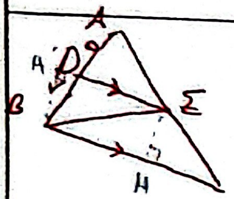
۲۰

نام و نام خانوادگی ...لیلیا غلامی... پاسخنامه تشریحی تکلیف شماره ...۲... کلاس ...نهم B...



$\frac{S_{BCE}}{S_{BDE}} = \frac{EH \times BC}{BH' \times DE} \Longrightarrow \frac{EH \times \cancel{BC}}{\cancel{BH'} \times \frac{5}{12} \times \cancel{BC}} = \boxed{\frac{12}{5}}$

$DE \parallel BC \Longrightarrow BH' = EH$

$DE \parallel BC \xrightarrow{\text{تعمیم تالس}} \frac{AD}{AB} = \frac{DE}{BC} = \frac{5}{12} = \frac{DE}{BC} \Longrightarrow DE = \frac{5}{12} BC$

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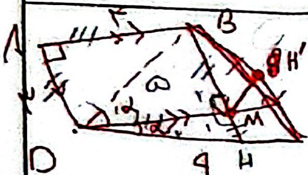

$MH'?$ $ABMD$ مستطیل $\Longrightarrow AD = BM ,\ AB = DM$

$\left.\begin{array}{l} \hat{M}_1 = \hat{M}_2 = 90^\circ \\ \hat{D}_1 = \hat{D}_2 = \alpha \\ DM = DM \text{ مشترک} \end{array}\right\} \rightarrow \overset{\triangle}{DHM} \cong \overset{\triangle}{DMB} \Rightarrow HM = MB ,\ DH = DB = 5$

$HC = DC - DH = 9 - 5 = 4$

$\frac{BM}{MH} = \frac{BH'}{H'C}$ عکس تالس $\Rightarrow MH' \parallel HC \xrightarrow{\text{تعمیم تالس}} \frac{MB}{BH} = \frac{MH'}{HC} = \frac{1}{2} = \frac{MH'}{4}$

$\boxed{MH' = 2}$

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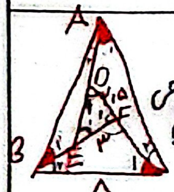

$AB = ?$

$\hat{F}_1 = \hat{C}_1 + \hat{B}_2$ زاویه خارجی $\overset{\triangle}{BCF}$ ، $\hat{C}_1 = \hat{B}_1 \longrightarrow \hat{F}_1 = \hat{B}$ ، $\hat{E}_1 = \hat{A}_2 + \hat{B}_1$ زاویه خارجی $\overset{\triangle}{ABE}$ ، $\hat{B}_1 = \hat{A}_1 \longrightarrow \hat{E}_1 = \hat{A}$

$\left.\begin{array}{l} \hat{F}_1 = \hat{B} \\ \hat{E}_1 = \hat{A} \end{array}\right\} \xrightarrow{\text{زز}} \overset{\triangle}{EFD} \sim \overset{\triangle}{ABC} \longrightarrow \frac{FE}{BA} = \frac{FD}{BC} = \frac{ED}{AC}$

$\frac{3}{BA} = \frac{2/5}{8} \longrightarrow BA = \frac{3 \times 8}{\frac{5}{2}} = \frac{48}{5} = \boxed{9/6}$

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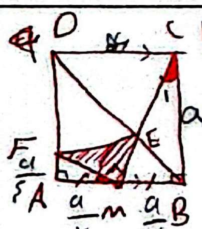

$S_{?}$ ، $a = 4$

$\left.\begin{array}{l} \hat{C}_1 = \hat{M}_1 \\ \hat{B} = \hat{A} = 90^\circ \end{array}\right\} \xrightarrow{\text{زز}} \overset{\triangle}{MCB} \sim \overset{\triangle}{FMA} \rightarrow \frac{\cancel{CB}}{\cancel{MA}} = \frac{\cancel{BM}}{FA} = \frac{MC}{FM}$

$FA = \frac{a}{4}$

$DC \parallel MB \xrightarrow{\text{تالس برعکس}} 2 \frac{\cancel{DC}}{\cancel{MB}} = \frac{CE}{EM} \xrightarrow{\text{ترکیب در صورت}} 3 = \frac{CM}{EM} ,\ EM = \frac{CM}{3}$

FM فیثاغورس $FM = \sqrt{FA^2 + AM^2} = \frac{\sqrt{5}}{4} a$ ، CM فیثاغورس $= \sqrt{CB^2 + BM^2} = \frac{\sqrt{5}}{2} a \longrightarrow EM = \frac{\sqrt{5}}{6} a$

$S_{\overset{\triangle}{MEF}} = \frac{1}{2} FM \times EM \xrightarrow{a=4} \frac{\sqrt{5} \times 4}{4} \times \frac{\sqrt{5} \times 4}{6} \times \frac{1}{2} = \boxed{\frac{15}{4}}$

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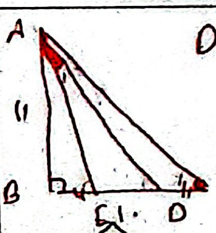

$DC ?$

$\left.\begin{array}{l} \hat{E} = \hat{E} \\ \hat{C} = \hat{A}_1 \end{array}\right\} \xrightarrow{\text{زز}} \overset{\triangle}{AED} \sim \overset{\triangle}{CEA} \rightarrow \frac{AE}{CE} = \frac{ED}{AE}$

$CD = BE = x \Longrightarrow \frac{AE}{10 + x} = \frac{10}{AE} \Longrightarrow AE^2 = 100 + 10x \xRightarrow{①} 121 + x^2 = 100 + 10x$

$\overset{\triangle}{ABE}$ فیثاغورس $\rightarrow AE^2 = BE^2 + 11^2 = 121 + x^2$ ①

$\Rightarrow x^2 - 10x - 21 = 0$

$(x - 3)(x - 7) = 0$

$x = 3$ ، $x = 7$

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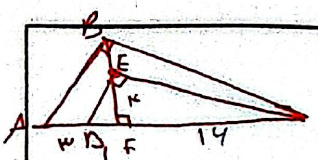
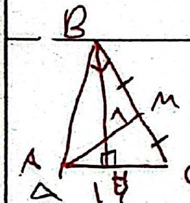


BC?

$EF^2 = DF \times FC \to 16 = 1 \times FC \to FC = 16$

$BC^2 = CF \times CA \longrightarrow BC^2 = 16 \times 20 \longrightarrow \boxed{BC = 8\sqrt{5}}$ ۶



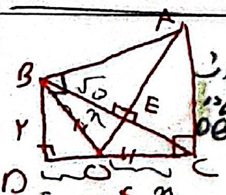
AM?

چون ۱) میانه نقش قاعده و ارتفاع دارد پس $\overset{\triangle}{ABC}$ متساوی الساقین قائم الزاویه است

$\overset{\triangle}{ABC}$ فیثاغورث: $2BC^2 = AC^2 \Rightarrow BC = 8\sqrt{2} = AB \Rightarrow BM = 4\sqrt{2}$ ۷

در $\overset{\triangle}{AMB}$ فیثاغورث $= AM^2 = MB^2 + AB^2 \Longrightarrow AM^2 = 128 + 32 = 160$

$\boxed{AM = 4\sqrt{10}}$



$S_{\overset{\triangle}{ABE}}$?

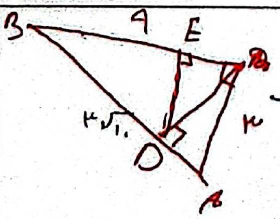
در $\overset{\triangle}{OBD}$ فیثاغورث: $(4-x)^2 + 2^2 = x^2 \Rightarrow 16 + x^2 - 8x + 4 = x^2 \to x = 2.5$

$OC = OB \xrightarrow[\text{عمود منصف}]{\text{ویژگی}}$ BC عمود منصف OA است $\Rightarrow BE = EC$ (۱) $BC = 2\sqrt{5} \Longrightarrow BE = EC = \sqrt{5}$ ۸

فیثاغورث $BC^2 = BD^2 + DC^2 \Rightarrow BC = 2\sqrt{5}$ (۱) $\Big\{$ فیثاغورث $\overset{\triangle}{BOE} \Rightarrow BO^2 - BE^2 = OE^2 \Rightarrow OE = \frac{\sqrt{5}}{2}$

$BE^2 = OE \times EA \to 5 = \frac{\sqrt{5}}{2} \times EA \Rightarrow 2\sqrt{5} = EA$

$S_{\overset{\triangle}{ABE}} = \frac{1}{2} BE \times EA = 2\sqrt{5} \times \frac{1}{2} \times \sqrt{5} = 5$

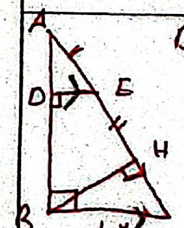


BE?

در $\overset{\triangle}{ACB}$ فیثاغورث: $AB^2 = CB^2 + AC^2 \Longrightarrow AB = 3\sqrt{10}$

در $\overset{\triangle}{ABC} \Rightarrow BC^2 = AB \times BD \longrightarrow 81 = 3\sqrt{10} \times BD \Rightarrow BD = \frac{27\sqrt{10}}{10}$ ۹

در $\overset{\triangle}{CDB} \Longrightarrow BD^2 = BC \times BE \Longrightarrow \frac{39}{10} = 9 \times BE \longrightarrow \boxed{BE = 8.1}$



DE?

$\hat{D} = \hat{B} \xrightarrow[\text{خطوط موازی}]{\text{عکس قضیه}} DE \parallel BC \xrightarrow{\text{تعمیم تالس}} \frac{DE}{BC} = \frac{AE}{AC} \overset{(1)}{\Rightarrow} \frac{DE}{12} = \frac{6.4}{20}$

$\boxed{DE = 3.84}$

در $\overset{\triangle}{ABC}$ فیثاغورث $\longrightarrow AC^2 = BA^2 + BC^2 \to AC = 20$ ۱۰

در $\overset{\triangle}{ABC} \longrightarrow BC^2 = CH \times AC \longrightarrow 144 = CH \times 20 \to CH = 7.2$

$\Longrightarrow AE = \frac{12.8}{2} = 6.4$ (۱)