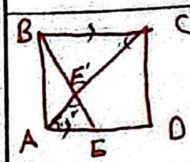
نام و نام خانوادگی ..البینا بابایی.......... **پاسخنامه تشریحی تکلیف شماره** ...۲۱... **کلاس** ...یازدهم ریاضی B...

۱



$ED = ۲AE$ $\quad \frac{EF}{AF} = ?$

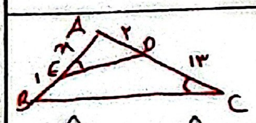
$BC \parallel AE ,\ CA \Rightarrow \hat{A}_1 = \hat{C}_1$ ، $\hat{F}_1 = \hat{F}_2$ متقابل به راس $\Big\} \xrightarrow{زز} \overset{\triangle}{CFB} \sim \overset{\triangle}{AFE} \Rightarrow \frac{CF}{AF} = \frac{CB}{AE} = \frac{FB}{FE}$ (۱)

$\left.\begin{matrix} AD = AE + ED \\ ED = ۲AE \end{matrix}\right\} \Rightarrow AD = ۳AE = CD = BA = BC \xrightarrow{فیثاغورس} AC = ۳\sqrt{۲}\,AE$ (۲)

فیثاغورس $BE = \sqrt{۱۰}\,AE$ (۳)

(۱) $\xrightarrow{\text{تکمیل صورت}} \frac{CA}{AF} = \frac{BE}{FE} \Longrightarrow \frac{FE}{AF} = \frac{BE}{CA} \xrightarrow{(۲),(۳)} \frac{FE}{AF} = \frac{\sqrt{۱۰}\,AE}{۳\sqrt{۲}\,AE} = \frac{\sqrt{۱۰}}{۳\sqrt{۲}} = \frac{۲\sqrt{۵}}{۶} = \boxed{\frac{\sqrt{۵}}{۳}}$

۲



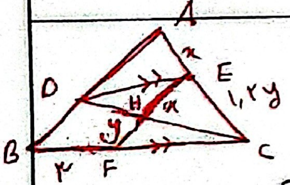
$A\hat{C}B = A\hat{E}D$

$x ?$

$\left.\begin{matrix} A\hat{C}B = A\hat{E}D \\ \hat{A} = \hat{A} \end{matrix}\right\}$ مشترک $\xrightarrow{زز} \overset{\triangle}{AED} \sim \overset{\triangle}{ACB} \longrightarrow \frac{AE}{AC} = \frac{AD}{AB} \xrightarrow{جایگذاری} \frac{x}{۱۵} = \frac{۲}{x+۱}$

$x^۲ + x = ۳۰ \Longrightarrow x^۲ + x - ۳۰ = ۰ \longrightarrow (x-۵)(x+۶) = ۰$ ⟨ $\boxed{۵}$ ، -۶ غ ق ق

۳



$۳y = ۵x \to x = \frac{۳}{۵}y$ (۱)

$BC ?$

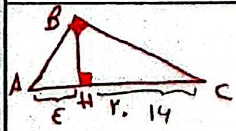
$DE \parallel FC \xrightarrow[\text{برطبق}]{\text{تعمیم تالس}} \frac{DE}{FC} = \frac{EH}{HF} \xrightarrow{EH = x,\ HF = y} \frac{DE}{FC} = \frac{x}{y} \overset{(۱)}{=} \frac{\frac{۳}{۵}y}{y} = \frac{۳}{۵} \Longrightarrow DE = \frac{۳}{۵}FC$

$DE \parallel BC \xrightarrow{\text{تعمیم تالس}} \frac{DE}{BC} = \frac{x}{۱,۲y + x} \Longrightarrow \frac{DE}{۳ + FC} = \frac{\frac{۳}{۵}y}{\frac{۹}{۵}y} = \frac{۱}{۳} \xrightarrow{DE = \frac{۳}{۵}FC} \frac{\frac{۳}{۵}FC}{۳ + FC} = \frac{۱}{۳}$

$\frac{۹}{۵}FC = ۳ + FC \Longrightarrow FC = \frac{۱۵}{۴} \Longrightarrow BC = BF + FC = ۳ + \frac{۱۵}{۴} = \boxed{\frac{۲۷}{۴}}$

$\Rightarrow DE = \frac{۳}{۵}FC$

۴



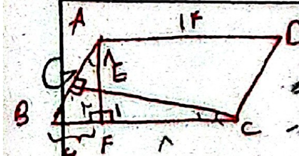
$AB, BC ?$

$AB^۲ = AH \times AC \Longrightarrow AB^۲ = ۴ \times ۲۰ \longrightarrow \boxed{AB = \sqrt{۸۰}}$

$BC^۲ = CH \times AC \Longrightarrow BC^۲ = ۱۶ \times ۲۰ \longrightarrow \boxed{BC = \sqrt{۳۲۰}}$

$\frac{AB}{BC} = \frac{\sqrt{۸۰}}{\sqrt{۳۲۰}} = \frac{۱}{۲}$ / $\frac{BC}{AB} = ۲$

۵



$AF ?$

$\left.\begin{matrix} \overset{\triangle}{ABF} \to \hat{A}_1 = ۹۰ - \hat{B} \\ \overset{\triangle}{CBG} \to \hat{C}_1 = ۹۰ - \hat{B} \end{matrix}\right\} \Rightarrow \left.\begin{matrix} \hat{A}_1 = \hat{C}_1 \\ \hat{F}_1 = \hat{F}_2 = ۹۰ \end{matrix}\right\} \xrightarrow{زز} \overset{\triangle}{CFE} \sim \overset{\triangle}{AFB}$

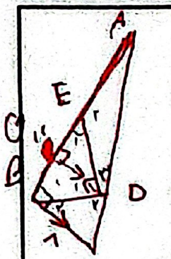
$\longrightarrow \frac{CF}{AF} = \frac{EF}{BF} \xrightarrow{EF = x} \frac{۸}{۸+x} = \frac{x}{۶} \longrightarrow ۸x + x^۲ = ۴۸ \to x^۲ + ۸x - ۴۸ = ۰$

$(x+۱۲)(x-۴)$

$x = -۱۲$ غ ق ق $\quad \boxed{x = ۴}$

$AF = AE + EF = ۸ + ۴ = \boxed{۱۲}$

$\frac{1}{4} = \frac{2}{8}$



$AE?$

$DG \parallel BC$, $AB \perp \rightarrow \hat{G} = \hat{B} = 90^\circ$

$\overset{\triangle}{BDE} \Rightarrow \overset{90}{\hat{D}} + \hat{E} + \overset{45}{\hat{B}_1} = 180 \Longrightarrow \hat{E}_1 = 45^\circ$

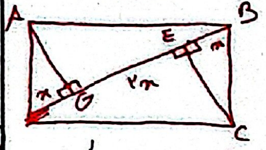
BD نیمساز $\Rightarrow \hat{B}_1 = \hat{B}_2 = 45^\circ$

$\overset{\triangle}{BED}$ متساوی الساقین $\Rightarrow BD = DE$, DG نیمساز $\Rightarrow GE = BG = \frac{11}{2}$, $DG^2 = ED \times BG$ (ارتفاع)

$DG^2 = (\frac{11}{2})^2 \rightarrow DG = \frac{11}{2}$ ۶

$DG \parallel BC \xrightarrow{\text{تعمیم تالس}} \frac{DG}{BC} = \frac{AG}{AB} \xrightarrow[AB = AE + EB]{AG = AE + GE} \frac{DG}{BC} = \frac{AE+GE}{AE+EB}$

جایگذاری $AE = x$: $\frac{\frac{11}{2}}{8} = \frac{x + \frac{11}{2}}{x + 11} \xrightarrow{\text{تفضیل در مخرج}} \frac{\frac{11}{2}}{\frac{5}{2}} = \frac{x + \frac{11}{2}}{\frac{11}{2}} \Longrightarrow 10x + 55 = 121 \rightarrow \boxed{x = 6.6}$

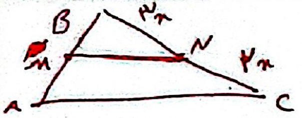


$\left.\begin{array}{l} AD = BC \\ AB = DC \\ \hat{A} = \hat{C} = 90^\circ \end{array}\right\}$ ض ز ض $\rightarrow \overset{\triangle}{ADB} \cong \overset{\triangle}{BCD} \xrightarrow{\text{ا.ن.ا}} AG = CE$ (ارتفاع)

$S_{\overset{\triangle}{ADB}} = S_{BCD} = \frac{CE \times 4x}{2}$ ۷

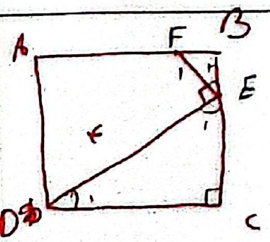
کوچکترین مثلث‌های دیگر $\Rightarrow \overset{\triangle}{CBE}$ و $\overset{\triangle}{AGD}$

$\frac{S_{\text{مستطیل}}}{S_{\text{کوچکترین}}} = \frac{S_{\overset{\triangle}{ABD}} + S_{\overset{\triangle}{BCD}}}{\overset{\triangle}{CBE}} = \frac{CE \times 4x}{\frac{CE \times x}{2}} = \boxed{8}$



$\frac{S_{\overset{\triangle}{ABC}}}{S_{\overset{\triangle}{BMN}}} = \frac{\sin \hat{B} \times AB \times BC \div \cancel{2}}{\sin \hat{B} \times BM \times BN \div \cancel{2}} = \frac{5x \times AB}{3x \times BM} = 3$

$\frac{AB}{BM} = \frac{9}{5} \xrightarrow[\text{در صورت}]{\text{تفضیل}} \frac{AM}{BM} = \frac{4}{5} \Longrightarrow \boxed{\frac{BM}{AM} = \frac{5}{4}}$ ۸



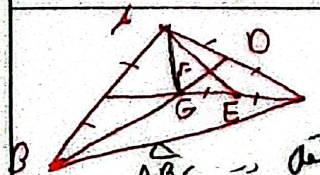
$\left.\begin{array}{l} \hat{E}_1 + \hat{D}_1 = 90^\circ \\ \hat{E}_1 + \hat{E}_2 = 90^\circ \end{array}\right\} \Rightarrow \left.\begin{array}{l} \hat{D}_1 = \hat{E}_2 \\ \hat{C} = \hat{B} = 90^\circ \end{array}\right\} \xrightarrow{\text{ز ز}} \overset{\triangle}{DCE} \sim \overset{\triangle}{BEF}$

$\frac{FE}{DE} = \frac{BE}{CD} = \frac{FB}{CE} = \frac{1}{4}$ ضلع $= x$ ، $\frac{BE}{x} = \frac{FB}{CE} = \frac{1}{4}$ ۹

$\boxed{\text{مربع} = 10.24}$

$\Longrightarrow BE = \frac{1}{4}x \Longrightarrow CE = \frac{3}{4}x$

فیثاغورث $\overset{\triangle}{ECD} \rightarrow 4^2 = CE^2 + CD^2 \longrightarrow 16 = \frac{9}{16}x^2 + x^2 \rightarrow 4 = \frac{5}{4}x \rightarrow x = 3.2$



$\frac{BD}{FD}$

G مرکز ثقل در $\overset{\triangle}{ABC} = \frac{BG}{GD} = 2 \xrightarrow{\text{ترکیب در صورت}} \frac{BD}{GD} = 3 \rightarrow \frac{1}{3}BD = GD$

در $\overset{\triangle}{AGC}$ F محل برخورد میانه‌ها $\rightarrow$ F مرکز ثقل $\rightarrow \frac{FD}{DG} = \frac{1}{3} \xrightarrow{DG = \frac{BD}{3}} \frac{FD}{\frac{1}{3}BD} = \frac{1}{3}$ ۱۰

$\frac{FD}{BD} = \frac{1}{9} \longrightarrow \boxed{\frac{BD}{FD} = 9}$