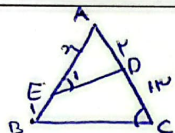


$$\left. \begin{array}{l} BC \parallel AD \rightarrow \hat{B}_1 = \hat{E}_1 \\ \hat{A}_r = \hat{C}_r \\ \hat{F}_1 = \hat{F}_r \end{array} \right\} \rightarrow \triangle AFE \sim \triangle BFC$$

$$\frac{BC}{AE} = \frac{\overbrace{AC-AF}^{CF}}{AF} = \frac{\overbrace{BE-EF}^{BF}}{EF} \rightarrow \frac{AC-AF}{AF} = \frac{BE-EF}{EF}$$

$$\begin{aligned} \text{Get } (BE)^r &= (AE)^r + (AB)^r = 2x^r + 9x^r = 11x^r \rightarrow BE = \sqrt{11} \cdot x \\ (AC)^r &= (AD)^r + (CD)^r = 9x^r + 9x^r = 18x^r \rightarrow AC = 3\sqrt{2} \cdot x \end{aligned}$$

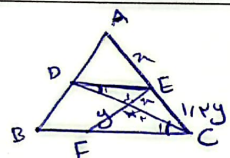
$$\begin{aligned}
 AE &= 2n \rightarrow AD = 3n \\
 ED &= 2n \rightarrow \text{منه } 2n, 2n, 2n \downarrow \\
 CD &= AB = AD = BC = 3n \\
 \text{BE} &\text{--- EF} \\
 \frac{BF}{FE} &\rightarrow \frac{AC - AF}{AF} = \frac{BE - EF}{EF} \quad (5) \\
 \text{منه } \downarrow \text{خرج ادمت، جمع في ادمت} \\
 \frac{3n}{5n} &= \frac{AC}{BE} = \frac{AF}{EF} \leftarrow \frac{AC}{AF} = \frac{BE}{EF} \\
 &\rightarrow \frac{AF}{AF} = \frac{3n}{3n} = \frac{5n}{5n}
 \end{aligned}$$



$$\left. \begin{array}{l} \hat{A} = \hat{A} \\ \hat{C} = \hat{E} \end{array} \right\} \rightarrow A \overset{\Delta}{B} C \overset{\Delta}{\sim} E \overset{\Delta}{A} D$$

$$\frac{AB}{AD} = \frac{BC}{ED} = \frac{AC}{AE} \rightarrow \frac{1+n}{1} = \frac{BC}{AD} = \frac{1d}{x} \rightarrow \frac{1+n}{1} = \frac{1d}{x} \rightarrow x + n = d$$

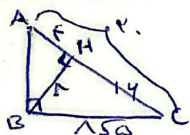
$$x^2 + x - 4 = 0 \rightarrow (x+4)(x-1) = 0 \rightarrow \begin{cases} x = 1 \\ x = -4 \end{cases}$$



$$DE \parallel BC \rightarrow \text{Querschnittsab.} : \frac{DE}{BC} = \frac{AE}{AC} \rightarrow \frac{DE}{\frac{BF}{r} + F_C} = \frac{x}{\frac{n + 1/r}{1/r}}$$

$$\left. \begin{array}{l} \hat{H}_1 = \hat{H}_r \\ \hat{D}_1 = \hat{C}_1 \end{array} \right\} \rightarrow DHE \overset{ii}{\sim} FHC \rightarrow \frac{DE}{FC} = \frac{x}{y} \xrightarrow{(1)} \frac{DE}{FC} = \frac{x}{\frac{1}{\frac{y}{x}}x} = \frac{x}{\omega} \rightarrow DE = \frac{x}{\omega} FC$$

$$\frac{DE}{r+FC} = \frac{x}{x} \xrightarrow{(v)} \frac{\frac{v}{a} FC}{r+FC} = \frac{1}{x} \rightarrow \frac{v}{a} FC = r + FC \rightarrow \frac{v}{a} FC = r \rightarrow FC = \frac{ra}{v} \rightarrow BC = BF + FC = \frac{ra}{v} + r = \frac{rv}{v}$$

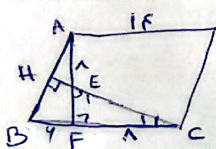


$$(BH)^r = AH \times HC \rightarrow BH^r = 14 \times 6 = 46 \rightarrow \boxed{BH = A}$$

$$HC = AC - AH = 7. - 8 = 19$$

در مثلث $\triangle BHC$: طبق فیثاغورس : $(BC)^2 = (BH)^2 + (HC)^2 = (8)^2 + (14)^2 \Rightarrow \sqrt{260} = BC$

$\hat{A}HB$ در مثلث : " " : $(AB)^r = (BH)^r + (AH)^r = (\wedge)^r + (\epsilon)^r \rightarrow AB = \epsilon \sqrt{2}$
 $\frac{AB}{BC} = \frac{\epsilon \sqrt{2}}{\wedge \sqrt{2}} = \frac{1}{r}$



D

$\square ABCD \rightarrow A = C = 15$ $CF = BC - BF = 15 - 4 = 11$

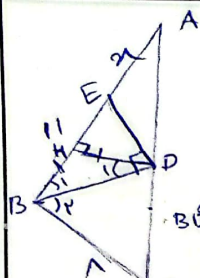
$\triangle BHC: \hat{C}_1 + \hat{B} = 90^\circ$

$\triangle FHC: \hat{E}_1 + \hat{C}_1 = 90^\circ$

$\left. \begin{matrix} \hat{B} = \hat{E}_1 \\ \hat{H} = \hat{F} = 90^\circ \end{matrix} \right\} \rightarrow \triangle FHB \sim \triangle FHE \rightarrow \frac{EF}{F} = \frac{FC}{AF}$

$$\rightarrow \frac{EF}{4} = \frac{\Lambda}{\Lambda + EF} \rightarrow \underbrace{(EF)^2}_{\tilde{z}} + \Lambda EF = \epsilon \Lambda \rightarrow z^2 + \Lambda z - \epsilon \Lambda = 0 \rightarrow (z + \Lambda)(z - \epsilon) = 0 \rightarrow \boxed{z = -\Lambda} \quad \text{oder} \quad \boxed{z = \epsilon}$$

$$AF = AE + EF = 1 + 8 = 12$$



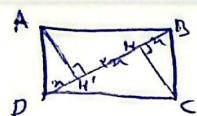
$$\left. \begin{array}{l} BD \text{ منبسط} \rightarrow \hat{B}_1 = \hat{B}_2 \\ PH \parallel BC \rightarrow D_1 = B_2 \end{array} \right\} D_1 = B_1 \rightarrow BHD \rightarrow BH = DH \quad (1)$$

$$DAB \text{ در مثل: } \hat{B}_1 + \hat{D}_1 = 90^\circ, \hat{D}_1 = \hat{B}_1 \rightarrow \hat{B}_1 = 90^\circ \rightarrow \hat{B}_1 = \hat{D}_1 = 45^\circ$$

$$\left. \begin{array}{l} \hat{D}_1 + \hat{D}_2 = 90^\circ, \hat{D}_1 = 45^\circ \rightarrow \hat{D}_2 = 45^\circ \\ BDE \text{ در مثل: } \hat{E}_1 + \hat{B}_1 = 90^\circ \rightarrow \hat{E}_1 = 45^\circ \end{array} \right\} BDE \rightarrow DH = HE \quad (2) \rightarrow DH = HE = BH = \frac{11}{2} = 5.5$$

$$HD \parallel BC \rightarrow \text{طبق گنج: } \frac{AH}{AB} = \frac{HD}{BC} \rightarrow \frac{n+5.5}{11+n} = \frac{5.5}{11} \rightarrow 11n + 55 = 5.5(11+n) \rightarrow 11n + 55 = 60.5 + 5.5n \rightarrow 5.5n = 5.5 \rightarrow n = 1$$

$$AE = \frac{11}{2} = 5.5$$

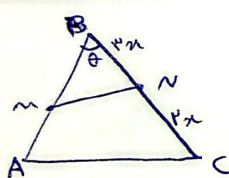


$$S_{DBC} = \frac{BC \times DC}{2}$$

$$S_{DAB} = \frac{AD \times AB}{2}$$

$$ABCD \rightarrow BC = AD, AB = DC \left\{ \begin{array}{l} S_{DAB} = S_{DBC} \\ S_{ABCD} = S_{DAB} + S_{DBC} \end{array} \right. \rightarrow S_{ABCD} = 2S_{DBC} \quad (1)$$

$$\left. \begin{array}{l} S_{DCB} = \frac{CH \times BD}{2} \\ S_{HCB} = \frac{CH \times BH}{2} \end{array} \right\} \frac{S_{DCE}}{S_{HCB}} = \frac{BD}{BH} = \frac{n+2n+n}{n} = 4 \rightarrow \frac{S_{ABCD}}{S_{BHC}} = \frac{2S_{DBC}}{S_{BHC}} = 4 \rightarrow S_{BHC} = \frac{1}{4} S_{ABCD} = 14$$

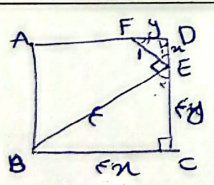


$$BN = NC$$

$$S_{ABC} = 3S_{BMN} \rightarrow \frac{1}{3} BC \times AB \times \sin \theta = 3 \times \frac{1}{3} \times BM \times BN \times \sin \theta$$

$$\rightarrow \frac{1}{3} BC \times AB = BM \times BN \rightarrow \frac{1}{3} \times 9 \times 9 = BM \times 3 \rightarrow BM = 3$$

$$\frac{BM}{AB} = \frac{3}{9} \rightarrow \frac{BM}{AM+MB} = \frac{3}{9} \rightarrow \frac{BM}{AM} = \frac{3}{6} = \frac{1}{2}$$



$$\left. \begin{array}{l} \hat{E}_1 + \hat{E}_2 = 90^\circ \\ \hat{E}_1 + \hat{F}_1 = 90^\circ \end{array} \right\} \hat{E}_2 = \hat{F}_1$$

$$ABCD \rightarrow \hat{C} = \hat{D} = 90^\circ$$

$$BCE \sim FDE$$

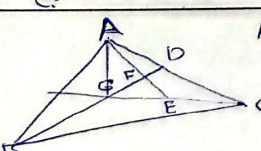
$$\frac{AE}{EF} = \frac{EC}{FD} = \frac{BC}{DE} = \frac{1}{1} \rightarrow EC = EF$$

$$FDE \text{ در مثل: } \text{طبق گنج: } n^2 + y^2 = 1$$

$$AFDB \rightarrow BC = CD \rightarrow nx = xy + n \rightarrow n = \frac{1}{4}y$$

$$S = (nx)^2 = 14^2 = 14 \times \frac{14}{4} = 10.78$$

$$y^2 + \frac{1}{4}y^2 = 1 \rightarrow \frac{5}{4}y^2 = 1 \rightarrow y = \frac{2}{\sqrt{5}}, n = \frac{1}{\sqrt{5}}$$



$$AGC \text{ در مثل: } GE = EC \rightarrow \text{میانوازی بر AE} \quad (1)$$

$$G \text{ مرکز ثقل } \rightarrow \text{میانوازی بر BD} \rightarrow AD = DC \rightarrow \text{در مثل AGC: } GD \text{ میانوازی است} \quad (2)$$

$$(1), (2) \Rightarrow \text{میانوازی بر AC} \rightarrow F \text{ مرکز ثقل } AGC \rightarrow \frac{GF}{FD} = \frac{1}{1} \rightarrow \frac{GF+FD}{FD} = \frac{2}{1} \quad (3)$$

$$ABC \text{ در مثل: } G \text{ مرکز ثقل } \rightarrow \frac{BG}{GD} = \frac{2}{1} \rightarrow \frac{BG+GD}{GD} = \frac{3}{1} \quad (4)$$

$$(3), (4) \rightarrow \frac{GD}{FD} \times \frac{BD}{GD} = \frac{BD}{FD} = 2 \times 2 = 4$$