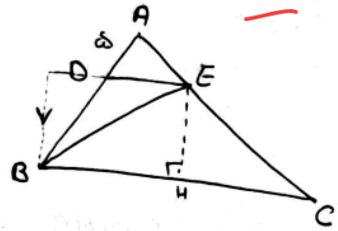
طاها محمدیان عطار - یازدهم پسران - تکلیف ۲۲

۲۰

۱- ۲



$S_{B\hat{C}E} = \frac{1}{2} \times BC \times EH$

$S_{B\hat{D}E} = \frac{1}{2} \times DE \times BH'$

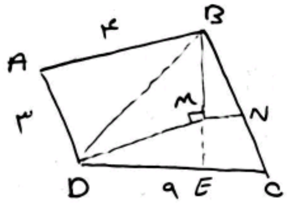
$EH = BH'$

$\Rightarrow \frac{S_{B\hat{C}E}}{S_{B\hat{D}E}} = \frac{BC}{DE}$

$DE \parallel BC \to \frac{AB}{AD} = \frac{BC}{DE} = \frac{12}{5}$

$\frac{S_{B\hat{C}E}}{S_{B\hat{D}E}} = \frac{12}{5}$

۲- ۲



$\left.\begin{array}{l} AD \parallel Bm \\ AB \parallel Dm \\ \hat{A} = 90 \end{array}\right\} ABmD \Rightarrow \left\{\begin{array}{l} AB = Dm = 4 \\ AD = Bm = 3 \\ \hat{m}_1 = 90 \end{array}\right.$

$B\hat{D}m \to Bm^2 + Dm^2 = BD^2 = (3)^2 + (4)^2 = BD^2 \to 9 + 16 = 25 \Rightarrow BD = 5$

$\left.\begin{array}{l} B\hat{D}C = B\hat{D}m + m\hat{D}C \\ B\hat{D}C = 2B\hat{D}m \end{array}\right\} \Rightarrow B\hat{D}m = m\hat{D}C \to Dm$ نیمساز

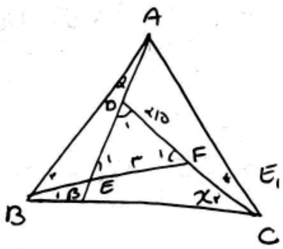
$\hat{m} = 90 , Dm$ ارتفاع

$B\hat{D}E \to$ متساوی‌الساقین $\Rightarrow BD = DE$

$DE = 5 \Rightarrow CE = 9 - 5 = 4$

$\frac{Bm}{mE} = 1 , \frac{BN}{NC} = 1 \to \frac{mN}{EC} = \frac{BN}{BC} = \frac{1}{2} \Rightarrow mN = 2$

۳- ۲



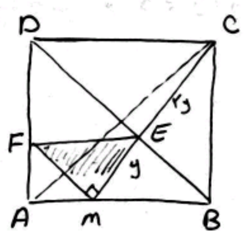
$\left.\begin{array}{l} F_1 = B_1 + C_2 = x + \beta \\ \hat{B} = B_1 + B_2 = x + \beta \end{array}\right\} F_1 = \hat{B}$

$\left.\begin{array}{l} E_1 = B_2 + A_1 = x + \alpha \\ A_2 + A_1 = x + \alpha \end{array}\right\} E_1 = A$

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

$\frac{DE}{AC} = \frac{EF}{AB} = \frac{DF}{CB} \to AB = \frac{8 \times 3}{2.5} = \frac{24}{2.5} = 9.6$

۴- ۲



$\frac{CE}{Em} = \frac{BE}{DE} = 2$

$CE = 2y$

$Em = y$

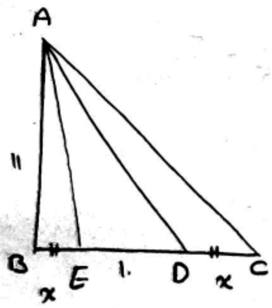
$\left.\begin{array}{l} \hat{m}_1 + \hat{m}_2 = 90 \\ \hat{m}_1 + \hat{C} = 90 \end{array}\right\} \Rightarrow \left.\begin{array}{l} \hat{C} = \hat{m}_2 \\ B = m_2 = 90 \end{array}\right] B\hat{C}m \sim A\hat{m}F$

$\frac{BC}{Am} = \frac{Cm}{mF} = \frac{Bm}{AF} \Rightarrow mF = \frac{\cancel{3} \times 3\sqrt{5}}{\frac{\cancel{6}}{2}} = \frac{3\sqrt{5}}{2}$

$\left.\begin{array}{l} Cm^2 = Bm^2 + BC^2 \to 36 + 9 = 45 , Cm = 3\sqrt{5} \\ Cm = CE + Em = 3y \end{array}\right\} y = \sqrt{5}$

$S_{F\hat{m}E} = \frac{Em \times mE}{2} = \frac{3 \times 5}{4} = \frac{15}{4}$

۵- ۲



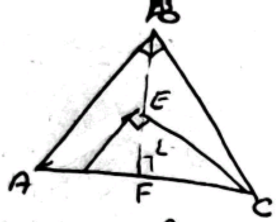
$AE^2 = AB^2 + BE^2 \Rightarrow AE^2 = 121 + x^2 \Rightarrow AE = \sqrt{121 + x^2}$

$\left.\begin{array}{l} E_1 = E_1 \\ EAD = ACE \end{array}\right\} A\hat{E}D \sim C\hat{E}A \to \frac{AE}{CE} = \frac{ED}{EA} \Rightarrow AE^2 = CE \times ED$

$x^2 + 121 = (x + 10)(10) \Rightarrow x^2 + 121 = 10x + 100 \Rightarrow x^2 - 10x + 21 = 0$

$(x-3)(x-7) = 0 \to x = 3 , x = 7$

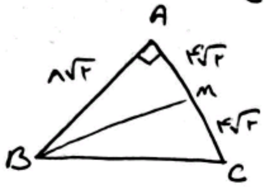
-۶ ۲



$EF^{۲} = DF \times FC \Rightarrow ۱۴ = ۱F \,,\; FC = ۱۴$

$BC^{۲} = CF \times AC \Rightarrow BC^{۲} = ۱۴ \times ۲۰ \Rightarrow BC = ۸\sqrt{۵}$ ✓

-۷ ۲

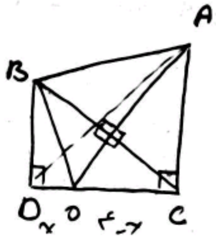


$\left.\begin{array}{l} AB^{۲} + AC^{۲} = BC^{۲} \\ AB = AC \end{array}\right\} \Rightarrow ۲AB^{۲} = ۲AC^{۲} = ۲۵۶ \Rightarrow AB = AC = ۸\sqrt{۲}$

$AM = MC \,,\; \frac{AC}{۲} = ۴\sqrt{۲} \rightarrow AM^{۲} + AB^{۲} = BM^{۲}$

$\underbrace{۳۲ + ۱۲۸}_{۱۶۰} = BM^{۲} \Rightarrow BM = ۴\sqrt{۱۰}$ ✓

-۸ ۲



$ADC = DO + OC = ۴ \rightarrow DO = x = ۱/۵$

$OC = ۴ - x \Rightarrow OC ; OB \,,\; OB = ۴ - x$

$= ۲/۵$

$OB^{۲} = BD^{۲} + DO^{۲} \Rightarrow (۴-x)^{۲} = ۴ + x^{۲} \Rightarrow \cancel{x^{۲}} - ۸x + \overset{۱۲}{\cancel{۱۶}} = \cancel{x^{۲}} + \cancel{۴}$

$۸x = ۱۲$

$x = ۱/۵$

$\left.\begin{array}{l} O_{۱} = O_{۲} \\ BO = CO \\ OA = OA \end{array}\right. \Rightarrow AOB \cong AOC \Rightarrow S_{۱} = S_{۲} \,,\; CE = BE$

$BD^{۲} + OC^{۲} = BC^{۲} \Rightarrow BC = \sqrt{۲۰} = ۲\sqrt{۵}$

$BC = CE + BE \Rightarrow ۲BE = ۲CE \rightarrow CE = BE = \sqrt{۵}$

$S_{BOC} = \frac{OE \times BC}{۲} = \frac{BD \times OC}{۲} \Rightarrow OE \times ۲\sqrt{۵} = ۲ \times ۲/۵ = ۵ \,,\; OE = \frac{\sqrt{۵}}{۲}$

$CE^{۲} = OE \times EA \Rightarrow ۵ = \frac{\sqrt{۵}}{۲} \times EA \,,\; EA = ۲\sqrt{۵}$

$AC^{۲} = AE^{۲} + EC^{۲} \Rightarrow AC^{۲} = ۲۵ \Rightarrow AC = ۵$

$S_{AOB} = S_{AOC} \Rightarrow S_{AOB} + S_{AOC} = ۲S_{AOC} \,,$

$S_{ABCD} = \frac{\cancel{۴} \times \overset{۲۵}{\cancel{۵}} \times ۲/۵}{۲} = ۱۲/۵$

$S_{BOC} = \frac{\cancel{۲} \times ۲/۵}{\cancel{۲}} = ۲/۵ \rightarrow S_{ABC} = S_{ABOC} - S_{BOC} = ۱۰$

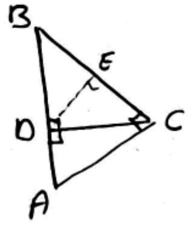
$S_{ABC} = S_{ABE} + S_{AEC}$

$\left.\begin{array}{l} AE = EA \,,\; E_{۱} = E_{۲} = ۹۰ \\ BE = CE \end{array}\right\} ABE = AEC$

$S_{ABC} = ۲S_{ABE}$

$۲S_{ABE} = ۱۰$

$S_{ABE} = ۵$ ✓



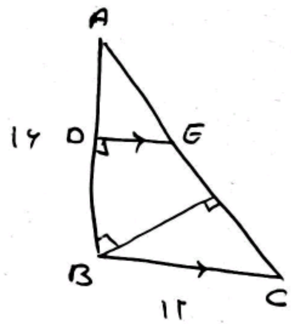
-۹ ۲

$AB^2 = AC^2 + BC^2 \Rightarrow \sqrt{۹۰} = AB = ۳\sqrt{۱۰}$

$BC^2 = BD \times AB \Rightarrow ۸۱ = BD \times ۳\sqrt{۱۰} \Rightarrow \frac{۲۷}{۱۰} = BD$

$DE \parallel AC$
$AC \perp BC \longrightarrow DE \perp BC \Rightarrow E_1 = E_2$

$BD^2 = BE \times BC = \frac{\cancel{۷۲۹}}{۱۰} = BE \times \cancel{۹} \Rightarrow \frac{۸۱}{۱۰} = BE$ ✓



-۱۰ ۲

$AC^2 = ۱۴۴ + ۲۵۶ = ۴۰۰ \Rightarrow AC = ۲۰$

$BC^2 = CH \times AC \Rightarrow CH \times ۲۰ = \frac{\cancel{۱۲} \times ۱۲}{\cancel{۲۰}} \Rightarrow CH = \frac{۷۲}{۱۰}$

$AC = AH + CH \Rightarrow AH = AC - CH = ۲۰ - ۷/۲ = ۱۲/۸$

$AH = ۲AE$

$DE \perp AB \,,\, BC \perp AB \longrightarrow DE \parallel BC$

$\frac{DE}{BC} = \frac{AE}{AC} \Rightarrow \frac{DE}{۱۲} = \frac{۶/۴}{۱۰}$

$\frac{\cancel{۱۲} \times ۶/۴}{\cancel{۲۵}} = ۳/۸۴$ ✓