} \Rightarrow 14 - 11k = f + k$$

$$\boxed{14 = 12k}$$

$$\boxed{k = \frac{7}{6}}$$

$$EO^2 + \left(\frac{\sqrt{10}}{2}\right)^2 = \frac{10}{4}$$

$$EO^2 = \frac{10}{4} \rightarrow \boxed{EO = \frac{\sqrt{10}}{2}}$$

$$OC^2 = EO \times OA$$

$$\frac{10}{4} \times \frac{10}{4} = \frac{\sqrt{10}}{2} \times OA$$

$$AE = AO - EO = \frac{5\sqrt{10}}{2} - \frac{\sqrt{10}}{2} = \frac{4\sqrt{10}}{2} = 2\sqrt{10}$$

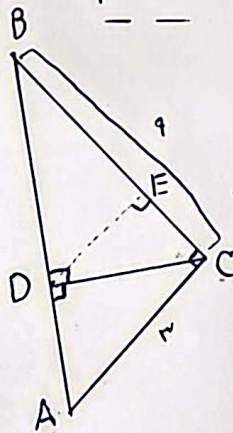
$$BA^2 = BC^2 + CA^2$$

$$BA = \sqrt{10}$$

$$BC \times AC = AB \times DC \rightarrow \boxed{DC = \frac{1\sqrt{10}}{10}}$$

$$DC^2 = EC \times BC \rightarrow \frac{1}{10} = 9 \times EC \rightarrow \boxed{EC = \frac{1}{90}}$$

$$BE = BC - EC = \frac{90}{10} - \frac{1}{10} = \frac{89}{10} = \boxed{\frac{89}{10}}$$



$$AB = 14 \quad BC = 12$$

$$AC^2 = AB^2 + BC^2 \rightarrow \boxed{AC = 20}$$

$$AB \times BC = AC \times BH \rightarrow 14 \times 12 = 20 \times BH$$

$$\rightarrow \boxed{BH = \frac{42}{5}}$$

$$BH = k \times 14 \rightarrow \frac{42}{5} = k \times 14 \rightarrow k = \frac{3}{5}$$

$$\triangle ADE \sim \triangle ABC \rightarrow \frac{AE}{AC} = \frac{DE}{BC} \rightarrow \frac{4/5}{20} = \frac{DE}{12}$$

$$\boxed{DE = 3/5}$$

$$BC^2 = CH \times AC \rightarrow 12 \times 12 = CH \times 20$$

$$\Rightarrow \boxed{CH = 7.2}$$

$$AH = AC - CH = 20 - 7.2 \rightarrow \boxed{AH = 12.8}$$

