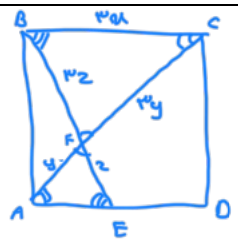
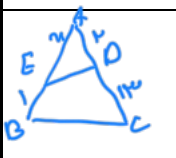


$ED = AE \rightarrow \frac{EF}{AF} ? \quad \Delta BFC \sim \Delta AFE \rightarrow \frac{BC}{AB} = \frac{CF}{AF} = \frac{BF}{EF}$
 $\frac{4}{n} = \frac{4}{n} = \frac{CF}{AF} \rightarrow CAF = CF, \quad WEF = BF$
 $AC^2 = (4n)^2 + (4n)^2 = 16n^2 \rightarrow AC = 4\sqrt{2}n \rightarrow \varepsilon y = 4\sqrt{2} \rightarrow y = \frac{4\sqrt{2}}{\varepsilon} n$
 $BE^2 = (4n)^2 + 4^2 = 16n^2 + 16 \rightarrow BE = \sqrt{16n^2 + 16} \rightarrow \varepsilon z = \sqrt{16} n \rightarrow z = \frac{4}{\varepsilon} n$
 $\frac{EF}{AF} = \frac{z}{y} = \frac{\frac{4}{\varepsilon} n}{\frac{4\sqrt{2}}{\varepsilon} n} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$



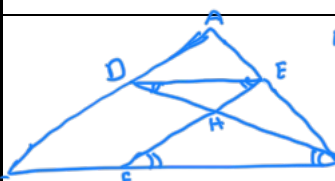
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$\Delta AED \sim \Delta ABC \begin{cases} \hat{E} = \hat{C} \\ \hat{A} \rightarrow \hat{A} \end{cases} \Rightarrow \hat{D} = \hat{B} \Rightarrow \frac{AE}{AC} = \frac{AD}{AB} = \frac{ED}{BC} \rightarrow \frac{n}{10} = \frac{2}{n+1}$
 $\Rightarrow n^2 + n - 20 = 0 \rightarrow (n+4)(n-5) = 0 \rightarrow n = 5, \quad \frac{-4}{\sqrt{2}}$



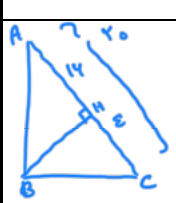
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$BC = ? \quad BF = 3 \quad y = 2n \quad DE \parallel BC \rightarrow \Delta ABC, \Delta DEF \sim \Delta ABC \rightarrow \frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC}$
 $\frac{AD}{AB} = \frac{n}{n+FC} = \frac{DE}{FC+BF} \rightarrow \frac{n}{n+FC} = \frac{1}{2} = \frac{DE}{FC+3} \rightarrow 2DE = FC+3$
 $DE = \frac{3}{\varepsilon} \rightarrow FC = \frac{10}{9}$
 $\Delta DEH \sim \Delta FCH \Rightarrow \frac{DF}{FC} = \frac{FH}{FH} = \frac{DH}{AC}$
 $\frac{4}{9} = \frac{DE}{FC} \rightarrow 4FC = 9DE$
 $FC = \frac{9}{4} DE$



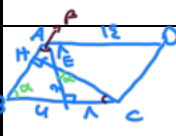
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$BC^2 = CH \times AC \rightarrow BC = \sqrt{2 \times 18} = 6\sqrt{2}$
 $AB^2 = AH \times AC \rightarrow AB = \sqrt{14 \times 18} = 6\sqrt{7}$
 $\frac{BC}{AB} = \frac{1}{\sqrt{2}}$

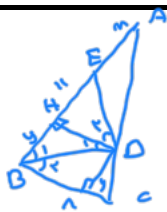


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$\hat{B} = \hat{B} \Rightarrow \Delta ABF \sim \Delta BCH \rightarrow \frac{BH}{BF} = \frac{CH}{AF} = \frac{BC}{AB} \sim \frac{BH}{4} = \frac{CH}{n+1}$
 $\hat{C} = \hat{C} \Rightarrow \Delta BFC \sim \Delta HCB \rightarrow \frac{BC}{FC} = \frac{BH}{FE} = \frac{HC}{FC} \sim \frac{HC}{1} = \frac{BH}{n}$
 $\rightarrow \frac{n}{4} = \frac{1}{n+1} \rightarrow n^2 + n = 4 \rightarrow n^2 + n - 4 = 0 \rightarrow (n+1)(n-4) = 0 \rightarrow n = 4$
 $AF = 2 + 1 = 3$



۵



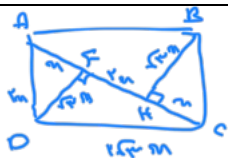
$$B_1 = B_2 \quad HD \parallel BC \rightarrow D_1 = B_2 \rightarrow DH = BH \quad H = 90^\circ \rightarrow B_1 = D_1 \rightarrow \angle D_1 = \angle D_2 \rightarrow B_2 = \angle D_2$$

$$D \hat{E} B \rightarrow EH \times BH = \frac{DH^2}{BH} = \frac{11}{4} \quad HD \parallel BC \rightarrow \frac{2 \times \frac{11}{4}}{2 + 11} = \frac{11}{13} = \frac{11}{14}$$

$$\sim 11m + 11 = 14m + 11 \rightarrow m = 4, 4$$

5)

6

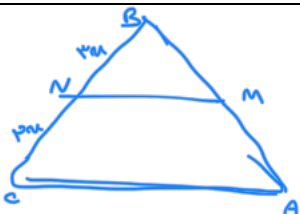


$$\frac{S_{ABCD}}{S_{BCH}} = \frac{AD \times DC}{\frac{1}{2} \times BH \times CH} = \frac{2m \times 2\sqrt{m}}{\frac{1}{2} \times \sqrt{m} \times m} = 1$$

$$BC^2 = HC \times AC \rightarrow BC = \sqrt{m}$$

5)

7



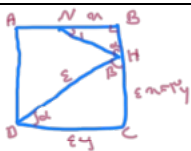
$$\frac{BC \times AB \times \sin \beta}{BN \times MB \times \sin \beta} = 1$$

$$\frac{2 \times 2 \times AB}{MB \times MB} = 1$$

$$\frac{AB}{MB} = \frac{2}{a} \quad \frac{BM}{AB} = \frac{2}{a} \rightarrow \frac{BM}{AM} = \frac{2}{a}$$

5)

8



$$\alpha + \beta = 90^\circ = 180^\circ \rightarrow \alpha + \beta = 90^\circ$$

$$\rightarrow \Delta_{NHB} : 90^\circ + \alpha + N_1 = 180^\circ \rightarrow N_1 = 90^\circ - \alpha = \beta$$

$$\Delta_{DHC} : 90^\circ + \beta + D_1 = 180^\circ \rightarrow D_1 = 90^\circ - \beta = \alpha$$

$$\Delta_{NHB} \sim \Delta_{DHC}$$

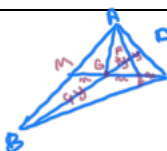
$$\frac{BN}{CH} = \frac{DH}{CD} = \frac{1}{2} \rightarrow \epsilon BH = CD \quad (BH = 4) \quad \Delta_{ACH} : (DH)^2 = (CH)^2 + (DC)^2 \rightarrow (DH)^2 = (4y)^2 + (\epsilon y)^2$$

$$\Rightarrow DH = 2y = \epsilon \rightarrow y = \frac{\epsilon}{2} \rightarrow DC = \epsilon \times \frac{\epsilon}{2} = \frac{\epsilon^2}{2}$$

$$S = \frac{14}{2} \times \frac{14}{2} = 10, 125$$

5)

9



$$BE = EC \quad \text{در مثل } BEC \rightarrow \angle EBC = \angle ECB \rightarrow BD, AB \parallel CM \rightarrow \text{در مثل } ABD \text{ و } CME \text{ متشابه}$$

$$\rightarrow BE = EC = 2 \times 2 = 4$$

$$GF = 2FD = 2y \quad \leftarrow \text{در مثل } ABE \text{ و } CDE : \angle ABE = \angle CDE, \angle BAE = \angle DCE$$

$$\frac{BD}{FD} = \frac{9y}{y} = 9$$

5)

10