

$$BE = \sqrt{10} \cdot x, \quad AC = 3\sqrt{2} \cdot x$$

$$fz = 3\sqrt{2} \cdot x \rightarrow z = \frac{3\sqrt{2}}{f} \cdot x \rightarrow \frac{EF}{AF} = \frac{y}{z} = \frac{\frac{\sqrt{10}}{f} \cdot x}{\frac{3\sqrt{2}}{f} \cdot x} = \frac{\sqrt{10}}{3\sqrt{2}} = \frac{\sqrt{5}}{3}$$

$$fy = \sqrt{10} \cdot x \rightarrow y = \frac{\sqrt{10}}{f} \cdot x$$

$$\left. \begin{array}{l} \hat{A} = \hat{A} \\ \hat{E} = \hat{C} \\ \hat{D} = \hat{B} \end{array} \right\} \rightarrow \triangle AED \sim \triangle ABC$$

$$\xrightarrow[\text{نسبت اضلاع}]{\text{نسبت}} \frac{y}{x+1} = \frac{x}{10} = \frac{ED}{BC} \Rightarrow x^2 + x = 10$$

$$\rightarrow (x-5)(x+2) = 0 \rightarrow \boxed{x=5} \quad \text{و } x=-2 \text{ غلط}$$

$$BF = 3$$

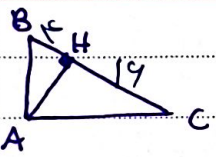
$$\frac{x}{y} = \frac{4}{5} \rightarrow \frac{DE}{z} = \frac{3}{5}$$

$$FC \rightarrow z$$

$$3y = 5x$$

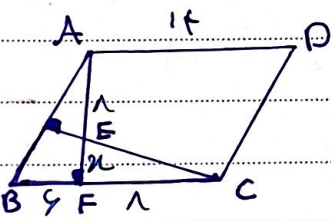
$$\frac{DE}{BC} = \frac{AE}{AC} \Rightarrow \frac{\frac{3}{5}z}{x+z} = \frac{x}{x+1+3y} \Rightarrow \frac{3z}{10+5z} = \frac{1}{3}$$

$$\rightarrow z = 3.5 \Rightarrow DC = 3 + 3.5 = 6.5$$



$$\text{رابطه هذلی در مثلث قائم الزاویه} \quad AH^2 = BH \times CH = 4 \times 9 \Rightarrow AH = 6$$

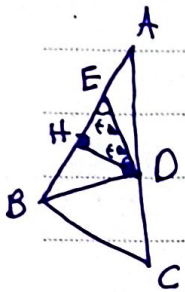
$$\triangle ABH \sim \triangle ABC \xrightarrow[\text{اضلاع}]{\text{نسبت}} \frac{AC}{AB} = \frac{AH}{BH} = \frac{6}{4} = \frac{3}{2}$$



$$\triangle BAF \sim \triangle ECF \rightarrow \frac{BF}{EF} = \frac{AF}{CF}$$

$$\rightarrow \frac{4}{x} = \frac{1+x}{12} \Rightarrow 48 = 12x + x^2 \Rightarrow (x-6)(x+8) = 0$$

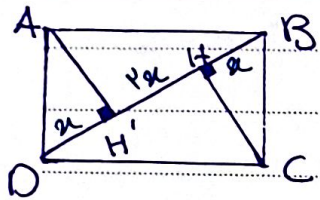
$$\rightarrow \boxed{x=6} \quad \text{و } x=-8 \text{ غلط} \Rightarrow AF = 1+x = 7$$



$$EH = DH = HB = 2a$$

$$\triangle AHD \sim \triangle ABC \Rightarrow \frac{AH}{AB} = \frac{HD}{BC} = \frac{a/a}{1} = \frac{a/a + AE}{1 + AE}$$

$$\Rightarrow 2a/a + 4a/a = 4 + 1AE \rightarrow AE = 4.4$$



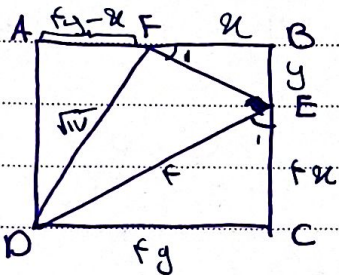
$$AH' = x \times \sqrt{3} \Rightarrow AH' = x\sqrt{3}$$

$$S_{\square} = \frac{4 \times x\sqrt{3} \times 4}{2} = 4\sqrt{3}x$$

$$\rightarrow S_{\Delta} = \frac{x\sqrt{3}}{2} \rightarrow \frac{S_{\square}}{S_{\Delta}} = \frac{4\sqrt{3}x}{\frac{x\sqrt{3}}{2}} = 8$$

$$\frac{S_{BMN}}{S_{ABC}} = \frac{BM \times BN}{BA \times BC} = \frac{BM}{AB} \times \frac{1}{a} = \frac{1}{4} \Rightarrow \frac{BM}{AB} = \frac{a}{4}$$

$$\rightarrow \frac{BM}{AM} = \frac{a}{f}$$



$$9. + F_1 = 9. + E_1 \rightarrow \begin{cases} \hat{E}_1 = \hat{F}_1 \\ \hat{B} = \hat{C} \end{cases} \rightarrow \triangle FBE \sim \triangle DCE$$

$$\frac{FE}{DE} = \frac{FB}{EC} = \frac{BE}{DC} = \frac{1}{f} / f_x + y = f_y \rightarrow x = \frac{f}{f} y$$

$$\rightarrow f_y - x = \frac{1}{f} y \Rightarrow (\sqrt{1+f^2})^2 = (\frac{1}{f} y)^2 + f_y^2 \Rightarrow y = \frac{1}{1+f^2}$$

$$DC = f \times \frac{1}{1+f^2} = \frac{1}{f} \rightarrow S_{\square} = \frac{1}{f} \times \frac{1}{f} = \frac{1}{f^2}$$

$$CM = DM = x \rightarrow AD = 2x / EM \parallel GD \rightarrow \frac{EC}{EG} = \frac{CM}{DM} = 1$$

$$FD \parallel EM \rightarrow \frac{AD}{AM} = \frac{FD}{EM} = \frac{FD}{EM} = \frac{2x}{f_x} \rightarrow EM = \frac{f}{2} FD$$

$$EM \parallel PG \rightarrow \frac{CM}{CO} = \frac{EM}{GO} = \frac{x}{f_x} = \frac{EM}{GO} \rightarrow GD = 2EM \rightarrow GD = f FD$$

$$\rightarrow \frac{GD}{BD} = \frac{1}{f} \rightarrow \frac{f FD}{BD} = \frac{1}{f} \rightarrow \frac{BD}{FD} = f$$