

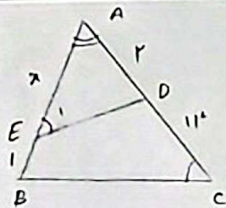
$$\frac{ED}{AE} = 1 \Rightarrow ED = 1-x, AE = x \Rightarrow \frac{ED}{AE} = 1-x$$

$$\Rightarrow BE^2 = 1^2 + x^2 = 1+x^2 \Rightarrow BE = \sqrt{1+x^2}$$

$$AC^2 = 1^2 + 1^2 = 2 \Rightarrow AC = \sqrt{2}$$

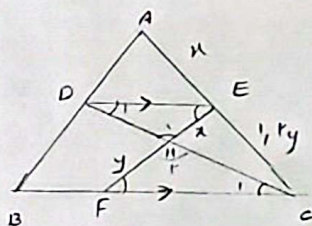
$$BC \parallel AE \Rightarrow \hat{C}_1 = \hat{A}_1, \hat{F}_1 = \hat{F}_2 \Rightarrow \triangle BCF \sim \triangle AEF$$

$$\Rightarrow \frac{BF}{EF} = \frac{CF}{AF} \Rightarrow \frac{BF+CF}{EF+AF} = \frac{CF+AF}{AF} \Rightarrow \frac{BC}{EF} = \frac{AC}{AF} \Rightarrow \frac{EF}{AF} = \frac{BC}{AC} = \frac{\sqrt{1+x^2}}{\sqrt{2}}$$



$$\hat{A}_1 = \hat{A}_2 \Rightarrow \triangle AED \sim \triangle ABC \Rightarrow \frac{AD}{AB} = \frac{AE}{AC} \Rightarrow \frac{x}{1} = \frac{1/2}{1} \Rightarrow x = 1/2$$

$$\Rightarrow x^2 + x = 1 \Rightarrow x^2 + x - 1 = 0 \Rightarrow (x+4)(x-1) = 0 \Rightarrow x = -4 \text{ or } x = 1$$

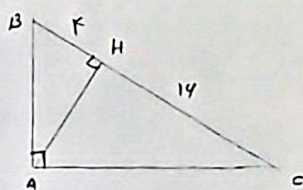


$$DE \parallel BC \Rightarrow \frac{AE}{AC} = \frac{DE}{BC} \Rightarrow \frac{1/2}{1} = \frac{DE}{1} \Rightarrow DE = 1/2$$

$$\Rightarrow \frac{AE}{AC} = \frac{x}{1+x} = \frac{1/2}{1} \Rightarrow \frac{x}{1+x} = 1/2 \Rightarrow 2x = 1+x \Rightarrow x = 1$$

$$DE \parallel FC \Rightarrow \hat{D}_1 = \hat{C}_1, \hat{H}_1 = \hat{H}_2 \Rightarrow \triangle DEH \sim \triangle FHC \Rightarrow \frac{EH}{FH} = \frac{DE}{FC} = \frac{x}{1-x} = \frac{1/2}{1-x} = \frac{1}{2(1-x)}$$

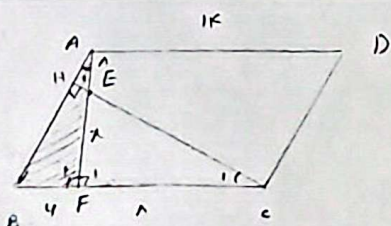
$$\Rightarrow FC = \frac{2a}{1-x} \Rightarrow BF = \frac{2a}{1-x} - \frac{2a}{1-x} = \frac{2a}{1-x} = 1 \Rightarrow a = \frac{1}{2} \Rightarrow BC = \frac{1}{2} = 1/2$$



$$AB^2 = 1^2 + 1^2 = 2 \Rightarrow AB = \sqrt{2}$$

$$AC^2 = 1^2 + 1^2 = 2 \Rightarrow AC = \sqrt{2}$$

$$\Rightarrow \frac{AB}{AC} = \frac{\sqrt{2}}{\sqrt{2}} = 1$$

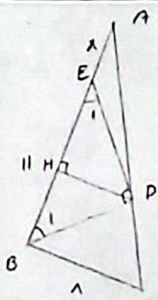


$$\triangle ABF, \triangle CBH \rightarrow \hat{A}_1 = \hat{C}_1, \hat{B}_1 = \hat{B}_2 \Rightarrow \triangle ABF \sim \triangle EFC$$

$$\triangle ABF, \triangle EFC : \hat{F}_1 = \hat{F}_2 = 1 \Rightarrow \frac{AB}{EF} = \frac{BF}{FC} = \frac{AF}{EC}$$

$$\Rightarrow \frac{AF}{FC} = \frac{BF}{EF} \Rightarrow \frac{1+x}{1-x} = \frac{1}{1-x} \Rightarrow 1+x = 1 \Rightarrow x = 0$$

$$\rightarrow AF = AE + EF = 1 + 1 = 2$$



$$\frac{AD}{DC} = \frac{AB}{BC} = \frac{x+11}{11}$$

نسبت اضلاع قائمه الساقين

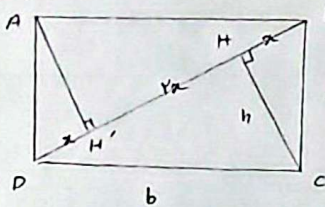
$$\rightarrow DH \perp AB \Rightarrow AB \perp BC \Rightarrow \hat{B} = 90^\circ \xrightarrow{\text{نسبت اضلاع}} \hat{B}_1 = 90^\circ$$

$$\rightarrow \triangle BED : \hat{D} = 90^\circ, \hat{B}_1 = 90^\circ \Rightarrow \hat{E}_1 = 90^\circ \Rightarrow ED = BD = a \rightarrow \frac{a}{11} = \frac{11}{\sqrt{14}} \Rightarrow a = \frac{11}{\sqrt{14}}$$

$$\rightarrow BD \times ED = HD \times 11 \Rightarrow \frac{11}{\sqrt{14}} = 11 \times HD \rightarrow HD = \frac{1}{\sqrt{14}}$$

$$\frac{AD}{AC} = \frac{HD}{BC} = \frac{\frac{1}{\sqrt{14}}}{11} = \frac{1}{11\sqrt{14}} = \frac{x+11}{14} = \frac{x+11}{14\sqrt{14}} \Rightarrow 10.9 + 11x = 14x + 14\sqrt{14} \rightarrow 3x = 14\sqrt{14} - 10.9 \Rightarrow x = \frac{14\sqrt{14} - 10.9}{3}$$

6



$$a^r = HB \times BD = x \times \sqrt{14} = \sqrt{14}x^r \rightarrow a = \sqrt{14}x$$

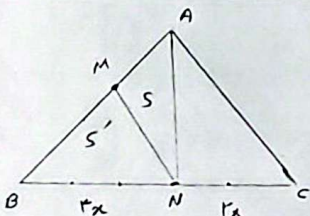
$$b^r = DH \times BD = \sqrt{14}x \times \sqrt{14} = 14x^r \rightarrow \sqrt{14}x = b$$

$$h^r = HB \times DH = x \times \sqrt{14} = \sqrt{14}x^r \rightarrow h = \sqrt{14}x$$

$$S_{\triangle BCD} = \frac{x \times \sqrt{14}x}{2} = \frac{\sqrt{14}x^2}{2}$$

$$S_{ABCD} = ab = \sqrt{14}x \times \sqrt{14}x = 14x^2 \rightarrow \frac{\sqrt{14}x^2}{2} = 14 \Rightarrow x = \frac{14\sqrt{2}}{\sqrt{14}} = \sqrt{28}$$

7



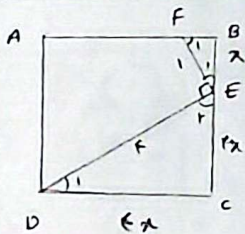
$$S_{AMN} = S, S_{BMN} = S'$$

$$\rightarrow \frac{S_{ACN}}{S_{ABN}} = \frac{r}{1-r} = \frac{S_{ACN}}{S+S'} \rightarrow S_{ACN} = \frac{r(S+S')}{1-r}$$

$$\rightarrow S_{ABC} = \frac{r}{1-r}(S+S') + (S+S') = \frac{S(S+S')}{1-r}$$

$$\rightarrow \frac{S_{ABC}}{S_{BMN}} = r = \frac{S(S+S')}{1-r} = \frac{S(S+S')}{1-r} \Rightarrow 19S' = 15S + 19S' + 19S' \Rightarrow 19S' = 15S \Rightarrow \frac{S'}{S} = \frac{15}{19} = \frac{BM}{AM}$$

8



$$\hat{E}_1 + \hat{E}_r = 90^\circ \Rightarrow \hat{E}_r = \hat{F}_1$$

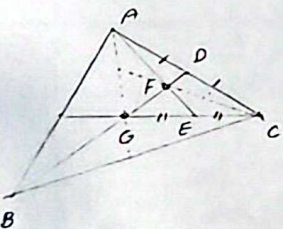
$$\hat{E}_1 + \hat{F}_1 = 90^\circ$$

$$\hat{B} = \hat{C} = 90^\circ \Rightarrow \triangle FEB \sim \triangle CDE \Rightarrow \frac{BE}{CD} = \frac{FE}{DE} = \frac{1}{r} \rightarrow BE = x, CD = \sqrt{14}x$$

$$\rightarrow BC = CD = \sqrt{14}x = BE + EC \rightarrow EC = \sqrt{14}x$$

$$9x^2 + 14x^2 = 14x^2 = 14 \rightarrow x^2 = \frac{14}{23} \rightarrow x = \frac{\sqrt{14}}{\sqrt{23}} \rightarrow (Fx)^2 = \left(\frac{14}{23}\right)^2 = \frac{196}{529}$$

9



$$\frac{GD}{BD} = \frac{1}{14} \rightarrow BD = 14GD \leftarrow \triangle ABC \text{ مثلث قائم الساقين}$$

$$\frac{FD}{GD} = \frac{1}{14} \Rightarrow FD = \frac{GD}{14} \leftarrow \triangle AGC \text{ مثلث قائم الساقين}$$

$$\rightarrow \frac{BD}{FD} = \frac{14GD}{\frac{GD}{14}} = 196$$

10