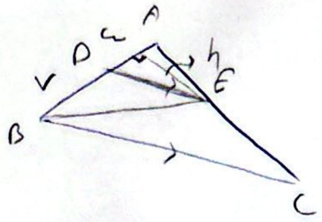
الیسا اقبالی کلاس شماره ی ۲۲

۱-



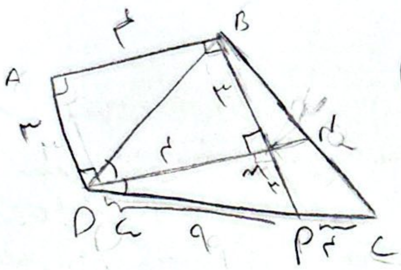
$\overset{\triangle}{ADE} \sim \overset{\triangle}{ABC} \to \frac{S_{ADE} \to S}{S_{ABC} \to \frac{144}{25}S} = \left(\frac{5}{12}\right)^2 = \frac{25}{144}$

$S_{ADE} = \frac{5h}{2}$ $\quad S_{DEB} = \frac{7h}{2} \longrightarrow S_{DEB} = \frac{7}{5}S$

$S_{BEC} = \frac{144}{25}S - S - \frac{7}{5}S = \frac{144S - 25S - 35S}{25} = \frac{84S}{25}$

$\frac{S_{BEC}}{S_{BDE}} = \frac{\cancel{84S}^{12}}{\cancel{25}_{5}} \times \frac{\cancel{5}}{\cancel{7S}} = \frac{12}{5}$

۲-



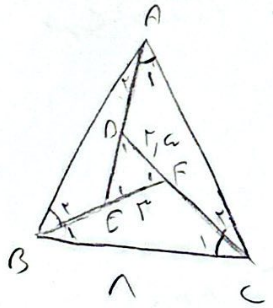
در مثلث PDB ، نیمساز ارتفاع است پس $5 = BD = PD$

$\to Pm = 4 = Bm$

$\frac{Bm}{BP} = \frac{Bn}{BC} = \frac{1}{2} \to mn \parallel PC$

$= \frac{mn}{PC} = \frac{mn}{4} = \frac{1}{2}$ $\quad \boxed{mn = 2}$

۳-



$\hat{C_1} + \hat{B_1} = \hat{F_1}$ $\quad \hat{B} = \hat{B_1} + \underbrace{\hat{B_2}}_{\hat{C_1}} = \hat{F_1}$

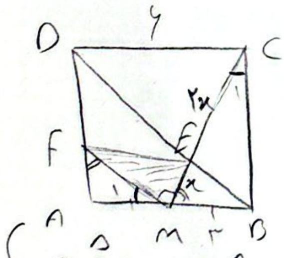
$\hat{C_2} + \hat{A_1} = \hat{D_1}$ $\quad \hat{C} = \underbrace{\hat{C_1}}_{\hat{A_1}} + \hat{C_2} = \hat{D_1}$

$\hat{A_2} + \hat{B_2} = \hat{E_1}$ $\quad \hat{A} = \underbrace{\hat{A_1}}_{\hat{B_2}} + \hat{A_2} = \hat{E_1}$

$\overset{\triangle}{ABC} \overset{\text{ززز}}{\sim} \overset{\triangle}{DEF} \to \frac{EF}{AB} = \frac{DE}{AC} = \frac{DF}{BC}$

$\frac{3}{AB} = \frac{2.5}{8}$ $\quad AB = \frac{24}{2.5} = 9.6$

۴-



$\left.\begin{array}{l}\hat{M_1} = \hat{C_1} \\ \hat{B} = \hat{A} = 90\end{array}\right\}$ ززز $\overset{\triangle}{BCM} \sim \overset{\triangle}{AFM}$ $\quad \frac{MC}{FM} = \frac{6}{3} = 2$

$MC = 3x$ $\quad FM = 1.5x$

$CM^2 = 9 + 36 = 45$ $\quad CM = 3\sqrt{5} \to x = \sqrt{5}$

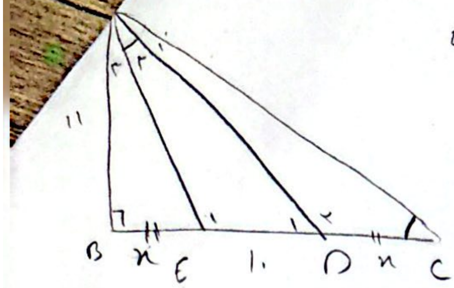
$S_{MFE} = \frac{ME \times FM}{2} = \frac{1.5\sqrt{5} \times \sqrt{5}}{2} = \frac{7.5}{2}$

$= 3.75$

$\overset{\triangle}{DEC} \sim \overset{\triangle}{BME}$

$\frac{6}{3} = \frac{DC}{MB} = \frac{CE}{ME} = 2$

۵-



$$\left.\begin{array}{l}\hat{A_2} = \hat{C}\\ \hat{E_1} = \hat{E_1}\end{array}\right\} \xrightarrow{\text{زز}} A\hat{E}D \sim A\hat{C}E$$

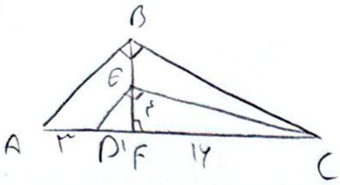
$$\frac{10}{AE} = \frac{AE}{10+x} \qquad \underbrace{AE^2}_{x^2+121} = 100 + 10x$$

$$x^2 - 10x + 21 = 0 \qquad (x-3)(x-7) = 0$$

$x = 3$

$x = 7$

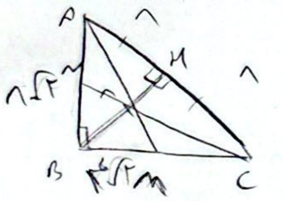
۶-



$$EF^2 = DF \times CF = 16 \qquad CF = 16 \to AC = 20$$

$$BC^2 = CF \times AC = 16 \times 20 \Rightarrow BC = 8\sqrt{5}$$

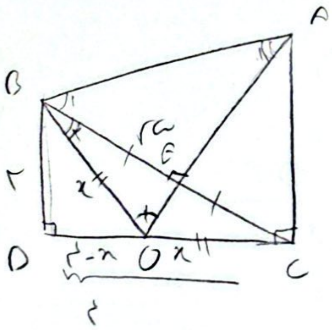
۷. مثلث، قائم الزاویه متساوی الساقین است زیرا میانه ای وارد بر وتر نصف وتر است.
از طرفی، چون مثلث متساوی الساقین است، میانه وارد بر قاعده، ارتفاع هم
می باشد.



$$AB^2 + BC^2 = 2AB^2 = 256 \qquad AB = 8\sqrt{2}$$

$$AM^2 = (8\sqrt{2})^2 + (4\sqrt{2})^2 = 128 + 32 = 160 \qquad AM = 4\sqrt{10}$$

۸-



$$BC^2 = 4 + 16 = 20 \qquad BC = 2\sqrt{5}$$

$$OC = OB \xrightarrow{\text{عمود منصف}} OE \Rightarrow BE = CE = \sqrt{5}$$

$$4 + (4-x)^2 = x^2 \qquad 4 + \cancel{x^2} - 8x + 16 = \cancel{x^2} \qquad 8x = 20$$

$$x = 2.5$$

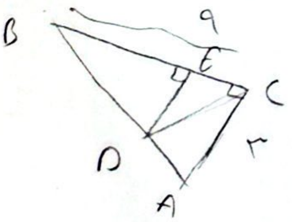
$$\left.\begin{array}{l}AO = AO\\ OB = OC\end{array}\right\} \xrightarrow{\text{وض}} A\hat{O}C \cong A\hat{O}B \to \hat{B} = \hat{C} = 90$$

$$OE^2 = (2.5)^2 - 5 = 6.25 - 5 = 1.25 \qquad OE = 0.5\sqrt{5}$$

$$AE \times OE = BE^2 \qquad AE \times 0.5\sqrt{5} = 5 \qquad AE = \frac{10}{\sqrt{5}}$$

$$S_{ABE} = \frac{1}{2} BE \times AE = \frac{1}{2} \times \sqrt{5} \times \frac{10}{\sqrt{5}} = 5$$

۹-

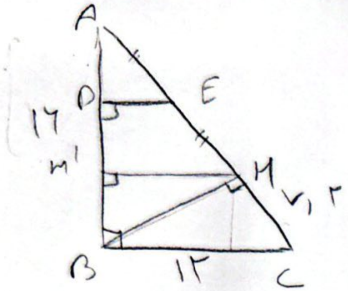


$$AB^2 = 81 + 9 = 90 \qquad AB = 3\sqrt{10}$$

$$CD \times AB = AC \times BC \qquad CD \times \cancel{3}\sqrt{10} = \cancel{3} \times 9 \qquad CD = \frac{9}{\sqrt{10}}$$

$$CD^2 = CE \times BC \qquad \frac{81}{10} = CE \times 9 \qquad CE = 0.9$$

$$BE = 9 - 0.9 = 8.1$$



$AC = \sqrt{۱۶^۲ + ۱۲^۲} = ۲۰$

$$\left.\begin{array}{l} \hat{C} = \hat{C} \\ \hat{H} = \hat{B} = ۹۰ \end{array}\right\} \xrightarrow{\text{زز}} A\overset{\triangle}{B}C \sim B\overset{\triangle}{C}H$$

$\frac{۱۲}{۲۰} = \frac{CH}{۱۲}$ $\qquad CH = \frac{۱۲ \times \cancel{۱۲}^{۳}}{\cancel{۲۰}_{۵}} = \frac{۳۶}{۵} = ۷,۲$

$MM' \parallel DE \rightarrow \frac{AE}{AM} = \frac{AD}{AM'} = \frac{DE}{MM'} = \frac{۱}{۲}$

$AM = ۲۰ - ۷,۲ = ۱۲,۸$

$BM = \sqrt{۱۴۴ - ۷,۲^۲} = ۹,۶$

$MM' \times AB = AM \times BM$

$MM' \times \cancel{۱۶} = \cancel{۱۲,۸}^{۰,۸} \times ۹,۶$ $\qquad MM' = ۰,۸ \times ۹,۶$

$DE = \frac{MM'}{۲} = ۰,۴ \times ۹,۶ = ۳,۸۴$