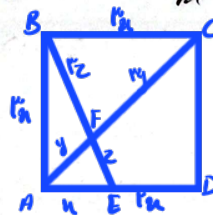


Given: $ED = r \cdot EA$
 $EF = ? \cdot AF$

$$\triangle AEF \sim \triangle BFC$$

$$\frac{BC}{AE} = \frac{FC}{AF} = \frac{BF}{FE} \rightarrow r = \frac{h}{k} = \frac{BF}{EF}$$



$$BE^2 = (r/2)^2 + h^2 \rightarrow BE = \sqrt{r^2/4 + h^2} \rightarrow z_1, z_2 = \sqrt{r^2/4 + h^2} \rightarrow z = \frac{\sqrt{r^2 + 4h^2}}{2}$$

$$(AC)^2 = (r/2)^2 + (r/2)^2 \rightarrow AC = r\sqrt{2} \rightarrow r_f = r\sqrt{2} \rightarrow y = \frac{r\sqrt{2}}{2}$$

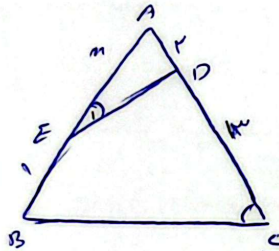
$$\frac{EF}{AF} = \frac{z}{y} = \frac{\sqrt{2}}{2}$$

$$\angle AED = \angle ACB$$

$$m = ?$$

$$\triangle AED \sim \triangle ABC \rightarrow \frac{AD}{AB} = \frac{AE}{AC}$$

$$\frac{AD}{AB} = \frac{AE}{AC} \rightarrow \frac{m}{n+1} = \frac{m}{n} \rightarrow m = n$$



$$\frac{AD}{AB} = \frac{AE}{AC} = \frac{m}{n+1} = \frac{m}{n} \rightarrow \frac{m}{n+1} = \frac{m}{n} \rightarrow m = n$$

$$DE \parallel BC$$

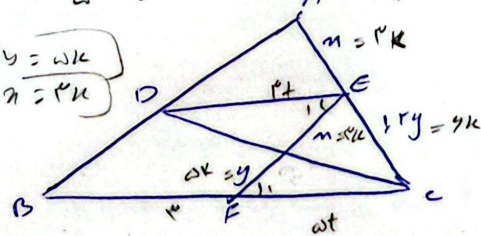
$$y = \omega x$$

$$y = \frac{\omega}{r} x$$

$$\frac{y}{\omega} = \frac{x}{r} = k$$

$$y = \omega k$$

$$x = rk$$



$$BF = r$$

$$BC = ?$$

$$\frac{r}{r+\omega t} = \frac{rk}{rk+\omega k} \rightarrow \frac{1}{1+\omega t/r} = \frac{1}{1+\omega/r}$$

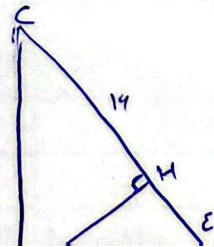
$$rk = r + \omega t \rightarrow t = \frac{r}{\omega} = \frac{r}{v\omega}$$

$$BC = r + \omega t = r + \frac{r}{v\omega} = \frac{r}{v\omega}$$

$$BC = r_0$$

$$HBSE$$

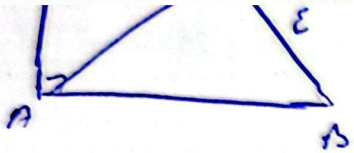
$$AB, AC = ?$$



$$AB^2 = BH \times CB \Rightarrow AB^2 = E \times r_0 \Rightarrow \sqrt{r_0} = \sqrt{r_0} = AB$$

$$AC^2 = CH \times CB \Rightarrow AC^2 = 4 \times r_0 = 4r_0 \rightarrow AC = 2\sqrt{r_0}$$

$$\frac{2\sqrt{r_0}}{r\sqrt{2}} = r \Rightarrow \frac{1}{r} = \frac{1}{r}$$



$$\frac{AE}{AC} = \frac{AD}{AB} = \frac{DE}{BC} \rightarrow \frac{u}{14} = \frac{DE}{BC} \rightarrow BC = 14 \frac{DE}{u} \quad (1)$$

(1)

$$\triangle DHE \sim \triangle CHF \rightarrow \frac{EH}{FH} = \frac{DH}{CH} = \frac{DE}{CF} \rightarrow \frac{u}{4} = \frac{DE}{CF} \rightarrow CF = \frac{4}{u} DE \quad (2)$$

$$(1), (2) \rightarrow BC = BF + CF \rightarrow DE = \frac{9}{4} \quad BC = 14 \times \frac{9}{4} = 9\sqrt{14}$$

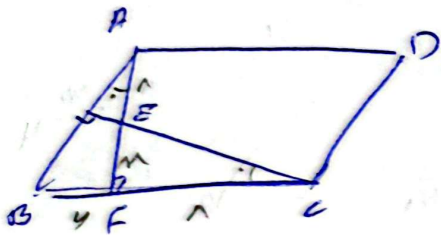
Final answer

$$AE = u$$

$$BF = 4$$

$$AD = 14$$

$$AB = ?$$



$$\begin{aligned} \hat{A} + \hat{C} &= \hat{A} \\ \hat{A} + \hat{B} &= \hat{A} \end{aligned}$$

$$\begin{aligned} \hat{C} &= \hat{A} \\ \hat{E} &= \hat{F} = 90^\circ \end{aligned}$$

$$\triangle ABF \sim \triangle EFC$$

$$\frac{FC}{AF} = \frac{EF}{BF} \Rightarrow \frac{14}{14+u} = \frac{u}{4} \Rightarrow 14 + 14u = 4u \Rightarrow 14 + 10u = 0$$

$$\Rightarrow (14+10u)(14-4u) = 0 \rightarrow u = -1.4 \text{ or } u = 3.5 \rightarrow AF = 14 + 3.5 = 17.5$$

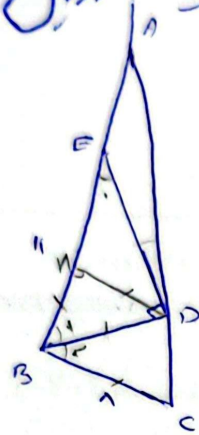
حل المسألة

AE = ?

BC = 10, DE = 4, BD = 6

AB = 10

24

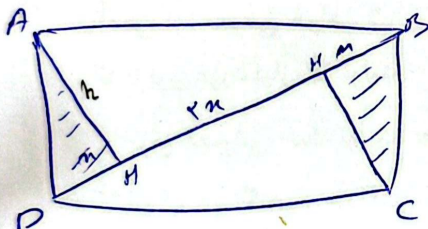


$$\left. \begin{array}{l} \hat{A}_1 + \hat{B}_1 = \hat{A} \\ \hat{E}_1 + \hat{B}_1 = \hat{A} \end{array} \right\} \hat{B}_1 = \hat{E}_1 \rightarrow \hat{A}_1 = \hat{B}_1 = \hat{E}_1$$

EDB مثلث قائم الزاوية → DH = ... (مسألة) = 4.4

→ BH = 11/2 → AND ~ ABC → AN = 11/2

11/2 AN + 11/2 = AN → 11/2 AN = 11/2 → AN = 11/2 → AE = 11/2 - 11/2 = 4.4

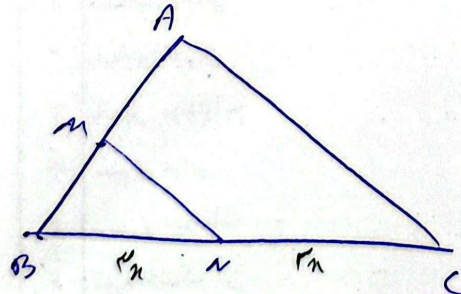


$h^2 = m \times n \Rightarrow h = \sqrt{mn}$

مساحة = 1/2 * BD * AC = 1/2 * h * mn = 1/2 * mn * h = 1/2 * mn * h

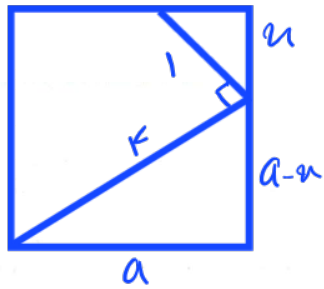
1/2 * mn * h = 1/2 * mn * h = 1/2 * mn * h

$\frac{1/2 * mn * h}{1/2 * mn * h} = 1$



$\frac{S_{BMN}}{S_{ABC}} = \frac{BM \times BN}{BA \times BC} = \frac{BM}{BA} \times \frac{BN}{BC} = \frac{1}{4} \Rightarrow \frac{BM}{BA} = \frac{1}{2}$

$\frac{BM}{AM} = \frac{1}{1} = 1$



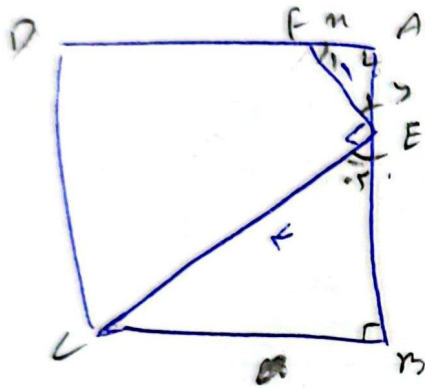
$$\frac{y}{a-u} = \frac{y}{a} = \frac{1}{K} \rightarrow \begin{cases} a - u = Ky \\ a - u = Ky \end{cases}$$

$$Ky - u = Ky \rightarrow u = \frac{Ky}{K}$$

$$S_{\square} = a^2 = \frac{y^2}{K^2}$$

$$K^2 = (a-u)^2 + u^2 \rightarrow u = \frac{Ky}{K}, a = \frac{14}{K}$$

نیز، $u = \frac{Ky}{K}$



$$\begin{aligned} \hat{F}_1 + \hat{E}_1 &= 90^\circ \\ \hat{E}_1 + \hat{E}_2 &= 90^\circ \end{aligned} \Rightarrow \hat{F}_1 = \hat{E}_2$$

$$\hat{F}_1 = \hat{E}_2 \rightarrow \triangle AEF \sim \triangle BCE$$

$$\triangle AEF \sim \triangle BCE$$

(10)

$$\frac{u}{a-u} = \frac{y}{a} = \frac{1}{K} \Rightarrow u = \frac{a}{2}$$

$$m = \frac{Ky}{14}$$

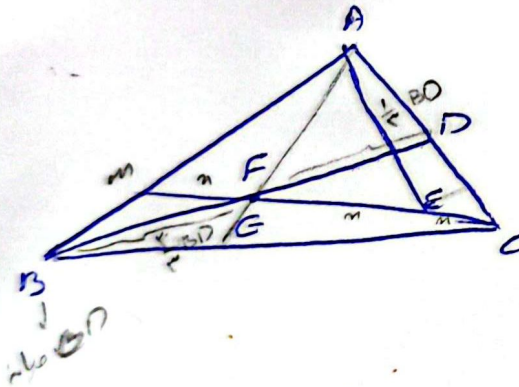
$$\Rightarrow m^2 + u^2 = 1 \Rightarrow a = \frac{14}{K} = \frac{14}{K}$$

$$\frac{40}{14^2} + \frac{a^2}{14^2} = \frac{100}{14^2} = 1$$

$$GE = EC$$

$$\frac{BD}{FD} = ?$$

پس $\frac{BD}{FD} = ?$ $\rightarrow$ $\frac{BD}{FD} = ?$



$$\frac{r}{m} = \frac{r}{n} \rightarrow m = n$$

$$FD = \frac{1}{K} BD$$

$$\rightarrow \frac{BD}{\frac{1}{K} BD} = K$$

$$BG = Ky, GD = y \rightarrow BD = \frac{Ky}{K}$$

$$\left. \begin{aligned} GF &= \frac{Ky}{K} \\ FD &= \frac{1}{K} y \end{aligned} \right\} \rightarrow \frac{BD}{FD} = \frac{\frac{Ky}{K}}{\frac{1}{K} y} = 9$$