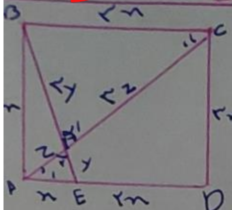
۱۲   ۲۱   شمارهٔ تکلیف ۸   یازدهم تجربی ۸   یاسین وسیرزاده

(1) ۲



$BC \parallel AD$, AC مورب $\Rightarrow C_1 = A_1$, $F_1 = F_2$ } دو زاویه $\Rightarrow B\hat{C}F \sim A\hat{F}E \Rightarrow \frac{AE}{BC} = \frac{FE}{FB} = \frac{FA}{FC}$

در مثلث قائم $A\hat{B}E$: $9x^2 + x^2 = 16y^2$

در مثلث قائم $A\hat{E}D$: $9x^2 + 9x^2 = 16z^2 \Rightarrow \frac{y^2}{z^2} = \frac{10}{18} \Rightarrow \frac{EF}{AF} = \frac{y}{z} = \frac{\sqrt{5}}{3}$ ✓

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(2) ۲

$A\hat{E}D = A\hat{C}B$, مشترک $\hat{A} = \hat{A}$ } بنا به دو زاویه $\Rightarrow A\hat{E}D \sim A\hat{B}C \Rightarrow \frac{3}{x} = \frac{x+1}{3+13} \Rightarrow x^2 + x - 30 = 0$ → $x = -6$ ✗ غ ق ق ، $x = 5$ ✓ ← جواب

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(3) ۱,۵

(۱) $\hat{H}_1 = \hat{H}_2$ $3y = 5x \Rightarrow y = 0/6x$

$DE \parallel FC$ و EF مورب $\Rightarrow E = F$ } دو زاویه $\Rightarrow D\hat{E}H \sim F\hat{H}C \Rightarrow \frac{DE}{FC} = \frac{x}{y} \xrightarrow{3y = 5x} \frac{DE}{FC} = 0/6 \Rightarrow FC$

(۲) طبق تالس در $A\hat{B}C$: $DE \parallel BC \Rightarrow \frac{AE}{AC} = \frac{DE}{BC}$ ($BC = BF + FC$) $\Rightarrow \frac{0/4y}{7y} = \frac{BF + FC}{DE} = 2 \Rightarrow \frac{10}{6} + \frac{BF}{DE} = 2 \Rightarrow DE = 9 \Rightarrow FC = 15 \Rightarrow BC = 3 + 15 = 18$

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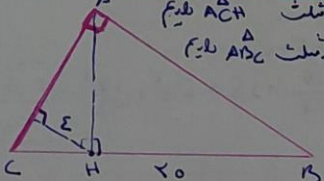
(4) ۰,۵



در مثلث قائم $A\hat{C}H$: $AH^2 + CH^2 = AC^2$

در مثلث قائم $A\hat{B}C$: $AH \times CB = AC \times AB$

$AB^2 + AC^2 = CB^2$

✓ $AC^2 = CH \times 20$

$(AB)^2 = BH \times BC = 80$

$(AC)^2 = CH \times BC = 320$

$\frac{AB}{AC} = \boxed{\frac{1}{2}}$

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(5) ۰

$C\hat{E}F \sim A\hat{B}F$

روبه‌رو α → $\frac{x}{4} = \frac{8}{x+8}$ روبه‌رو β

→ $\boxed{x = 4}$ $AF = x + 8 = \boxed{12}$

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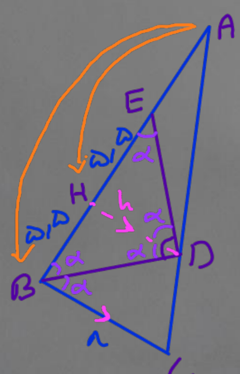
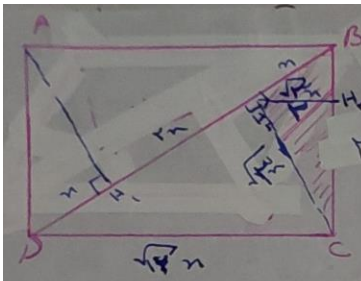
(6) ۰



$h^2 = 5,5 \times 5,5 \to \boxed{h = 5,5}$

تالس $= \frac{x + 5,5}{11 + x} = \frac{5,5}{8} \to \boxed{x = \frac{33}{5}}$



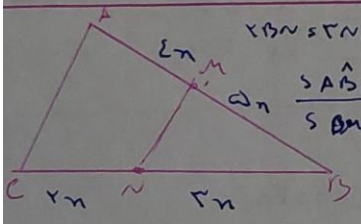
$CH_1^2 = BH_1 \times DH_1 \Rightarrow x \times 3x = 3 \Rightarrow CH_1 = \sqrt{3}x$

$BC^2 = BH_1 \times BD = x \times 3x = 3 \Rightarrow BC = 2x$

$x \times \sqrt{3}x = 2x \times H_1H_2 \Rightarrow H_1H_2 = \frac{\sqrt{3}x}{2}$

$DC^2 = DH_1^2 + CH_1^2 = (3x)^2 + (\sqrt{3}x)^2 \Rightarrow DC = \sqrt{12}x$

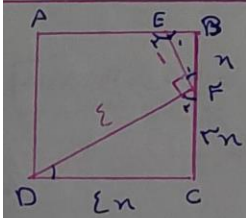
$\Rightarrow \frac{S_{ABCD}}{S_{DBC}} = \frac{2 \times \sqrt{12}x}{\frac{1}{2} \times 2 \times \sqrt{3}x} = 4$ ✓



$2BN = 3NC \Rightarrow BN = \frac{3}{2}NC$

$\frac{S_{ABC}}{S_{BMN}} = \frac{AB \times CB \times \frac{1}{2}\sin B}{BM \times \frac{2}{3}BA \times \frac{1}{2}\sin B} = 3 \Rightarrow \frac{AB}{BM} = \frac{9}{5}$

$\Rightarrow \frac{BM}{AM} = \frac{5x}{4x} = 1.25$ ✓



$\hat{E}_1 + \hat{F}_1 = 90^\circ$

$\hat{F}_2 + \hat{F}_1 = 90^\circ$

$\Rightarrow \hat{E}_1 = \hat{F}_2$

$\hat{B} = \hat{C} = 90^\circ$

وزاویه $\Rightarrow \triangle EBF \sim \triangle DFC \Rightarrow \frac{EF}{DF} = \frac{BF}{DC}$

$DC = BC$

$\Rightarrow \frac{1}{4} = \frac{BF}{BC} \Rightarrow BF = x$

$FC = 3x$

$\Rightarrow 15^2 = 12x^2 + 9x^2 = 225x^2 \Rightarrow x = \frac{3}{5}$

$\Rightarrow 4x = \frac{12}{5} \Rightarrow S = DC^2 = \left(\frac{12}{5}\right)^2 = \frac{144}{25}$ ✓

محل برخورد میانه‌ها G ← $BG = 2x$ $GD = x$ → $BD = 3x$

از A به G وصل کنیم، AE و GD میانه‌های مثلث AGC می‌شوند:

$GF = \frac{2}{3}x$

$FD = \frac{1}{3}x$

$\rightarrow \frac{BD}{FD} = \frac{3x}{\frac{1}{3}x} = 9$

۳-

$DE \parallel BC \xrightarrow{\text{جزء به جزء}} \frac{AE}{AC} = \frac{DE}{BC} \rightarrow \frac{۲}{۳} = \frac{DE}{BC} \rightarrow BC = ۳DE$

$۱,۲y = ۲x$

$\hat{D} = \hat{C}$, $\hat{E} = \hat{F}$ $\rightarrow \triangle DHE \sim \triangle CHF \rightarrow \frac{EH}{FH} = \frac{DE}{CF} \rightarrow CF = \frac{۵}{۳} DE$

$y \leftarrow \frac{۵}{۳}x$

$BC = BF + FC \rightarrow ۳DE = ۳ + \frac{۵}{۳} DE \rightarrow ۱DE = \frac{۹}{۴}$ $BC = \boxed{\frac{۲۷}{۴}}$