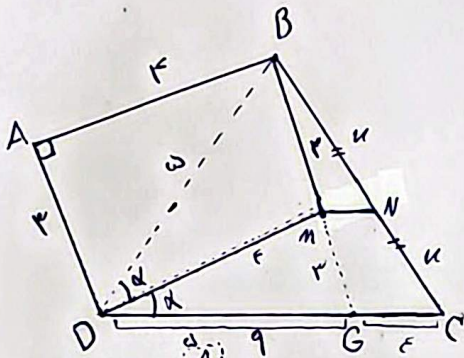


$$DE \parallel BC \rightarrow \frac{AD}{AB} = \frac{DE}{BC} = \frac{5}{12}$$

(۱) (۲)

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

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

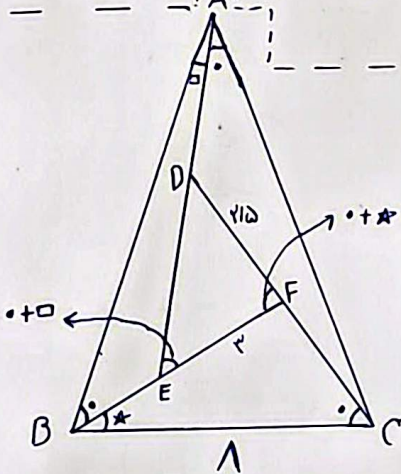


$$\triangle BDM \cong \triangle DGM \xrightarrow{\text{مقطع متساوی}} MG = 3$$

$$DG = 4$$

(۲) (۲)

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



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

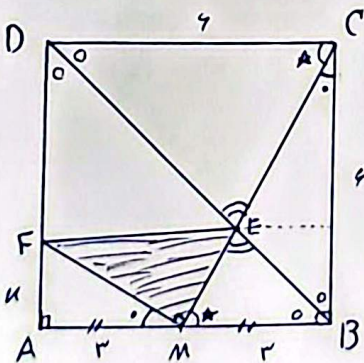
(۲) (۳)

$$\frac{AC}{DE} = \frac{BC}{DF} = \frac{AB}{EF} \Rightarrow \frac{1}{\frac{5}{12}} = \frac{AB}{3} \rightarrow \boxed{AB = 9/5} \checkmark$$

$$\frac{r}{k} = \frac{5}{12} \Leftrightarrow \triangle AMF \sim \triangle BCM \xrightarrow{\text{بنا بر «متر»}} \frac{AM}{BF} = \frac{BM}{CM}$$

(۲)

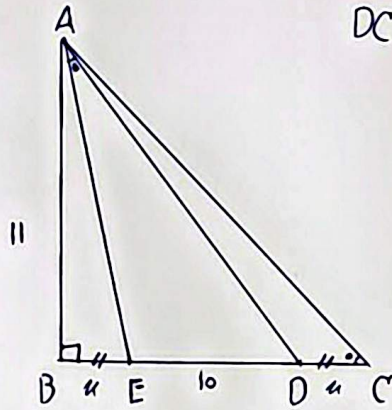
$$\rightarrow \boxed{k = AF = \frac{5}{12}}$$



$$FM^2 = AF^2 + AM^2 \rightarrow \sqrt{\frac{25}{144} + \frac{25}{144}} = \left(\frac{5}{12}\right) \sqrt{2}$$

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

$$S_{\triangle FME} = \frac{ME \times FM}{2} = \frac{\sqrt{2} \times \frac{5}{12} \sqrt{2}}{2} = \boxed{\frac{5}{12}} = 0.41 \checkmark$$



$$DC = BE = x$$

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

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

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

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

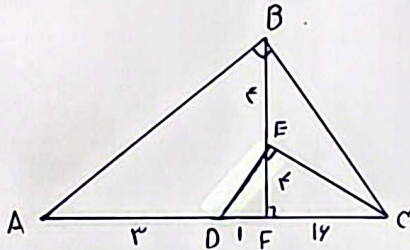
$$(x-7)(x-3) = 0$$

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

$$\Rightarrow FC = 196$$

$$BF^2 = AF \times FC \rightarrow 1 \times 196 = BF^2 \Rightarrow BF = 14$$

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



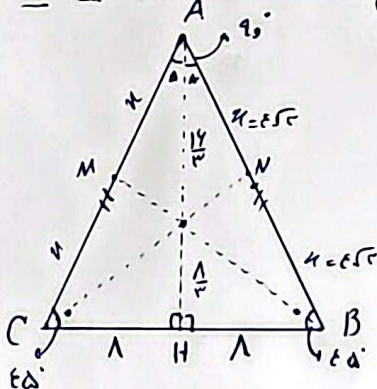
$$CH \times HB = AH^2 \rightarrow 1 \times 1 = AH^2 \Rightarrow AH = 1$$

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

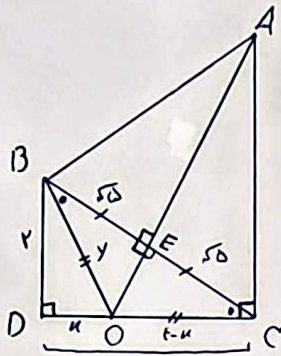
$$HB = AH \rightarrow \star = 0 \Rightarrow \hat{A} + \hat{B} + \hat{C} = 180$$

$$20 + 0 + 0 = 180$$

$$0 = 160$$



$$CN^2 + BM^2 = 2AH^2 \rightarrow \begin{cases} CN^2 = 140 \\ BM^2 = 140 \end{cases} \rightarrow CN \perp BM = 14\sqrt{6}$$



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

$$BD^2 + DC^2 = BC^2 \rightarrow 10 = BC^2 \rightarrow \boxed{BC = 17\sqrt{2}}$$

$$BD^2 + DC^2 = BC^2 \rightarrow \boxed{r^2 + 10^2 = 17^2}$$

$$r^2 + 10^2 = 17^2 \rightarrow \boxed{r^2 = 144} \rightarrow \boxed{r = 12}$$

$$\rightarrow 144 + 100 = 292 \rightarrow 17^2 = 289$$

$$\boxed{12 = 12}$$

$$EO^2 + (\frac{10}{2})^2 = \frac{17^2}{4}$$

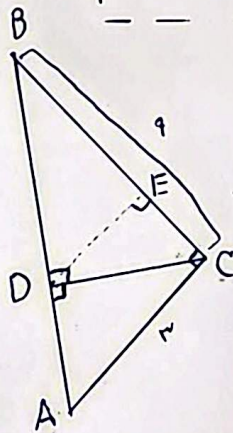
$$EO^2 = \frac{17^2}{4} - \frac{10^2}{4} \rightarrow \boxed{EO = \frac{15}{2}}$$

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

$$\frac{17^2}{4} = \frac{15}{2} \times OA \rightarrow OA = \frac{17^2}{15}$$

$$AE = AO - EO = \frac{17^2}{15} - \frac{15}{2} = \frac{289}{15} - \frac{15}{2} = \frac{578 - 225}{30} = \frac{353}{30}$$

$$S_{ABE} = \frac{\sqrt{2} \times 17\sqrt{2}}{2} = \boxed{149} \checkmark$$



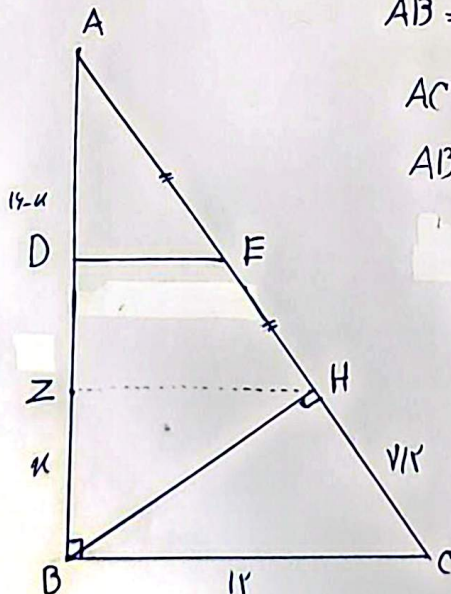
$$BA^2 = BC^2 + CA^2$$

$$BA = 17\sqrt{10}$$

$$BC \times AC = AB \times DC \rightarrow \boxed{DC = \frac{17\sqrt{10}}{10}}$$

$$DC^2 = EC \times BC \rightarrow \frac{17^2}{10} = 9 \times EC \rightarrow \boxed{EC = \frac{9}{10}}$$

$$BE = BC - EC = \frac{90}{10} - \frac{9}{10} = \frac{81}{10} = \boxed{8.1} \checkmark$$



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

$$AC^2 = AB^2 + BC^2 \rightarrow \boxed{AC = 17}$$

$$AB \times BC = AC \times BH \rightarrow 14 \times 12 = 17 \times BH$$

$$\rightarrow \boxed{BH = \frac{168}{17}}$$

$$BH^2 = CH \times AC \rightarrow \frac{168^2}{17^2} = CH \times 17 \rightarrow CH = \frac{168^2}{17^3}$$

$$\triangle ADE \sim \triangle ABC \rightarrow \frac{AE}{AC} = \frac{DE}{BC} \rightarrow \frac{4/17}{17} = \frac{DE}{12}$$

$$\boxed{DE = 3/17} \checkmark$$

$$BC^2 = CH \times AC \rightarrow 12^2 = CH \times 17$$

$$\rightarrow \boxed{CH = 864/289}$$

$$AH = AC - CH = 17 - 864/289 \rightarrow \boxed{AH = 4013/289}$$