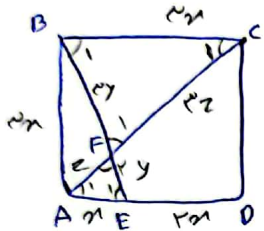


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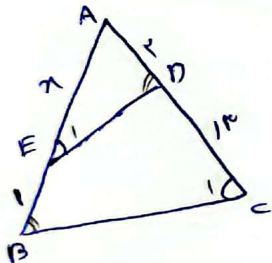
$ED \parallel AE$
 $\frac{EF}{AF} = \frac{y}{x}$

$BC \parallel AD \Rightarrow \begin{cases} \hat{B} = \hat{E} \\ \hat{A} = \hat{C} \end{cases} \Rightarrow \triangle AEF \sim \triangle CEF \Rightarrow \frac{BF}{FE} = \frac{CF}{AF} = \frac{CB}{EA} = \frac{n}{x}$

$\triangle ABC \Rightarrow AC = x + z \Rightarrow (BC)^2 + (AB)^2 = (AC)^2$
 $9n^2 + 9x^2 = (x+z)^2 \Rightarrow z^2 = 10x^2$

$\triangle ADE \Rightarrow DE = y + v \Rightarrow (AE)^2 + (AD)^2 = (DE)^2 \Rightarrow y^2 = 10x^2$

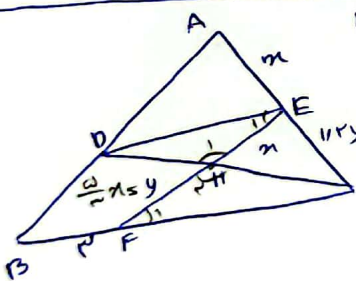
$\frac{y}{x} = \frac{EF}{AF} = \frac{y}{x} \leq \frac{y}{2} \sqrt{\frac{10}{x}}$



$\triangle AED \sim \triangle ACB$
 $(x \leq ?) \Delta$

$\hat{A} = \hat{A} \Rightarrow \triangle AED \sim \triangle ACB \Rightarrow \frac{x}{x+m} = \frac{y}{n} \Rightarrow n^2 + m^2 \leq m^2$

$n^2 + m^2 \leq m^2 \Rightarrow (m+n)(m-n) \leq 0 \Rightarrow n \leq m$



$BF = m$
 $CF = n \Rightarrow y = \frac{n}{m}x$
 $DE \parallel BC$
 $BC = ?$
 $\frac{1}{2} \times \frac{n}{m}x = m$

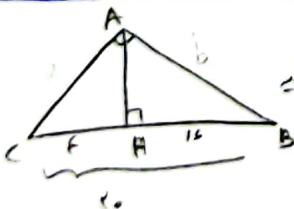
H is H'
 $DE \parallel BC \Rightarrow DE \parallel FC \Rightarrow E$ is F

$DE \parallel BC \Rightarrow DE \parallel FC \Rightarrow E$ is F

$\frac{DE}{FC} = \frac{x}{n} \Rightarrow \frac{DE}{FC} = \frac{x}{n} = \frac{m}{n} = \frac{1}{2}$

$DE \parallel BC \Rightarrow \frac{DE}{BC} = \frac{AE}{AC} \Rightarrow \frac{DE}{BF+FC} = \frac{x}{m+n} = \frac{1}{2} \Rightarrow \frac{m}{m+n} = \frac{1}{2} \Rightarrow m = n$

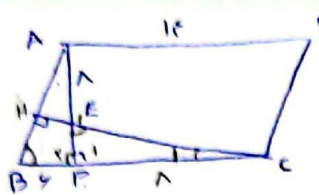
$m + FC = \frac{1}{2}FC \Rightarrow \frac{1}{2}FC = m \Rightarrow FC = \frac{2}{1}m \Rightarrow BC = BF + FC = m + 2m = 3m$



طبق روابط طولی
در مثلث قائم الزاویه

$AC^2 = CH \times CB$
 $AB^2 = BH \times CB$

$\frac{AB^2}{AC^2} = \frac{BH \times CB}{CH \times CB} = \frac{BH}{CH} = \frac{c^2}{b^2} = \frac{1}{2} \Rightarrow \frac{AB}{AC} = \frac{1}{\sqrt{2}}$



$$AF \leq ? \Rightarrow AF \leq EF + AE \leq F + A \leq 12$$

$$ABCD \Rightarrow AD \leq BC \leq 12$$

$$12, BC \leq BF + FC \Rightarrow FC \leq 12$$

$$\triangle HEC \Rightarrow \hat{E} + \hat{B} \leq 90^\circ$$

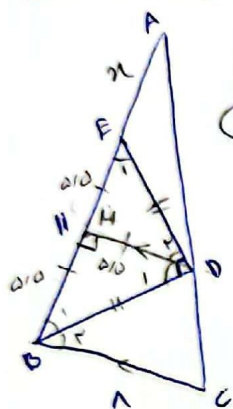
$$\triangle FEC \Rightarrow \hat{E}_1 + \hat{C}_1 \leq 90^\circ$$

$$\hat{F}_1 \leq \hat{F} \leq 90^\circ$$

$$\hat{B} \leq \hat{E}_1$$

$$\Rightarrow \triangle ABF \sim \triangle CFE \Rightarrow \frac{EF}{F} \leq \frac{A}{AEF} \Rightarrow (EF)^2 + AEF \leq FA$$

$$\begin{aligned} EF \leq 12 \\ n^2 + 12n - FA \leq 0 \\ (n+12)(n-F) \leq 0 \end{aligned} \Rightarrow \begin{aligned} n \leq 12 \\ n \leq F \end{aligned}$$



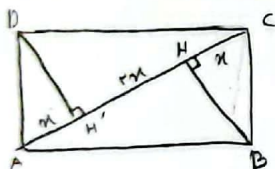
$$\begin{aligned} BD \parallel AC &\Rightarrow \hat{D}_1 \leq \hat{B}_1 \} \hat{D}_1 \leq \hat{B}_1 \text{ (I)} \\ BH \parallel BC &\Rightarrow \hat{D}_1 \leq \hat{B}_1 \end{aligned}$$

$$AE \leq EF \leq 12$$

$$\triangle HD \Rightarrow \hat{B}_1 + \hat{D}_1 \leq 90^\circ \Rightarrow \hat{B}_1 \leq 90^\circ \Rightarrow \hat{B}_1 \leq \hat{D}_1 \leq 90^\circ$$

$$\begin{aligned} \hat{D}_1 + \hat{D}_2 \leq 90^\circ &\Rightarrow \hat{D}_2 \leq 90^\circ \\ \triangle BDE &\Rightarrow \hat{E}_1 + \hat{B}_1 \leq 90^\circ \Rightarrow \hat{E}_1 \leq 90^\circ \end{aligned}$$

$$\begin{aligned} HD \parallel BC &\Rightarrow \frac{n + 0.5}{0.11 + n} \leq \frac{0.5}{n} \Rightarrow \frac{n + 0.5}{0.5} \leq \frac{0.5}{0.1} \Rightarrow \frac{n}{0.5} \leq \frac{0.5}{0.1} \Rightarrow n \leq \frac{0.5}{0.1} = 5 \end{aligned}$$



$$S_{ABC} \leq \frac{BC \times AB}{2}$$

$$S_{ADC} \leq \frac{AD \times DC}{2}$$

$$ABCD \Rightarrow BC \leq AD, DC \leq AB$$

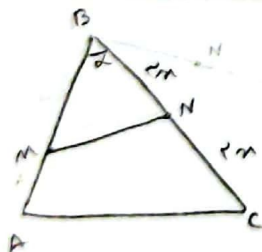
$$S_{ADC} \leq S_{ABC}$$

$$S_{ABCD} \leq S_{ADC} + S_{ABC} \Rightarrow S_{ABCD} \leq 2S_{ABC} \text{ (I)}$$

$$S_{ABC} \leq \frac{BH \times AC}{2}$$

$$S_{BHC} \leq \frac{BH \times CH}{2}$$

$$\frac{S_{ABC}}{S_{BHC}} \leq \frac{AC}{CH} = \frac{n + n + 2x}{n} = F \Rightarrow \frac{S_{ABCD}}{S_{BHC}} = \frac{2S_{ABC}}{S_{BHC}} \leq F$$



$$\angle B \leq \angle C$$

$$S_{ABC} \leq S_{BMN} \rightarrow \frac{1}{2} BC \times AB \sin \alpha \leq \frac{1}{2} BM \times BN \sin \alpha$$

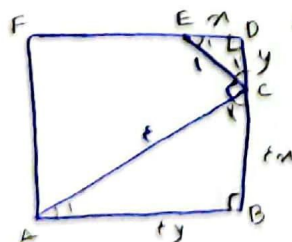
$$\frac{BM}{AM} \leq \frac{d}{f}$$

$$\frac{BC \times AB}{2} \leq \frac{BM \times BN}{2} \Rightarrow \angle AB \leq \angle BM$$

$$\frac{BM}{AB} \leq \frac{d}{f}$$

$$\frac{BM}{AM} \leq \frac{d}{f}$$

$$\frac{BM}{AM + MB} \leq \frac{d}{f} \Rightarrow \frac{BM}{f} \leq \frac{d}{f}$$



$$\hat{C}_1 + \hat{C}_2 \leq 90^\circ$$

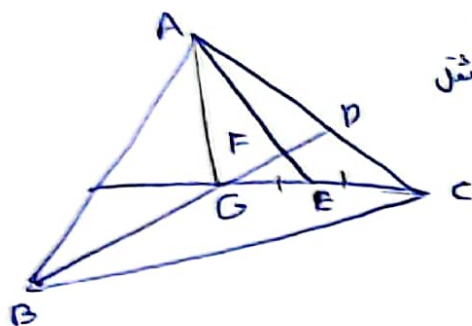
$$\hat{A}_1 + \hat{E}_1 \leq 90^\circ \Rightarrow \hat{E}_1 \leq \hat{C}_1$$

$$\triangle FDB \Rightarrow \hat{B} \leq \hat{D} \leq 90^\circ$$

$$\triangle CDE \Rightarrow n^2 + y^2 \leq 1$$

$$\triangle FDB \Rightarrow AB \leq BD \Rightarrow Fy \leq Fx + y \Rightarrow y \leq \frac{F}{F} x$$

$$S_{FDB} = (Fy)^2 + 16y^2 = 16 \times \frac{16}{16} = 16$$



$GE \leq EC$
مرکز ثقل G

$$\frac{ED}{FD} \leq ?$$

$\triangle AGC \Rightarrow GE = EC \Rightarrow AE$ میان خط
مثلاً (I)

$\Rightarrow$ محل برخورد میان خط مرکز ثقل $\Rightarrow$ $\triangle ABC \Rightarrow BD \Rightarrow AD \leq DC \Rightarrow GD$ در مثلث $\triangle AGC$ میان خط است (II)

(I), (II) $\Rightarrow$ مرکز ثقل مثلث F است $\triangle AGC$ $\Rightarrow$

$$\frac{GF}{FD} \leq \frac{2}{1}$$

ترکیب
مخرج در صورت

$$\frac{GF+GD}{FD} = \frac{3}{1} \quad (3)$$

$\triangle ADC$ مرکز ثقل مثلث است G

$$\Rightarrow \frac{BG}{GD} = \frac{2}{1} \Rightarrow$$
 ترکیب مخرج در صورت

$$\frac{BG+GD}{GD} = \frac{3}{1} \quad (4)$$

$$(3), (4) \Rightarrow \frac{GD}{FD} \times \frac{BD}{GD} = 3 \times 3 \Rightarrow 9 \Rightarrow \frac{BD}{FD}$$