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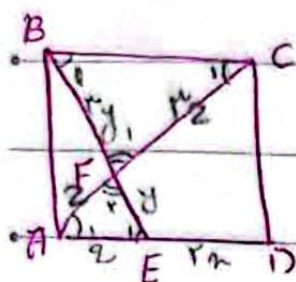
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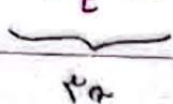
11/10

A ...



$$\left. \begin{array}{l} \hat{F}_1 = \hat{F}_2 \\ \hat{B}_1 = \hat{E} \\ \hat{C}_1 = \hat{A} \end{array} \right\} \triangle BFC \sim \triangle AFE \rightarrow \frac{BC}{AE} = \frac{CF}{AF} = \frac{BF}{EF} = k$$

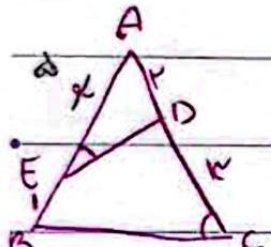
$$\Rightarrow CF = k \cdot AF, BF = k \cdot EF$$



$$AC^2 = 9a^2 + 9a^2 = 18a^2 \quad (2 \Rightarrow 2 = \frac{18a^2}{a^2})$$

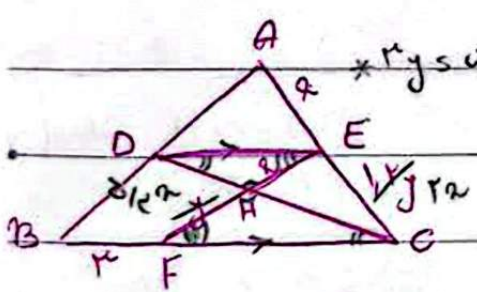
$$BE^2 = 9a^2 + 2^2 = 17a^2 \Rightarrow y = \sqrt{17}a$$

$$\frac{EF}{AF} = \frac{y}{2} = \frac{\sqrt{17}a}{2} = \frac{10}{11}$$



$$\left. \begin{array}{l} \hat{AED} = \hat{ACB} \\ \hat{A} = \hat{A} \end{array} \right\} \triangle AED \sim \triangle ACB \rightarrow \frac{AE}{AC} = \frac{ED}{CB} = \frac{AD}{AB} = k$$

$$\frac{2}{10} = \frac{y}{2+1} \rightarrow 2^2 + 2 - y^2 = 0 \Rightarrow y = 4x$$



$$DE \parallel BC \Rightarrow \frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC} = \frac{2}{10} = \frac{DE}{k+FC}$$

$$\left. \begin{array}{l} \hat{E} = \hat{E} \\ \hat{D} = \hat{C} \end{array} \right\} \triangle DHE \sim \triangle CHF \rightarrow \frac{FH}{EH} = \frac{FC}{DE} = \frac{1}{k} \Rightarrow FC = \frac{1}{k} DE$$

$$\Rightarrow \frac{1}{k} = \frac{FC}{k+FC} \rightarrow \frac{1}{k} (k+FC) = FC \Rightarrow 1 + \frac{FC}{k} = FC \Rightarrow FC = \frac{10}{9}$$

$$BC = k + \frac{10}{9} = \frac{10}{9}$$





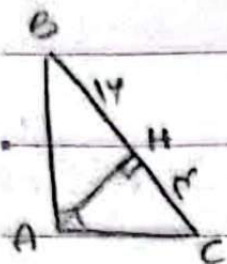
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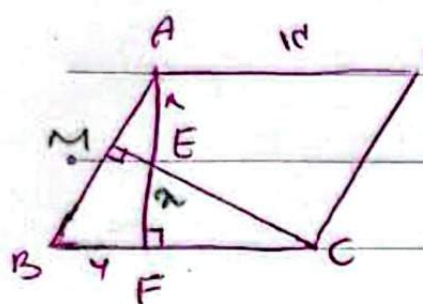
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$$AB = \sqrt{BH \times BC} = \sqrt{14 \times y} = \sqrt{14y} \rightarrow \frac{AB}{AC} = \sqrt{\frac{y}{x+y}}$$

$$AC = \sqrt{CH \times BC} = \sqrt{y \times (x+y)} = \sqrt{y(x+y)}$$

(12)



$$\left. \begin{array}{l} \angle B = \angle D \\ \angle F = \angle E = 90^\circ \end{array} \right\} \triangle AFB \sim \triangle CDE \rightarrow \frac{AB}{BC} = \frac{BF}{FC} = \frac{AF}{CE}$$

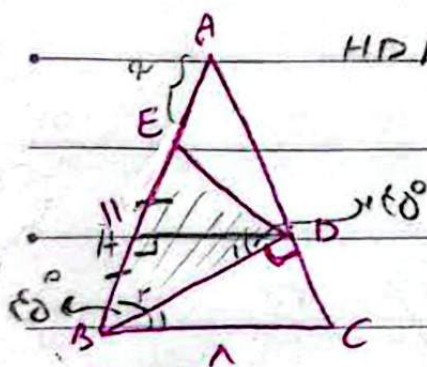
$$\rightarrow \frac{y}{x} = \frac{z}{w} \rightarrow \frac{y}{x} = \frac{z}{w} \rightarrow \frac{y}{x} = \frac{z}{w} \rightarrow \frac{y}{x} = \frac{z}{w}$$

(13)

$$\left. \begin{array}{l} \angle C = \angle E \\ \angle F = \angle M = 90^\circ \end{array} \right\} \triangle EFC \sim \triangle BMC \rightarrow \frac{BC}{EC} = \frac{BM}{FE} = \frac{MC}{FC} \rightarrow \frac{MC}{x} = \frac{BM}{y}$$

(14)

$$\frac{y}{x} = \frac{z}{w} \rightarrow z^2 + w^2 = x^2 + y^2 \rightarrow z^2 + w^2 = x^2 + y^2$$



$$HD \parallel BC \rightarrow \angle D_1 = \angle B_1 \rightarrow \angle B_1 H = \angle D_1 H$$

$$\angle B_1 D_1 = \angle B_1 \rightarrow \angle B_1 = \angle B_1 \rightarrow \angle B_1 = \angle B_1$$

(15)

$$\triangle EHB \sim \triangle DHC \rightarrow \frac{EH}{DH} = \frac{BH}{CH} \rightarrow \frac{EH}{DH} = \frac{BH}{CH}$$

(16)

$$HD \parallel BC \rightarrow \frac{AH}{AB} = \frac{HD}{BC} \rightarrow \frac{z}{x+y} = \frac{w}{x+y} \rightarrow \frac{z}{x+y} = \frac{w}{x+y}$$

$$BC = \sqrt{BN \times BD} = \sqrt{y \times x} = \sqrt{xy}$$

$$AC = \sqrt{AN \times AD} = \sqrt{z \times w} = \sqrt{zw}$$

$$\frac{S_{ABCD}}{S_{BNC}} = \frac{y \times x \times \sqrt{xy}}{y \times x \times \sqrt{zw}} = \frac{\sqrt{xy}}{\sqrt{zw}}$$

(17)



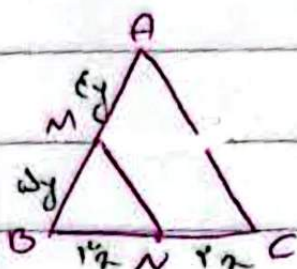
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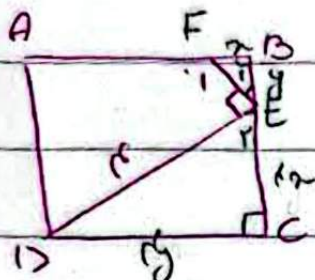


$$\frac{S_{\triangle ABC}}{S_{\triangle AMN}} = \frac{BC \times BA \times \sin B}{MN \times BM \times \sin B} = 10 \Rightarrow \frac{BA}{BM} = 10$$

$$\frac{BM}{AM} = \frac{dy}{by} = \frac{1}{9}$$

(1)

(5)



$$E_1, E_2, 90^\circ \Rightarrow \angle E_1 = \angle E_2 = 90^\circ$$

(19)

$$\angle FEB: \hat{F} + \hat{B} + E_1 = 180^\circ \Rightarrow \hat{F} + 90^\circ - \hat{E}_1 = 90^\circ \Rightarrow \hat{F} = \hat{E}_1$$

$$\angle DEC: \hat{D} + \hat{C} + E_2 = 180^\circ \Rightarrow \hat{D} + 90^\circ - E_2 = 90^\circ \Rightarrow \hat{D} = E_2$$

$$\left. \begin{array}{l} \textcircled{1} \\ \textcircled{2} \end{array} \right\} \angle BFE \sim \angle CDE \Rightarrow \frac{BF}{DE} = \frac{BF}{CE} = \frac{BF}{CD} \Rightarrow \angle BFE \sim \angle CDE$$

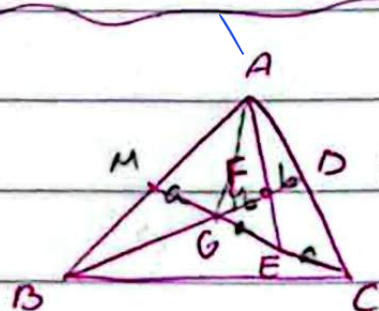
(5)

$$ABCD \text{ مربع: } BC \parallel DC \Rightarrow y, \angle 2 \text{ و } \angle 3 \Rightarrow \angle 2 = \angle 3$$

$$\triangle DCE: DE^2 = CE^2 + CD^2 \Rightarrow 14^2 = 9y^2 + 14y^2 \Rightarrow 25y^2 = 14 \Rightarrow y = \frac{\sqrt{14}}{5}$$

$$\Rightarrow DC \text{ و } y = \frac{14}{5}$$

$$S: \left(\frac{14}{5} \right)^2 = \frac{254}{25} = 10.16$$



(1) مرکز ثقل: محل برخورد میانه ها

(5)

میانه ها به نسبت 2/1 یکدیگر را تقاطع می کنند

$$2FD = BF = 2b \Rightarrow AG \text{ میانه } AC \text{ نسبت } 2/1$$

$$2b = 2GD \Rightarrow y \Rightarrow AG \text{ میانه } AC \text{ نسبت } 2/1$$

$$\frac{BD}{FD} = \frac{y}{b} = 2$$

$$BG = 2y, GD = y \Rightarrow BD = 3y$$

$$\left\{ \begin{array}{l} GF = \frac{2y}{3} \\ FD = \frac{1y}{3} \end{array} \right\} \Rightarrow \frac{BD}{FD} = \frac{3y}{\frac{1y}{3}} = 9$$

