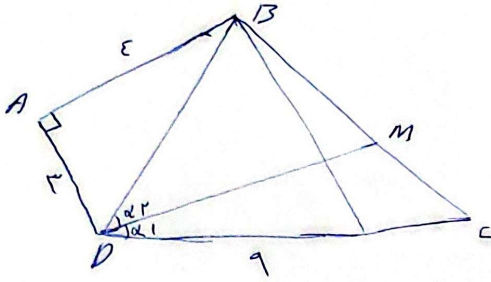
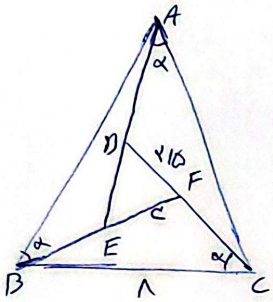


$$\frac{AB}{AD} = \frac{AC}{AE} = \frac{BC}{DE} = \frac{12}{a}$$

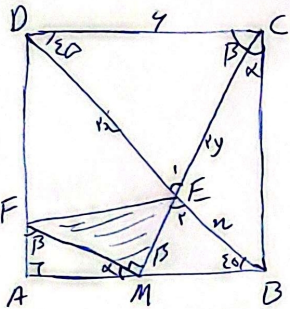
$$\frac{S_{\triangle BCE}}{S_{\triangle BDE}} = \frac{\frac{1}{2} \times BC \times h}{\frac{1}{2} \times DE \times h} = \frac{12}{a} = \frac{2}{1} \Rightarrow a = 6$$



ABMD متوازي $\rightarrow DM = \epsilon$ $BM = c$
 $\hat{D}_1 = \hat{D}_2 \rightarrow \triangle MDB, \triangle MDE$ متماثل الزاوية $\rightarrow MF = BM = c$
 $DF = a$ $FC = \epsilon$
 $\frac{BM}{BF} = \frac{MO}{FC} = \frac{c}{\epsilon} = \frac{1}{2} \rightarrow MO = 2$



$\triangle EFD \rightarrow \triangle FBC$ زاوية خارجي $\rightarrow \hat{EFD} = \hat{B} - \alpha + \alpha = \hat{B}$
 $\triangle FDE \rightarrow \triangle ABE$ زاوية خارجي $\rightarrow \hat{FDE} = \hat{A} - \alpha + \alpha = \hat{A}$
 $\triangle ABC \sim \triangle DEF \rightarrow \frac{12}{a} = \frac{c}{AB} \rightarrow AB = 9/4$



$$\tan \beta = \frac{AM}{AF} = \frac{BC}{MB} \rightarrow \frac{c}{AF} = 2 \rightarrow AF = \frac{c}{2}$$

$$MF = \sqrt{\left(\frac{c}{2}\right)^2 + (c)^2} = \frac{c\sqrt{5}}{2}$$

$\hat{E}_1 = \hat{E}_2$ $\rightarrow \triangle DCE \sim \triangle MEB \rightarrow \frac{y}{c} = 2 \rightarrow cy = \sqrt{4c^2 + c^2} = c\sqrt{5}$
 $y = \sqrt{5}$

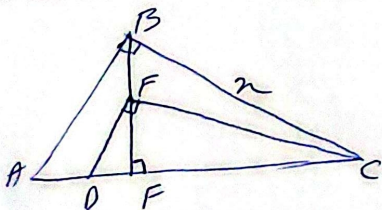
$$S_{FEM} = \frac{1}{2} \times MF \times EM = \frac{1}{2} \times \frac{c\sqrt{5}}{2} \times \sqrt{5} = \frac{5c}{4}$$

$$11^2 + 2^2 \rightarrow AF = \sqrt{11^2 + 2^2}$$

$$\triangle AEC \sim \triangle ACD \rightarrow \frac{AE}{ED} = \frac{EC}{AE} \rightarrow AE^2 = ED \times EC$$

$$11^2 + 2^2 = ED \times EC \rightarrow 11^2 + 2^2 = 1 \cdot 0 + 1 \cdot n \rightarrow n^2 - 1 \cdot n + 21 = 0$$

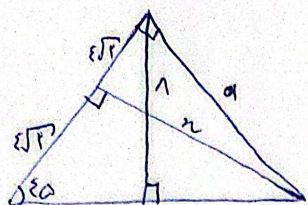
$$\rightarrow (n-7)(n-3) = 0 \rightarrow \begin{cases} n=7 \\ n=3 \end{cases}$$



$$EF^2 = DF \times FC \rightarrow 14 = 1 \times FC \rightarrow FC = 14$$

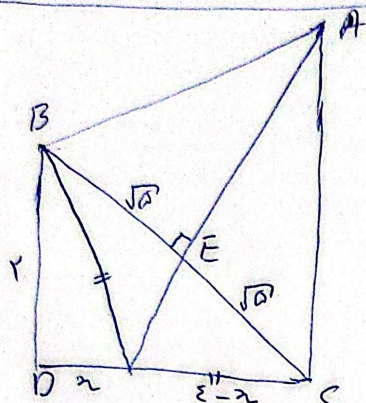
$$2^2 = CF \times AC \rightarrow 2^2 = 14 \times 2$$

$$2 = 7 \times 2\sqrt{2} = 14\sqrt{2}$$



$$2a^2 = 16^2 \rightarrow a^2 = 16 \times 14 \rightarrow a = 8 \times 2\sqrt{2} = 16\sqrt{2}$$

$$2^2 = \sqrt{(16\sqrt{2})^2 + (8\sqrt{2})^2} = \sqrt{144} = 12$$



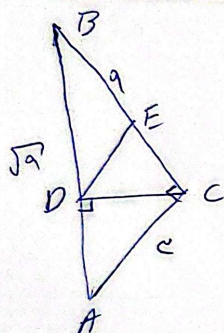
$$BC = \sqrt{2^2 + 2^2} = 2\sqrt{2}$$

$$(2-x)^2 = 2 + x^2 \rightarrow 4 - 4x + x^2 = 2 + x^2 \rightarrow 2 = 4x \rightarrow x = \frac{1}{2}$$

$$BO \rightarrow 2-x \rightarrow 2 - \frac{1}{2} = \frac{3}{2} \quad \triangle OEC \Rightarrow OE^2 = \left(\frac{3}{2}\right)^2 - (\sqrt{2})^2 = \frac{1}{4}$$

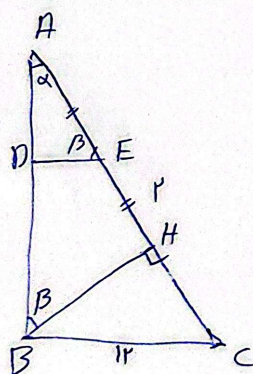
$$OE = \frac{\sqrt{2}}{2} \rightarrow AO \times OE = OC^2 \rightarrow AO \times \frac{\sqrt{2}}{2} = \left(\frac{3}{2}\right)^2$$

$$AO = \frac{9}{2\sqrt{2}} \rightarrow \frac{9\sqrt{2}}{4} \quad S_{AEB} = \frac{1}{2} \times \sqrt{2} \times \left(\frac{9\sqrt{2}}{4} - \frac{\sqrt{2}}{2}\right) = \frac{1}{2}$$



$$BC^2 = BD \times AB \rightarrow 9^2 = BD \times 9 \rightarrow BD = \frac{81}{9} = 9$$

$$BD^2 = BE \times BC \rightarrow \left(\frac{81}{9}\right)^2 = BE \times 9 \quad BE = \frac{81 \times 81}{9 \times 9} = 81$$



$$AC = 12$$

$$BH \times AC = AB \times BC \rightarrow BH \times 12 = 12 \times 12 \rightarrow BH = \frac{144}{12} = 12$$

$$AH = \sqrt{(12)^2 - (12)^2} = 0 \rightarrow HE = 12$$

$$\begin{cases} \hat{A} = \hat{A} \\ \hat{H} = \hat{D} \end{cases} \rightarrow \triangle ADE \sim \triangle AHB \rightarrow \frac{DE}{BH} = \frac{AE}{AB}$$

$$\rightarrow \frac{DE}{12} = \frac{12}{12} \rightarrow DE = 12 = \frac{1}{2}$$