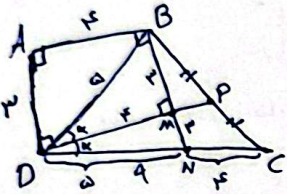


$$DE \parallel BC \Rightarrow \frac{AD}{AB} = \frac{DE}{BC} \Rightarrow \frac{\omega}{\omega + \nu} = \frac{DE}{BC} \Rightarrow BC = \frac{12}{\omega} DE$$

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

$$\frac{S_2}{S_1} = \frac{\frac{1}{2} \times \omega \times BC}{\frac{1}{2} \times \omega \times DE} = \frac{BC}{DE} = \frac{\frac{12}{\omega} DE}{DE} = \frac{12}{\omega}$$

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

$AB \parallel MD \Rightarrow$ چارمضی $ABMD$ مستطیل است $\Rightarrow BM = 3$
 $AD \parallel MB \Rightarrow DM = 4$

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

رضی $\hat{BDM} = \hat{NDM} \Rightarrow \hat{BDM} = \hat{NDM}$
 $\hat{M}_1 = \hat{M}_2 = 90^\circ$

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

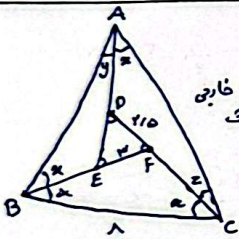
$$MN = 3$$

$$DN = 4$$

$$NC = 4 - 4 = 0$$

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

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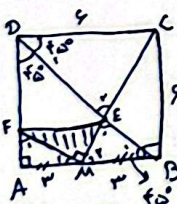


$$\begin{cases} \hat{E} = x + y \Rightarrow \hat{E} = \hat{A} \\ \hat{D} = x + z \Rightarrow \hat{D} = \hat{C} \\ \hat{F} = x + x \Rightarrow \hat{F} = \hat{B} \end{cases}$$

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

$$\Rightarrow \frac{1}{1/5} = \frac{AB}{3} \Rightarrow AB = \frac{3 \times 5}{1} = 15$$

۴



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

$\hat{B}_1 = \hat{D}_1 = 45^\circ$
 $\hat{E}_1 = \hat{E}_2$

$$\hat{DEC} \sim \hat{MEB} \Rightarrow K = \frac{MB}{DC} = \frac{1}{4} = \frac{ME}{CE}$$

$$\Rightarrow CE = 4ME$$

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

$$ME = \sqrt{5}$$

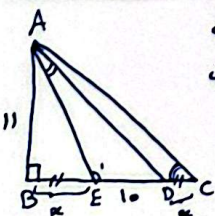
$$\begin{cases} \hat{M}_1 + \hat{F}_1 = 90^\circ \\ \hat{M}_1 + \hat{M}_2 = 90^\circ \end{cases} \Rightarrow \hat{M}_1 = \hat{F}_1 \Rightarrow \hat{AMF} \sim \hat{CBM}$$

$$\Rightarrow \frac{AF}{4} = \frac{1}{4} \Rightarrow AF = 1$$

$$FM = \sqrt{AF^2 + AM^2} = \sqrt{\left(\frac{1}{4}\right)^2 + 3^2} = \sqrt{\frac{1}{16} + 9} = \sqrt{\frac{145}{16}} = \frac{\sqrt{145}}{4}$$

$$S_{\text{مربع}} = \frac{MF \times ME}{2} = \frac{\frac{\sqrt{145}}{4} \times \sqrt{5}}{2} = \frac{145}{16}$$

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$$\hat{E}_1 = \hat{E}_2$$

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

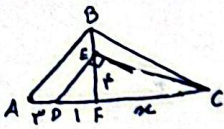
$$AE = \sqrt{11^2 + 1^2}$$

$$\hat{AED} \sim \hat{AEC} \Rightarrow \frac{AE}{ED} = \frac{EC}{AE} \Rightarrow \frac{\sqrt{121 + 1}}{10} = \frac{10 + x}{\sqrt{121 + 1}}$$

$$121 + 1 = 100 + 10x$$

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

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



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

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

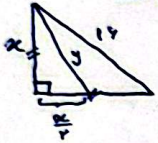
$$x = 14$$

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

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

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

6



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

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

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

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

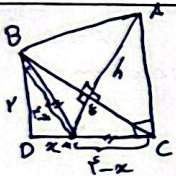
$$x = 8\sqrt{2}$$

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

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

مثلث متساوی الساقین است پس میانه نظیر آن کی ساق نیز نصفی مقدار است.

7



$$BC = \sqrt{14^2 + 14^2} = 14\sqrt{2} \Rightarrow BE = CE = 7\sqrt{2}$$

ME عمود منصف BC است $\Rightarrow BM = CM$

$$BM = CM \Rightarrow \frac{14}{2} = 7 \Rightarrow MC = 7 - x = \frac{14}{2} - \frac{14}{2} = 0$$

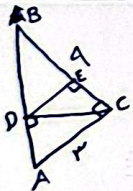
$$ME = \sqrt{MC^2 - FC^2} = \sqrt{\left(\frac{14}{2}\right)^2 - (7\sqrt{2})^2} = \sqrt{\frac{196}{4} - 98} = \sqrt{49} = 7$$

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

$$(7\sqrt{2})^2 = \frac{\sqrt{2}}{2} \times h \Rightarrow h = \frac{10}{\sqrt{2}} = 5\sqrt{2}$$

$$S_{ABE} = \frac{BE \times h}{2} = \frac{7\sqrt{2} \times 5\sqrt{2}}{2} = \boxed{49}$$

8



$$AB = \sqrt{12^2 + 16^2} = 20$$

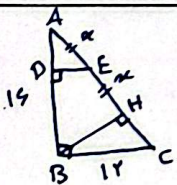
$$AC^2 = AD \times AB \Rightarrow 4 = AD \times 20 \Rightarrow AD = \frac{4}{20} = \frac{1}{5}$$

$$BD = AB - AD = 20 - \frac{1}{5} = \frac{99}{5}$$

$$\frac{DE}{AC} = \frac{BE}{BC} \Rightarrow \frac{DE}{20} = \frac{BE}{20} \Rightarrow DE = BE$$

$$BE = \frac{4 \times 9}{10} = \boxed{3.6}$$

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$$AC = \sqrt{12^2 + 16^2} = 20 \Rightarrow AB^2 = AH \times AC$$

$$\frac{12}{20} \times 16 = \frac{1}{20} \times \frac{16}{20} \Rightarrow x = \frac{16}{20}$$

$$DE \perp AB$$

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

$$\Rightarrow DE = \frac{12 \times \frac{16}{20}}{20} = \frac{12 \times 16}{100} = \frac{384}{100} = \boxed{3.84}$$

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