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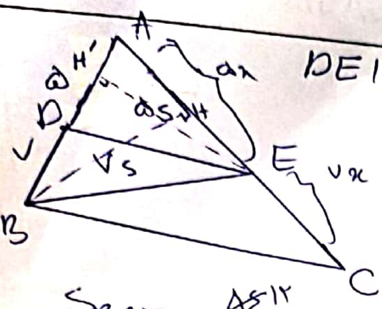
نام و نام خانوادگی ...دنیا بابارات نصیری... پاسخنامه تشریحی تکلیف شماره ...۲۰... کلاس ...یازدهم... دفتر...



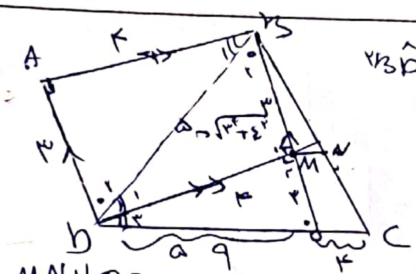
$DE \parallel BC \to \frac{AD}{BD} = \frac{AE}{EC} = \frac{5}{7}$ $\quad \frac{S_{B\hat DE}}{S_{A\hat DE}} = \frac{\cancel{\frac12} BD \times EH'}{\cancel{\frac12} \times AD \times EH'} = \frac{7}{5}$ ۱

$\to S_{BDE} = 7S$

$S_{ADE} = 5S \to S_{ABE} = 12S$ (۴)

$\frac{S_{ABE}}{S_{ECB}} = \frac{\cancel{\frac12} AE \times BH}{\cancel{\frac12} EC \times BH} = \frac{5}{7} \to \frac{12S}{S_{ECB}} = \frac{5}{7} \to S_{ECB} = \frac{84}{5}S$

$\frac{S_{BCE}}{S_{BDE}} = \frac{\frac{84}{5}S}{7S} = \frac{12}{5}S$



$B\hat DM = B\hat DC \to B\hat DM = M\hat DC$ ①

$AB \parallel DM, BD / \to \hat B_1 = \hat D_1$

$AD \parallel BM, DB / \to \hat D_2 = \hat B_2$ $\Big\}$ زضز $\to A\hat BD \cong B\hat MD \to BM = 3 = AD$

BD مشترک $\qquad AB = DM = K$ ۲

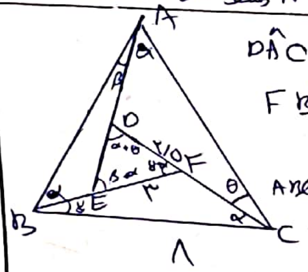
① $\hat D_1 = \hat D_3$

$\hat M_1 = \hat M_2 = 90^\circ$ $\Big\}$ زضز $\to B\hat DM \cong D\hat MO \to MO = 3 = BM$ (۴)

DM مشترک $\qquad DO = BD = 5 \to OC = 9 - 5 = 4$

$MN \parallel OC \to \frac{BM}{MO} = \frac{BN}{NC} = \frac{c}{c} = 1$ از M به موازات DC به BC (نقطه N) رسم می‌کنیم

N وسط BC است $\to \frac{BM}{BO} = \frac{MN}{OC} \to \frac{\cancel{3}}{\cancel{6}} = \frac{MN}{4} \to MN = 2$



$D\hat AC = B\hat CF = A\hat BE = \alpha \quad B\hat AE = \beta \to$ زاویه $\hat E$ خارجی $A\hat BE \to \hat E = \beta + \alpha$

$F\hat BC = \gamma \to$ زاویه $\hat F$ زاویه خارجی $B\hat CF \to \hat F = \gamma + \alpha$

$A\hat CD = \theta \to$ زاویه $\hat D$ زاویه خارجی $A\hat DC \to \hat D = \theta + \alpha$

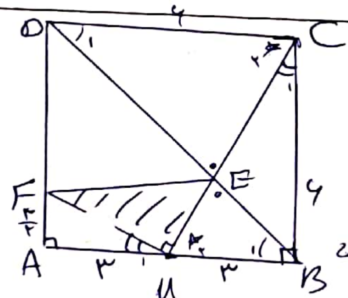
در مثلث ABC $\to \hat A = \alpha + \beta$ $\quad$ مثلث $EFC \to \hat D = \alpha + \theta$ (۴) ۳

$\hat B = \gamma + \alpha \qquad \hat F = \gamma + \alpha$

$\hat C = \alpha + \theta \qquad \hat E = \beta + \alpha$

$AB = 9/6$

$\underbrace{\qquad}_{2}$ متشابه $\to \frac{DE}{AC} = \frac{EF}{AB} = \frac{DF}{BC} \to \frac{2/5}{8} = \frac{3}{AB}$



$\hat C_1 = \hat M_1$

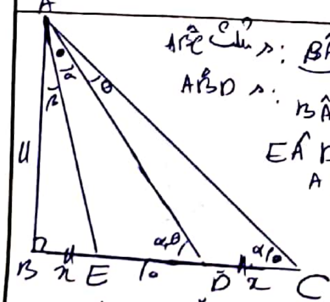
$\hat A = \hat B = 90$ $\Big\}$ زز $\to C\hat BM \sim A\hat FM \to \frac{AM}{BC} = \frac{AF}{MB} \to \frac{3}{6} = \frac{AF}{3} \to AF = \frac{3}{2}$

$MF^2 = AF^2 + AM^2 = \frac{9}{4} + 9 = \frac{45}{4} \to MF = \frac{3\sqrt5}{2}$ (۴)

$DC \parallel MB$, $CM/ \to \hat C_2 = \hat M_2$ $\quad$ // $DB/$ $\hat D_1 = \hat B_1$ $\Big\}$ زز $\to C\hat EC \sim M\hat BE \to \frac{MB}{DC} = \frac{ME}{CE}$ ۴

قضیه تالس $\quad \frac{MB}{DC + MB} = \frac{ME}{MC} \to \frac{\cancel{3}}{\cancel{9}} = \frac{ME}{\cancel{3}\sqrt5} \to \sqrt5$

$BC^2 + MB^2 = MC^2 \Rightarrow 36 + 9 = 45 \to MC = 3\sqrt5$, مساحت $= \frac12 \times FM \times ME = \frac12 \times \frac{3\sqrt5}{2} \times \sqrt5 = \frac{15}{4} = 3/75$



در مثلث ABC: $B\hat AE + E\hat AD + D\hat AC + A\hat CD = 90^\circ \to 2\alpha + \beta + \theta = 90^\circ$

ABD در: $B\hat AE + E\hat AD + A\hat DE = 90^\circ \to \alpha + \beta + A\hat DE = 90^\circ \to A\hat DE = \alpha + \theta$

$E\hat AD = A\hat CD = \alpha$

$A\hat DE = E\hat AC = \alpha + \theta$ $\Big\}$ زز $\to A\hat ED \sim A\hat EC \to \frac{ED}{AE} = \frac{AE}{EC} = \frac{AD}{AC}$

$\to \frac{10}{\sqrt{x^2+121}} = \frac{\sqrt{x^2+121}}{10+x} \to x^2 + 121 = 100 + 10x \to x^2 - 10x + 21 = 0$ (۴) ۵

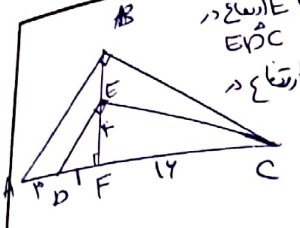
$(x-7)(x-3) = 0$

$DC = 7$ یا $DC = 3$

$AE^2 = x^2 + 11^2 \Rightarrow AE = \sqrt{x^2+121}$

$AD^2 = (10+x)^2 + 121 \to AD = \sqrt{(10+x)^2 + 121}$

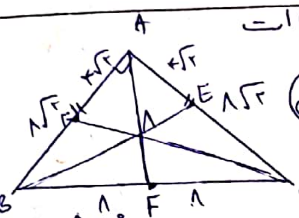
$AC^2 = (2x+10)^2 + 121 \to AC = \sqrt{121 + (2x+10)^2}$



EF ارتفاع در $E\hat{D}C$ $\to EF^2 = DF \times FC \to 16 = 1 \times FC \to FC = 16 \to AC = 3+1+16 = 20$

BF ارتفاع در $B\hat{A}C$ $\to FC \times AC = BC^2 \to 16 \times 20 = BC^2 \to BC = 8\sqrt{5}$

(۵) ۶



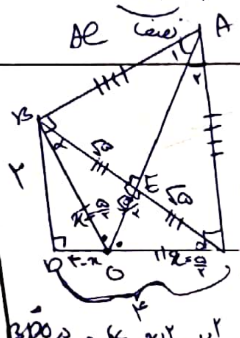
از آنجا که میانه نصف وتر است بنابراین $B\hat{A}C$ یک مثلث قائم الزاویه متساوی الساقین است $(\hat{A} = 90^\circ)$

در این نوع مثلث میانه، ارتفاع نیز هست پس AF هم ارتفاع است هم میانه

$AB^2 = AC^2 = \underbrace{BF}_{FC} \times BC = 8 \times 16 \to AB = AC = 8\sqrt{2}$ (۵)

$A\hat{F}C$ در $\xrightarrow{\hat{A}=90^\circ}$ $\underbrace{AF^2}_{\text{نصف } AB} + AC^2 = FC^2 \to (4\sqrt{2})^2 + (8\sqrt{2})^2 = FC^2 \to FC = 4\sqrt{10}$ میانه وارد بر ضلع AB → میانه وارد بر ضلع AC ۷

$A\hat{E}B \to \underbrace{AE^2}_{\text{نصف } AC} + AB^2 = BE^2 \to (4\sqrt{2})^2 + (8\sqrt{2})^2 = EB^2 \to EB = 4\sqrt{10}$



$OC = BO \to O\hat{B}E = O\hat{E}C$, OE مشترک, $\hat{E}_1 = \hat{E}_2 = 90^\circ$ $\Big\}\ B\hat{O}E \cong EOC \to EB = EC$

$D\hat{B}C$ در $BD^2 + DC^2 = BC^2 \to 4 + 16 = 20 = BC^2 \to BC = 2\sqrt{5} \to EB = EC = \sqrt{5}$

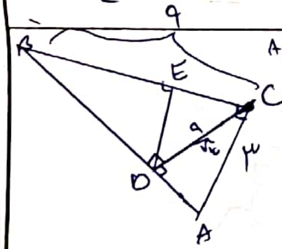
O روی AO (عمودمنصف BC) است، از هر نقطه روی آن به یک فاصله است ← A روی عمودمنصف BC $(\hat{E} = 90^\circ,\ BE = EC)$ (۵) ۸

$AB = AC$, EA مشترک, $BE = EC$ $\Big\}$ $\xrightarrow{\text{ض ض ض}}$ $A\hat{B}E \cong A\hat{E}C \to \hat{A}_1 = \hat{A}_2 \to AO$ نیمساز $\hat{A}$ $\to$ از آنجا که $OB = OC$ لذا $90 = O\hat{C}A = O\hat{B}A$

$B\hat{D}O$ در $\to (4-x)^2 + 2^2 = x^2 \to 16 + \cancel{x^2} - 8x + 4 = \cancel{x^2} \to 8x = 20 \to x = \frac{5}{2}$

$A\hat{B}O$ در $\hat{B} = 90^\circ$ BE ارتفاع $\to BE^2 = EO \times AE \Rightarrow 5 = \frac{\sqrt{5}}{2} \times EA \Rightarrow EA = \frac{10}{\sqrt{5}}$ → مثلث $B\hat{E}O \to EB^2 + EO^2 = BO^2 \to 5 + EO^2 = \frac{25}{4} \to EO = \frac{\sqrt{5}}{2}$

$\boxed{S_{E\hat{B}A} = \frac{1}{2} EB \times EA = \frac{10}{\sqrt{5}} \times \sqrt{5} \times \frac{1}{2} = 5}$

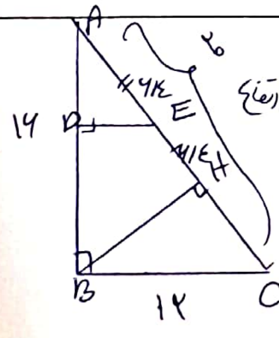


$A\hat{B}C$ در $AB^2 = BC^2 + AC^2 \Rightarrow 81 + 9 = 90 \to AB = 3\sqrt{10}$

DC ارتفاع $\Rightarrow DC \times AB = BC \times AC \to 9 \times \cancel{3} = \cancel{3}\sqrt{10} \times DC \to DC = \frac{9}{\sqrt{10}}$

$B\hat{D}C$ در، DE ارتفاع $\to DC^2 = EC \times BC \to \frac{9 \times \cancel{9}}{10} = \cancel{9} \times EC \to EC = \frac{9}{10}$ (۵)

$BC = BE + EC \to 9 = \frac{9}{10} + BE \to \frac{81}{10} = BE$ ۹



$AC^2 = AB^2 + BC^2 \to 144 + 256 = 400 \to AC = 20$

BH ارتفاع $\to BC^2 = HC \times AC \to 144 = HC \times 20 \to HC = 7/2 \to AH = 20 - 7/2 = 12/8$

$EH = AE = \frac{1}{2} AH = 6/4$

$DE \parallel BC \to \frac{DE}{BC} = \frac{AE}{AC} \to \frac{DE}{12} = \frac{6/4}{20}$ (۵)

عمود بر AB

$DE = 3/84$ ۱۰