Subject:
Date

۱۵/
لیلا امری

تکلیف شماره ۲۱

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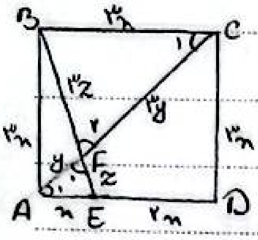

متقابل به رأس $\hat{F}_1 = \hat{F}_2$

$BC \parallel AC$ ، AC / $\longrightarrow \hat{A}_1 = \hat{C}_1$

$\xrightarrow{\text{زز}} \triangle AEF \sim \triangle CBF \Rightarrow \dfrac{AE}{BC} = \dfrac{AF}{CF} = \dfrac{EF}{BF} = \dfrac{1}{3}$ ($AE = x$ ، $BC = 3x$)

$\Rightarrow CF = 3AF \ , \ BF = 3EF$

$\triangle ABD : (3x)^2 + (3x)^2 = (4y)^2 \longrightarrow 3\sqrt{2}\,x = 4y \longrightarrow y = \dfrac{3\sqrt{2}}{4}x$

$\triangle ABE : x^2 + (3x)^2 = (4z)^2 \longrightarrow \sqrt{10}\,x = 4z \longrightarrow z = \dfrac{\sqrt{10}}{4}x$

$\Rightarrow \dfrac{EF}{AF} = \dfrac{\frac{\sqrt{10}}{4}x}{\frac{3\sqrt{2}}{4}x} = \dfrac{\sqrt{5}}{3}$ ($EF = z$ ، $AF = y$)

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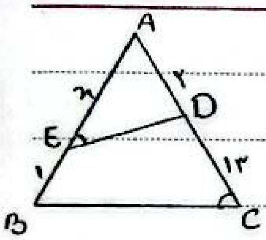

$\hat{E} = \hat{C}$

مشترک $\hat{A} = \hat{A}$

$\xrightarrow{\text{زز}} \triangle AED \sim \triangle ACB \Rightarrow \dfrac{AE}{AC} = \dfrac{AD}{AB} = \dfrac{ED}{BC}$

$\Rightarrow \dfrac{2}{x+1} = \dfrac{x}{15} \Rightarrow 30 = x^2 + x = x(x+1) \longrightarrow x = 5$

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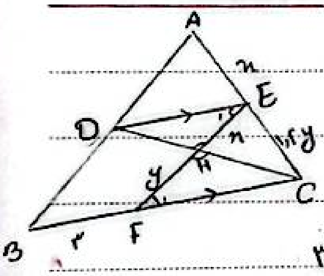

$ED \parallel BC$ ، EF / $\longrightarrow \hat{E}_1 = \hat{F}_1$

متقابل به رأس $\hat{H}_1 = \hat{H}_2$

$\xrightarrow{\text{زز}} \triangle HED \sim \triangle HFC \longrightarrow \dfrac{HE}{HF} = \dfrac{HD}{HC} = \dfrac{ED}{FC}$ (1) ($HE = x$ ، $HF = y$)

$3y = 5x \longrightarrow x = 0.6y \qquad \overset{(1)}{\Rightarrow} \dfrac{ED}{FC} = \dfrac{0.6y}{y} = 0.6 \longrightarrow DE = 0.6FC \ \star$

$ED \parallel BC \Rightarrow \triangle ABC \sim \triangle ADE \Rightarrow \dfrac{AE}{AC} = \dfrac{DE}{BC} \xrightarrow{\frac{1}{3}} \dfrac{0.6y}{0.6y + 1.2y} = \dfrac{DE}{BC} \overset{\star}{\Rightarrow} \dfrac{0.6FC}{BC} = \dfrac{1}{3} \rightarrow BC = 1.8FC$

$\Rightarrow BC = 3 + FC = 1.8FC \Rightarrow \dfrac{4}{5}FC = 3 \Rightarrow FC = \dfrac{15}{4} = 3.75 \longrightarrow BC = 3 + 3.75 = \underline{6.75}$

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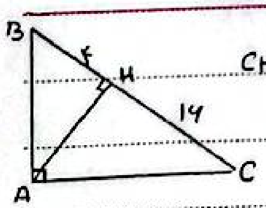


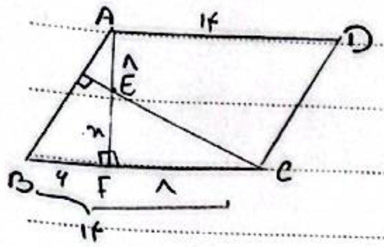
$CH = 20 - 4 = 16$

$\dfrac{AC}{AB} = \dfrac{16 \times 20}{4 \times 20} = \underline{4}$

$AB = BH \times BC$

$AC = CH \times BC$

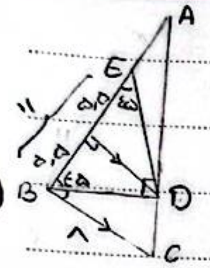
PAPCO



$$\overset{\triangle}{BAF} \sim \overset{\triangle}{ECF} \Rightarrow \frac{BF}{EF} = \frac{AF}{CF} \Rightarrow \frac{6}{x} = \frac{x+8}{8}$$ -5

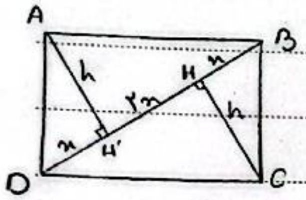
$$\Rightarrow x^2 + 8x = 48 \Rightarrow x^2 + 8x - 48 = 0 \Rightarrow (x-4)(x+12) = 0$$

$$x = 4 \longrightarrow AF = 12$$



$$\overset{\triangle}{AHD} \sim \overset{\triangle}{ABC} \Rightarrow \frac{AH}{AB} = \frac{HD}{BC} \Rightarrow \frac{5.5}{8} = \frac{5.5 + AE}{11 + AE} \Rightarrow$$ -6

$$44 + 8AE = 5.5AE + 60.5 \longrightarrow 2.5AE = 16.5 \Rightarrow AE = 6.6$$



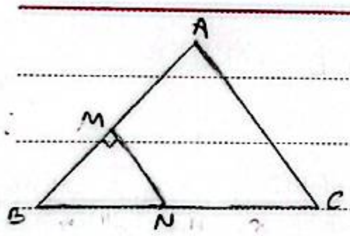
$$AH'^2 = DH' \times BH' \Rightarrow h^2 = x \times 3x \longrightarrow h = x\sqrt{3}$$ -7

$$S_{ABCD} = S_{ABD} + S_{BCD} = 2S_{ABD} = 2 \times \frac{1}{2} \times \sqrt{3}x \times 4x = 4\sqrt{3}x^2$$

$$S_{BHC} = S_{ADH'} = \frac{h \times x}{2} = \frac{\sqrt{3}x^2}{2}$$

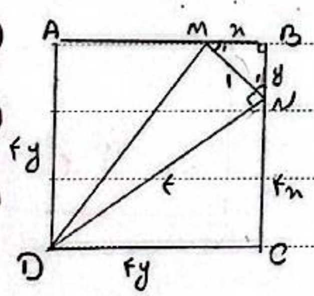
$$\Rightarrow \frac{S_{ABCD}}{S_{BHC}} = \frac{4\sqrt{3}x^2}{\frac{\sqrt{3}x^2}{2}} = 8$$

کوچکترین ←



$$3S_{BMN} = S_{ABC} \longrightarrow \frac{S_{BNM}}{S_{ABC}} = \frac{BM \times BN}{BA \times BC} = \frac{BM}{AB} \times \frac{3}{5} = \frac{1}{3}$$ -8

$$\Rightarrow \frac{BM}{AB} = \frac{5}{9} \Rightarrow \frac{BM}{AM} = \frac{5}{4} = 1.25$$

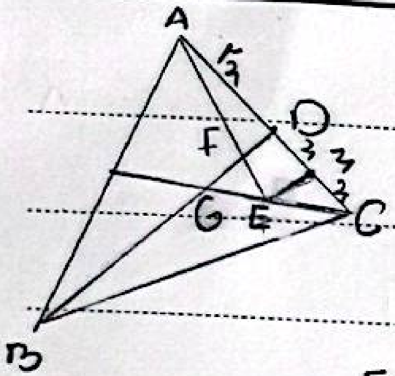


$$BC = y + 4x = 4y \Rightarrow x = \frac{3}{4}y \qquad AM = 4y - x = \frac{13}{4}y$$ -9

$$\left.\begin{array}{l} 90 + \hat{M}_1 = 90 + \hat{N}_1 \Rightarrow \hat{M}_1 = \hat{N}_1 \\ 90 = \hat{B} = \hat{C} \end{array}\right\} \longrightarrow \overset{\triangle}{MBN} \sim \overset{\triangle}{DCN}$$

$$\Rightarrow \frac{MN}{DN} = \frac{MB}{NC} = \frac{BN}{DC} = \frac{1}{4} \Rightarrow 17 = \left(\frac{13}{4}y\right)^2 + (4y^2) \Rightarrow y = 0.8$$

$$CD = 4 \times 0.8 = 3.2 \longrightarrow S = 3.2 \times 3.2 = 10.24$$



۱۰- از E به M وصل می‌کنیم

$$EM \parallel GD \longrightarrow \frac{EC}{EG} = \frac{CM}{DM} = 1 \Rightarrow CM = DM$$

$$FD \parallel EM \longrightarrow \frac{AD}{AM} = \frac{FD}{EM} = \frac{2x}{3x} \Rightarrow EM = \frac{3}{2}FD$$

$$EM \parallel DG \longrightarrow \frac{CM}{CD} = \frac{EM}{GD} = \frac{x}{2x} \Rightarrow GD = 2EM = 2 \times \frac{3}{2}FD = 3FD$$

$$\frac{GD}{BD} = \frac{1}{3} \Rightarrow \frac{3FD}{BD} = \frac{1}{3} \Rightarrow \frac{BD}{FD} = \underline{9}$$