

$$ED = r_n - AE \Rightarrow AE = x, AD = r_n \Rightarrow AC = \sqrt{2} r_n$$

$$\frac{EF}{AF} = ?$$

$$AF = \frac{1}{\sqrt{2}} AC \Rightarrow AF = \frac{\sqrt{2}}{2} r_n$$

$$FE = \frac{1}{\sqrt{2}} BE \Rightarrow FE = \frac{\sqrt{2}}{2} (r_n - x)$$

$$BE = \sqrt{10} x$$

$$\frac{FE}{AF} = \frac{\frac{\sqrt{2}}{2} (r_n - x)}{\frac{\sqrt{2}}{2} r_n} = \frac{r_n - x}{r_n}$$

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$$2 - \hat{A}ED = \hat{A}CB \rightarrow \hat{A} = \hat{A}' \Rightarrow \triangle ADE \sim \triangle ABC \Rightarrow \frac{AD}{AB} = \frac{AE}{AC} = \frac{ED}{BC}$$

$$\rightarrow \frac{r}{1+n} = \frac{n}{10} \Rightarrow n^2 + n - 10 = 0 \Rightarrow (n-2)(n+5) = 0 \Rightarrow \begin{cases} n=2 \\ n=-5 \end{cases}$$

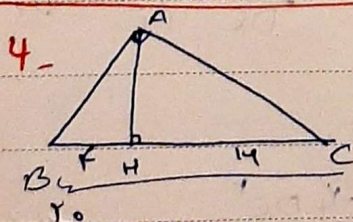
$$3 - DE \parallel BC \Rightarrow \frac{AE}{AC} = \frac{AD}{AB} = \frac{DE}{BC} \quad (1)$$

$$DE \parallel BC, DC \Rightarrow \hat{EDC} = \hat{FCD} \quad \left. \begin{array}{l} \hat{H} = \hat{H} \end{array} \right\} \Rightarrow \triangle DEH \sim \triangle FHC \Rightarrow \frac{EH}{FH} = \frac{DH}{CH} = \frac{DE}{FC} \Rightarrow \frac{x}{y} = \frac{a}{r}$$

$$ry = an \Rightarrow y = \frac{a}{r} n \Rightarrow EC = r_n \Rightarrow (1) \rightarrow \frac{n}{r_n} = \frac{DE}{r+FC} \Rightarrow rDE = r+FC \quad (1')$$

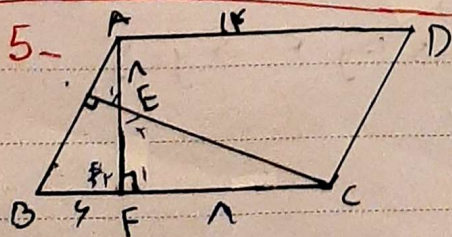
$$(2) \rightarrow \frac{DE}{FC} = \frac{a}{r} \Rightarrow rDE = aFC \quad (2')$$

$$(1') (2') \Rightarrow \frac{r+FC}{r} = \frac{aFC}{r} \Rightarrow 1 \cdot FC = a + rFC \Rightarrow FC = \frac{a}{1-r} \Rightarrow BC = \frac{r}{1-r}$$



$$AH = r = r_0 + r_1 \rightarrow AH = r_0 + r_1$$

$$\frac{AC}{AB} = \frac{r_1}{r_0} \Rightarrow \frac{AB}{AC} = \frac{\sqrt{r_0 r_1}}{\sqrt{r_0 r_1}} = \frac{1}{r}$$

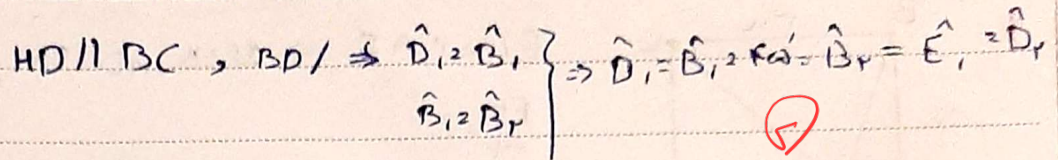


$$\hat{E}_1 = \hat{E}_2 = \hat{B} \Rightarrow \triangle ABF \sim \triangle CEF$$

$$\frac{CF}{AF} = \frac{EF}{BF} = \frac{CE}{AB}$$

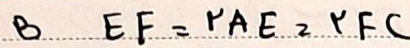
$$\Rightarrow \frac{r}{r+EF} = \frac{EF}{r}$$

$$\rightarrow EF^2 + rEF - r^2 = 0 \rightarrow (EF - r)(EF + r) = 0 \Rightarrow EF = r$$



$$\rightarrow HD \parallel BC \Rightarrow \frac{AH}{AB} = \frac{HD}{BC} = \frac{AD}{AC} \Rightarrow \frac{AE + \frac{1}{2}AD}{AE + AD} = \frac{\frac{11}{2}}{11}$$

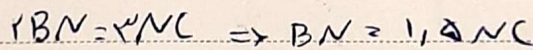
$$2 \omega A E_2 \mu \mu \Rightarrow A E_2 \frac{\mu \mu}{2}$$



$$\left. \begin{array}{l} \hat{B} = 9. \Rightarrow \hat{F}_1 = 9. \\ \hat{C}_1 = \hat{C}_1 \end{array} \right\} \Rightarrow \hat{F}\hat{C}\hat{B}, \hat{A}\hat{E}\hat{D} \sim \hat{A}\hat{B}\hat{C}, \hat{A}\hat{D}\hat{C}$$

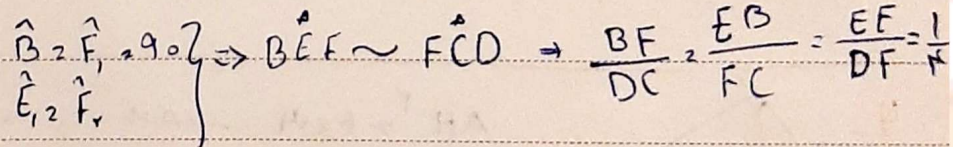
$$\Rightarrow \frac{BC}{AC} = \frac{FC}{BC} = \frac{BF}{AB} \Rightarrow \frac{BC}{FC} = \frac{AB}{BC} \Rightarrow BC^2 = FC \cdot AB$$

$$\text{نسبت} = \left(\frac{S_{ABC}}{S_{ABCD}} \right)^2 \Rightarrow \frac{S_{FBC}}{S_{ABC}} = \frac{1}{4} \Rightarrow \frac{S_{FBC}}{S_{ABCD}} = \frac{1}{16} \Rightarrow \text{نسبت برابر 16}$$



$$\Rightarrow \frac{S_{ABC}}{S_{BMN}} = \frac{\frac{1}{2} \times P \times \cancel{AB} \times \sin B}{\frac{1}{2} \times \cancel{AB} \times MB \times \sin B} = \frac{P}{MB} = \frac{MB}{AB} = \frac{2}{9}$$

$$\rightarrow A_M = \frac{1}{4} \Rightarrow \frac{M_B}{A_M} = \frac{2}{1}$$



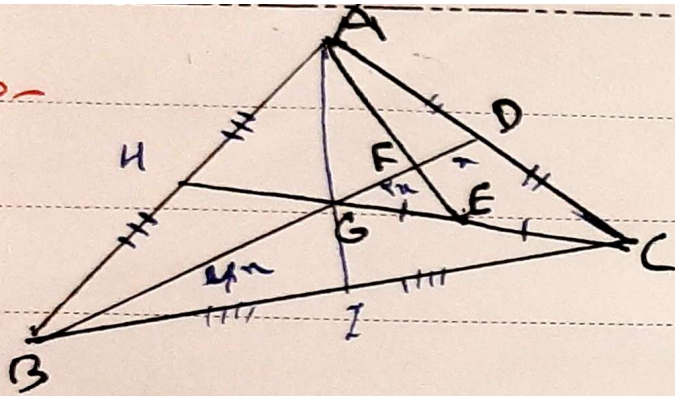
$$FC^2 \times y - y^2 \times y \rightarrow FID = FC^4 + DC^2$$

$$214 = 9y^2 + 14y^2 + 2ay^2 \Rightarrow 2y = F \Rightarrow y = \frac{F}{2}$$

$$\Rightarrow S_{gr} = 14 \text{ g} = 14 \times \frac{14}{100} = 10,14 \text{ g}$$

$$\frac{S_{ABC}}{S_{BMN}} = \frac{\frac{1}{2} \times AB \times BC \times \sin B}{\frac{1}{2} \times BM \times BN \times \sin B} = \mu \quad (1)$$

$$\frac{AB}{BM} = \frac{1}{\omega} \rightarrow \frac{AB - BM}{BM} = \frac{\mu}{\omega} \rightarrow \frac{BM}{AM} = \frac{\omega}{\mu}$$



$$\begin{aligned} \triangle ABC \rightarrow BD, AE \rightarrow \mu &\Rightarrow \frac{FD}{FG} = \frac{1}{\mu} \\ \triangle ABC \rightarrow BD \rightarrow \omega &\Rightarrow \frac{GD}{BG} = \frac{1}{\omega} \end{aligned} \Rightarrow \frac{BF}{FD} = \frac{\mu}{\omega} = 1$$

$$BG = \mu y, GD = y \rightarrow BD = \mu y$$

$$\left\{ \begin{aligned} GF = \frac{\mu y}{\omega} &\rightarrow \frac{BD}{FD} = \frac{\mu y}{\frac{\mu y}{\omega}} = \omega \\ FD = \frac{1}{\omega} y \end{aligned} \right.$$

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

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

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