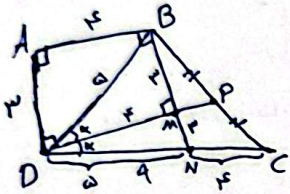


$$DE \parallel BC \Rightarrow \frac{AD}{AB} = \frac{DE}{BC} \Rightarrow \frac{h}{h+h'} = \frac{DE}{BC} \Rightarrow BC = \frac{12}{5} DE$$

$h = h' \Rightarrow$ فاصله بین دو خط موازی

$$\frac{S_2}{S_1} = \frac{\frac{1}{2} \times h' \times BC}{\frac{1}{2} \times h \times DE} = \frac{BC}{DE} = \frac{\frac{12}{5} DE}{DE} = \frac{12}{5}$$

۵



$$BD = \sqrt{4^2 + 4^2} = 4\sqrt{2}$$

$$AB \parallel MD$$

$$AD \parallel MB$$

$\Rightarrow$ چارمضی ABMD مستطیل است $\Rightarrow BM = 3, DM = 4$

$$\hat{BDC} = 2\hat{BDM} \Rightarrow \text{DM نیساز } \hat{BDC} \Rightarrow \hat{BDM} = \hat{NDM}$$

$$\frac{BM}{BN} = \frac{1}{2} \text{ و } \frac{BP}{BC} = \frac{1}{2} \Rightarrow MP \parallel NC$$

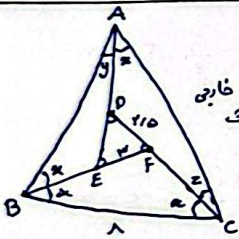
$$\hat{DM} = \hat{DN} \Rightarrow \hat{BDM} = \hat{NDM} \Rightarrow \hat{BDM} = \hat{NDM} \Rightarrow \hat{BDM} = \hat{NDM} \Rightarrow \hat{BDM} = \hat{NDM}$$

$$MN = 3$$

$$DN = 4$$

$$NC = 4 - 4 = 0$$

$$MP \parallel NC \Rightarrow \frac{BM}{BN} = \frac{PM}{NC} \Rightarrow \frac{1}{2} = \frac{PM}{4} \Rightarrow PM = 2$$



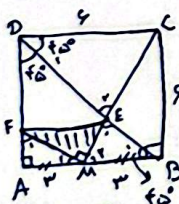
$$\begin{cases} \hat{E} = x + y \Rightarrow \hat{E} = \hat{A} \\ \hat{D} = x + z \Rightarrow \hat{D} = \hat{C} \\ \hat{F} = x + x \Rightarrow \hat{F} = \hat{B} \end{cases}$$

$$\hat{ABC} \sim \hat{EFD} \Rightarrow \frac{BC}{DF} = \frac{AB}{EF}$$

$$\Rightarrow \frac{1}{2.5} = \frac{AB}{3} \Rightarrow AB = \frac{2.5}{3} = \frac{5}{6} = 0.83$$

۵

۳



$$MC = \sqrt{3^2 + 4^2} = \sqrt{25} = 5$$

$$\hat{B}_1 = \hat{D}_1 = 45^\circ \Rightarrow \hat{DEC} \sim \hat{MEB} \Rightarrow \frac{MB}{DC} = \frac{1}{2} = \frac{ME}{CE}$$

$$\Rightarrow CE = 2ME$$

$$\Rightarrow CE = 2\sqrt{5}$$

$$ME = \sqrt{5}$$

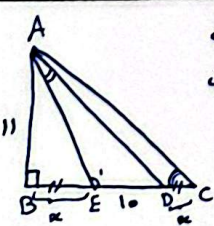
$$\begin{cases} \hat{M}_1 + \hat{F}_1 = 90^\circ \\ \hat{M}_1 + \hat{M}_2 = 90^\circ \end{cases} \Rightarrow \hat{M}_2 = \hat{F}_1 \Rightarrow \hat{AMF} \sim \hat{CBM}$$

$$\Rightarrow \frac{AF}{F} = \frac{F}{F} \Rightarrow AF = \frac{F}{F}$$

$$FM = \sqrt{AF^2 + AM^2} = \sqrt{\left(\frac{F}{F}\right)^2 + 2^2} = \sqrt{\frac{4}{F} + \frac{4}{F}} = \sqrt{\frac{8}{F}} = \frac{2\sqrt{2}}{F}$$

$$S_{\text{مربع}} = \frac{MF \times ME}{2} = \frac{\frac{2\sqrt{2}}{F} \times \sqrt{5}}{2} = \frac{1.5}{F}$$

۴



$$\hat{E}_1 = \hat{E}_1$$

$$\hat{EAD} = \hat{ACB}$$

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

$$\hat{AED} \sim \hat{AEC} \Rightarrow \frac{AE}{ED} = \frac{EC}{AE} \Rightarrow \frac{\sqrt{11^2 + x^2}}{10} = \frac{10 + x}{\sqrt{11^2 + x^2}}$$

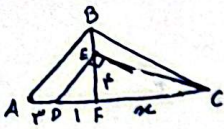
$$11^2 + x^2 = 100 + 10x$$

$$x^2 - 10x + 11 = 0$$

$$(x - 7)(x - 4) = 0 \Rightarrow \begin{cases} x_1 = 7 \\ x_2 = 4 \end{cases}$$

۵

۵



$$EF^2 = DF \times FC$$

$$x^2 = 1 \times x$$

$$x = 14$$

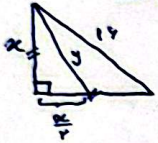
$$BF^2 = AF \times FC = 4 \times 14 = 56$$

$$BC = \sqrt{BF^2 + FC^2} = \sqrt{56 + 14^2} = \sqrt{14(4+14)}$$

$$= 4\sqrt{10} = \boxed{1\sqrt{5}}$$

(5)

6



معمده همان وتر است $\Rightarrow$ مثلث قائم الزاویه است $\Rightarrow$ اندازه میانه وارد بر قاعده نصف آن است

$$x^2 + x^2 = 14^2$$

$$2x^2 = 14 \times 14$$

$$x^2 = 8 \times 14$$

$$x = 8\sqrt{2}$$

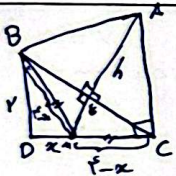
$$y = \sqrt{\left(\frac{14}{2}\right)^2 + x^2} = \sqrt{(7\sqrt{2})^2 + (8\sqrt{2})^2}$$

$$= \sqrt{32 + 128} = \sqrt{160} = \boxed{4\sqrt{10}}$$

(5)

مثلث متساوی الساقین است پس میانه نظیر آن کی ساق نیزه می شود است.

7



$$BC = \sqrt{r^2 + f^2} = 2\sqrt{5} \Rightarrow BE = CE = \sqrt{5}$$

معمده همان وتر است $\Rightarrow$ مثلث قائم الزاویه است $\Rightarrow$ اندازه میانه وارد بر قاعده نصف آن است

$$r^2 + x^2 = (f-x)^2 = 14^2 + x^2 - 14x \Rightarrow x = \frac{14}{2} = \frac{7}{1} \Rightarrow MC = f-x = \frac{14}{2} - \frac{7}{1} = \frac{7}{2}$$

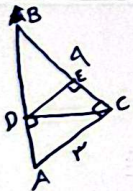
$$ME = \sqrt{MC^2 - FC^2} = \sqrt{\left(\frac{7}{2}\right)^2 - (5\sqrt{2})^2} = \sqrt{\frac{49}{4} - 50} = \frac{\sqrt{5}}{2}$$

$$EC^2 = ME \times AE$$

$$(5\sqrt{2})^2 = \frac{\sqrt{5}}{2} \times h \Rightarrow h = \frac{10}{\sqrt{5}} = 2\sqrt{5}$$

$$S_{ABE} = \frac{BE \times h}{2} = \frac{\sqrt{5} \times 2\sqrt{5}}{2} = \boxed{5}$$

8



$$AB = \sqrt{14^2 + 4^2} = 2\sqrt{10}$$

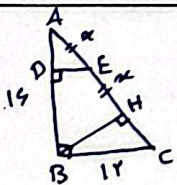
$$AC^2 = AD \times AB \Rightarrow 4 = AD \times 2\sqrt{10} \Rightarrow AD = \frac{2}{\sqrt{10}} = \frac{2\sqrt{10}}{10}$$

$$BD = AB - AD = 2\sqrt{10} - \frac{2\sqrt{10}}{10} = \frac{18\sqrt{10}}{10}$$

$$\frac{DE}{AC} = \frac{BD}{AB} \Rightarrow \frac{DE}{2\sqrt{10}} = \frac{18\sqrt{10}}{2\sqrt{10}} \Rightarrow DE = \frac{18 \times 2}{2} = \boxed{18}$$

$$BE = \frac{4 \times 9}{10} = \boxed{1.1}$$

9



$$AC = \sqrt{14^2 + 12^2} = 20 \Rightarrow AB^2 = AH \times AC$$

$$\frac{14}{20} \times 14 = \frac{x}{20} \times \frac{20}{2} \Rightarrow x = \frac{14}{2} = 7$$

(5)

$$DE \perp AB$$

$$BC \perp AB \Rightarrow DE \parallel BC \Rightarrow \frac{AE}{AC} = \frac{DE}{BC} \Rightarrow \frac{x}{20} = \frac{DE}{12}$$

$$\Rightarrow DE = \frac{12 \times \frac{14}{2}}{20} = \frac{12 \times 7}{20} = \frac{3 \times 7}{5} = \boxed{4.2}$$

10