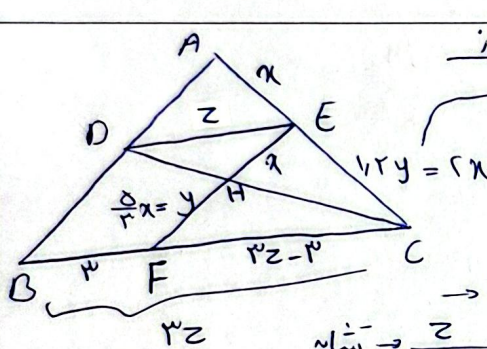


$\Delta AFE \sim \Delta BFC \rightarrow$ نسبت = ۳
 $\rightarrow \begin{cases} BE = \sqrt{10}x \\ AC = 3\sqrt{2}x \end{cases}$
 $AF = y \xrightarrow{\text{پی}} FC = 3y \rightarrow AF + FC = AC = 5y \rightarrow 3\sqrt{2}x = 5y$
 $\rightarrow y = \frac{3\sqrt{2}}{5}x = AF$
 $FE = z \xrightarrow{\text{پی}} BF = 3z \rightarrow FE + FB = BE = 5z \rightarrow \sqrt{10}x = 5z$
 $\rightarrow z = \frac{\sqrt{10}}{5}x = FE$
 $\Rightarrow \frac{FE}{AF} = \frac{\frac{\sqrt{10}}{5}x}{\frac{3\sqrt{2}}{5}x} = \sqrt{\frac{10}{18}} = \sqrt{\frac{5}{9}} \rightarrow$ جواب $\rightarrow \frac{FE}{AF} = \frac{1}{3}$

iii $\Delta AED \sim \Delta ABC$

$\frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC} \xrightarrow{\text{جایگزینی از شکل}} \frac{2}{1+x} = \frac{x}{18} \rightarrow 36 = x^2 + x$

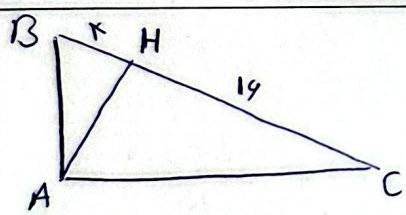
$\Rightarrow x^2 + x - 36 = 0 \Rightarrow (x+4)(x-9) = 0 \rightarrow x = -4$ $\checkmark$ $x = 9$
 $\boxed{x = 9}$



$\xrightarrow{\text{iii}} \Delta DEH \sim \Delta FCH \rightarrow \frac{DE}{FC} = \frac{EH}{FH} = \frac{DH}{CH} \rightarrow \frac{z}{15} = \frac{12y}{12x} \rightarrow z = 15 \cdot \frac{y}{x}$

$\xrightarrow{\text{نسبت}} \frac{AE}{AC} = \frac{DE}{BC} \rightarrow \frac{x}{18} = \frac{DE}{18} \rightarrow DE = x$
 $\rightarrow FC = BC - BF = 15$

$\xrightarrow{\text{نسبت}} \frac{z}{15} = \frac{x}{18} \rightarrow \frac{z}{15} = \frac{x}{18} \rightarrow 9z - 9 = 5z \rightarrow z = \frac{9}{2} \Rightarrow BC = 18 \cdot \frac{9}{2} = \frac{81}{2}$



$\begin{cases} AC^2 = CH \times BC \\ AB^2 = BH \times BC \end{cases}$

$AC^2 = 14 \times 20$
 $AB^2 = 5 \times 20$
 $\frac{AC^2}{AB^2} = \frac{14 \times 20}{5 \times 20} = \frac{14}{5} = 2$
 $\boxed{\frac{AC}{AB} = \sqrt{2}}$

iii $\Delta ABF \sim \Delta FEC$

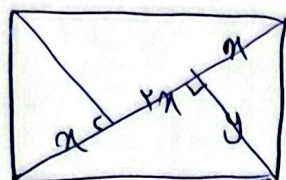
$\frac{FE}{BF} = \frac{FC}{AF} \xrightarrow{FE=x} \frac{x}{9} = \frac{\lambda}{x+\lambda} \rightarrow x^2 + \lambda x = 9\lambda$

$x^2 + \lambda x - 9\lambda = 0 \rightarrow (x+12)(x-9) = 0 \rightarrow x = -12$ $\checkmark$ $x = 9$

$EF \rightarrow x = 9$ $AF = AE + EF$

$AF = 9 + 9 = 18$
 $\boxed{AF = 18}$

$DH = DH' = \frac{\sqrt{r}}{r} \alpha$
 فیثاغذی $\rightarrow \alpha^r + \alpha^r = 121 \rightarrow \alpha^r = \frac{121}{r} \rightarrow \alpha = \frac{11}{\sqrt{r}}$
 $\frac{\sqrt{r}}{r} \alpha = \frac{\sqrt{r}}{r} \times \frac{11}{\sqrt{r}} = \frac{11}{r}$
 کس $\rightarrow \frac{AH}{AB} = \frac{DH}{BC} \rightarrow \frac{y + 0,8}{y + 11} = \frac{0,8}{\alpha}$ $y + 2\varepsilon = 0,8y + 4,9\varepsilon$
 $2,2y = 14,8$
 $y = 6,7 = AE$

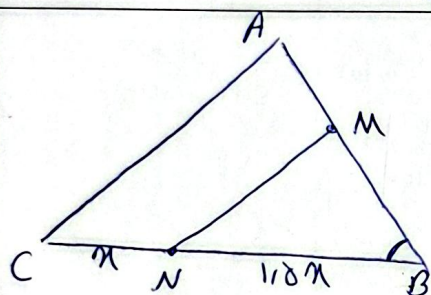


بنا بر رابطه $y' = \alpha \times \sqrt{r} \alpha = \sqrt{r} \alpha^r \rightarrow y = \sqrt{r} \alpha$

$S_{\text{مربع کوچک}} = \frac{\alpha \times \sqrt{r} \alpha}{r} = \frac{\sqrt{r}}{r} \alpha^r$

$S_{\text{مربع بزرگ}} = 2 \times \left(\frac{1}{r} \times \varepsilon \alpha \times \sqrt{r} \alpha \right) = \varepsilon \sqrt{r} \alpha^r$

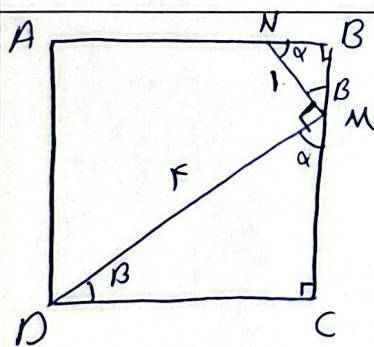
$\frac{\varepsilon \sqrt{r} \alpha^r}{\frac{\sqrt{r}}{r} \alpha^r} = 1$



$\angle BNM = \angle BNC \rightarrow BN = 1,8 NC$

$\frac{S_{ABC}}{S_{BMN}} = \frac{\frac{1}{2} \times \sin B \times 1,8 \alpha \times AB}{\frac{1}{2} \times \sin B \times 1,8 \alpha \times BM} = r$

$\frac{AB}{BM} = \frac{q}{\alpha} \rightarrow BM = \frac{\alpha}{q} AB$
 $AM = \frac{\varepsilon}{q} AB$ $\frac{BM}{AM} = \frac{\frac{\alpha}{q} AB}{\frac{\varepsilon}{q} AB} = \frac{\alpha}{\varepsilon}$

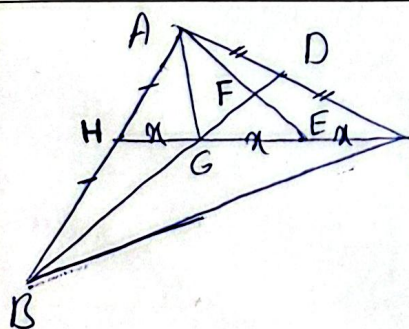


$\triangle BMN \sim \triangle DCM$

$\frac{NM}{DM} = \frac{BN}{CM} = \frac{BM}{DC} = \frac{1}{\varepsilon}$

$BM = \alpha \rightarrow MC = \sqrt{r} \alpha$ $MC^r + DC^r = \varepsilon^r$

$9\alpha^r + 14\alpha^r = (\varepsilon \alpha)^r = 14 \rightarrow \alpha = \frac{\varepsilon}{\alpha} \rightarrow S = (\varepsilon \alpha)^r = 14 \times \frac{14}{r} = 10,28$ جواب



$\frac{CG}{GH} = \frac{r}{1} \rightarrow GH = \alpha$

$CG = r\alpha \rightarrow GE + EC = r\alpha$

$GE = EC \rightarrow GE = EC = \alpha$

$\triangle AGC$: $AE \rightarrow$ میانه, $GD \rightarrow$ میانه

کس $\rightarrow AF = r FE$ و $GF = r FD \rightarrow FD = \alpha$
 $FG = r\alpha$

BC میانه $\rightarrow$ تقسیم $\rightarrow \frac{BG}{GD} = r \rightarrow \frac{BG}{FG + FD} = r$ $\frac{BG}{r\alpha} = r$

$\rightarrow BG = 9\alpha$

$\frac{BD}{FD} = \frac{BG + GF + FD}{FD} = \frac{9\alpha}{\alpha} = 9$ جواب