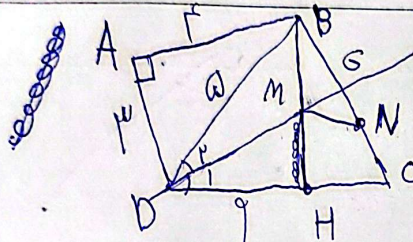


$$\text{ارتفاع بر} \rightarrow \frac{S_{\triangle BCE}}{S_{\triangle BDE}} = \frac{BC}{DE} = \frac{AB}{AD} = \frac{12}{\omega} = \boxed{1,4}$$



$M=90^\circ$ $DM \rightarrow$ نسبت از $\hat{BDM} \rightarrow \hat{M}=90^\circ$ $\hat{P}_1=\hat{P}_2$ $\hat{BDM} \cong \hat{MPH}$ $DH=BD=\omega \Rightarrow HC=f$

$M \rightarrow BH$ $BHC \rightarrow \frac{BM}{BH} = \frac{MH}{HC} \rightarrow \frac{1}{2} = \frac{MN}{f}$

$\rightarrow MN=1$



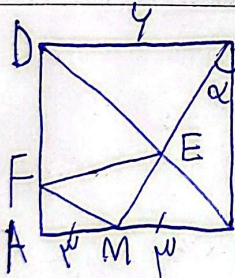
$\hat{ABF} = \hat{CAE} = \hat{BCD} = \alpha$

$\hat{ABE}$ زاویه قاره $\hat{E}_1 \rightarrow \hat{E}_1 = \alpha + \alpha = \hat{A}$

$\hat{ADC}$ زاویه قاره $\hat{D}_1 \rightarrow \hat{D}_1 = \alpha + \alpha = \hat{C}$

$DEF \sim ABC$

$C \Rightarrow \frac{DF}{BC} = \frac{EF}{AB} \rightarrow \frac{1, \omega}{\omega} = \frac{f}{AB} \rightarrow AB = \frac{f}{1, \omega} = \boxed{9,9}$



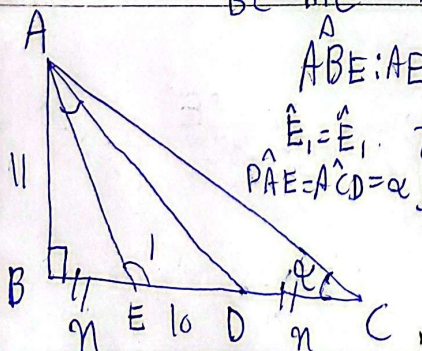
$AM=BM=3, BM \parallel DC \rightarrow \hat{BME} \sim \hat{DEC}$

$\Rightarrow \frac{ME}{CE} = \frac{BM}{DC} = \frac{3}{4} = \frac{1}{2} \quad (1) \quad \hat{BCM} : \hat{CM} = \hat{BC} + \hat{BM} = f \omega$

$\rightarrow CM = 3\sqrt{\omega} \quad (2) \quad (1), (2) \rightarrow ME = \sqrt{\omega}, CE = 2\sqrt{\omega}$

$\hat{AMF} \sim \hat{BCM} \rightarrow \frac{AM}{BC} = \frac{MF}{MC} \rightarrow \frac{3}{4} = \frac{MF}{3\sqrt{\omega}} \rightarrow MF = \frac{9}{4}\sqrt{\omega}$

$S_{MFE} = \frac{1}{2} ME \times MF = \frac{1}{2} (\sqrt{\omega}) \times (\frac{9}{4}\sqrt{\omega}) = \frac{9}{8} \omega$

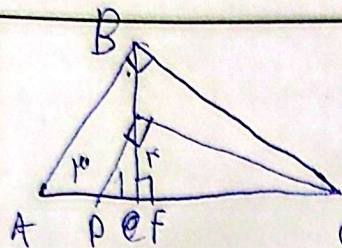


$\hat{ABE} : \hat{AE} = 11^\circ : \eta^\circ \rightarrow \hat{AE} = \sqrt{11 \times \eta}$

$\hat{E}_1 = \hat{E}_2$ $\hat{PAE} = \hat{ACD} = \alpha$ $\hat{AEC} \sim \hat{AED} \Rightarrow \frac{AE}{ED} = \frac{EC}{AE} \Rightarrow AE^2 = ED \times EC$

$\rightarrow 11 \times \eta = 10(10 + \eta) \rightarrow \eta^2 - 10\eta + 11 = 0 \rightarrow (\eta - 3)(\eta - 7) = 0$

$\Rightarrow \begin{cases} \eta = 3 \\ \eta = 7 \end{cases}$



$$\triangle DEC : EE' = DF \times FC \rightarrow E' = 1 \times FC \rightarrow FC = 16$$

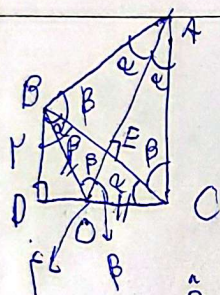
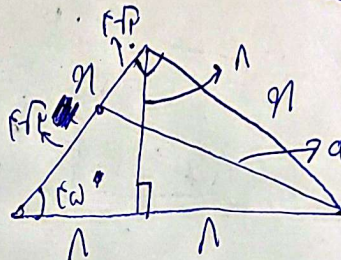
$$\triangle ABC : BF' = AF' \times FC \Rightarrow BF' = 9 \Rightarrow BF = 11$$

$$\triangle BFC : BC' = BF' + FC' \Rightarrow BC' = 11 + 16 \Rightarrow BC = 17\sqrt{2}$$

میتوانیم ثابت کنیم که این مثلث قائم الزامی است چون می‌تواند دایره بر وتر نصف وتر

$$m^2, n^2 = 16^2 \rightarrow 2m^2 = 256 \rightarrow m^2 = 128 \rightarrow m = 16\sqrt{2}$$

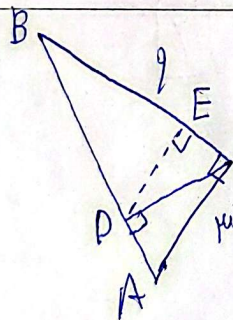
$$d^2 = \sqrt{(11-16)^2 + (16\sqrt{2})^2} = \sqrt{10} = \sqrt{10}$$



$$\hat{D} = \hat{C} = 90^\circ, BE = EC, \angle B = 90^\circ, C = 90^\circ \rightarrow C_1 = B$$

$$\left. \begin{array}{l} CE = EB \\ AE = EA \\ \angle E_1 = \angle E_2 = 90^\circ \end{array} \right\} \Rightarrow \triangle ABE \cong \triangle ACE$$

$$\hat{B}_1 = \hat{B}_2, \hat{A}_1 = \hat{C}_1 \rightarrow \triangle ABE \sim \triangle BDC \rightarrow \frac{\sqrt{2}}{1} = k, \triangle ABE = k \triangle BDC \Rightarrow \sqrt{2} = k \times \frac{1}{\sqrt{2}} \Rightarrow k = 2$$



$$AB = \sqrt{16^2 + 9^2} = 17\sqrt{2}$$

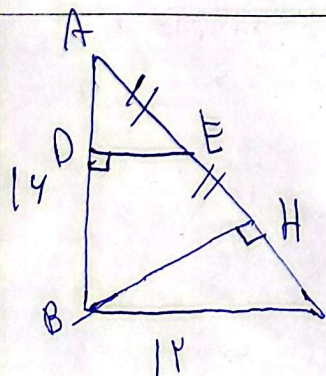
$$CD' = AD \times DB, AD = \frac{AC'}{AB}, BD = \frac{BC'}{AB}$$

$$\triangle CDE : DB = \frac{9^2}{17\sqrt{2}} = \frac{9}{17\sqrt{2}}$$

$$\hat{E} = \hat{D} = 90^\circ, \hat{C} = \hat{C} \rightarrow \triangle CDE \sim \triangle CDB$$

$$\frac{DE}{DB} = \frac{CD}{CB} \rightarrow CD = \frac{AC \times BC}{AB} = \frac{17 \times 9}{17\sqrt{2}} = \frac{9}{\sqrt{2}}$$

$$\frac{DE}{\frac{9}{\sqrt{2}}} = \frac{9}{17\sqrt{2}} \rightarrow DE = \frac{9}{17} \Rightarrow \frac{BE}{BC} = \frac{DE}{CD} \Rightarrow \frac{BE}{17} = \frac{9}{17\sqrt{2}} \Rightarrow BE = \frac{9}{\sqrt{2}}$$



$$AC = 10 \Rightarrow \sqrt{16^2 + 9^2} = 17\sqrt{2}$$

$$\triangle ADE \Rightarrow \left. \begin{array}{l} \hat{H} = \hat{D} = 90^\circ \\ \hat{A} = \hat{A} \end{array} \right\} \rightarrow \triangle ADE \sim \triangle ABH \Rightarrow \frac{DE}{BH} = \frac{AE}{17} \quad (1)$$

$$\triangle BH \Rightarrow \frac{16 \times 17}{17} = \frac{BH \times 10}{17} \rightarrow BH = 17 \quad (2) \quad \triangle AE \Rightarrow \frac{AH \times 10}{17} = 17^2$$

$$DE = \frac{17 \times 17 \times 10}{17} = 17\sqrt{2} \quad (3) \quad \frac{AH}{17} = \frac{AE}{17} \Rightarrow AE = 17$$

$$\frac{BE}{17} = \frac{9}{17\sqrt{2}} \Rightarrow BE = \frac{9}{\sqrt{2}}$$