

$$\triangle AFE \sim \triangle BFC$$

$$\frac{AE}{BC} = \frac{FE}{BF} = \frac{AF}{FC} = \frac{1}{\sqrt{2}}$$

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$$BE = \sqrt{(4-x)^2 + x^2} = \sqrt{16-8x+x^2+x^2} = \sqrt{16-8x+2x^2}$$

$$FE = \frac{\sqrt{2} \cdot x}{\sqrt{2}}$$

$$\frac{AF}{FC} = \frac{1}{\sqrt{2}}$$

$$\frac{AF}{AC} = \frac{1}{\sqrt{2}}$$

$$\frac{AF}{AC} = \frac{1}{\sqrt{2}}$$

$$AF = \frac{\sqrt{2} \cdot x}{\sqrt{2}}$$

$$\frac{FE}{AF} = \frac{\frac{\sqrt{2} \cdot x}{\sqrt{2}}}{\frac{\sqrt{2} \cdot x}{\sqrt{2}}} = \sqrt{\frac{1}{16}}$$

$$\triangle AED \sim \triangle ABC$$

$$\frac{ED}{BC} = \frac{AD}{AB} = \frac{AE}{AC}$$

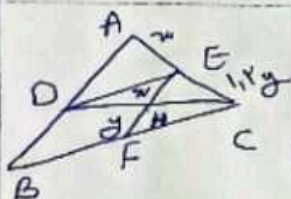
$$\rightarrow \frac{1}{x+1} = \frac{x}{4}$$

$$x^2 + x = 4$$

$$x^2 + x - 4 = 0 \quad (x+4)(x-1) = 0$$

$$x = -4 \text{ یا } x = 1$$

$$x = 1 \text{ یا } x = 0$$



$$x = 1 \text{ یا } x = 0$$

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

$$\triangle DHE \sim \triangle FHC$$

$$\frac{DE}{FC} = \frac{1}{4}$$

$$x = \frac{1}{4} \cdot 4 = 1$$

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

$$\frac{AE}{AC} = \frac{DE}{BC} = \frac{1}{4}$$

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

$$\frac{DE}{FC} = \frac{1}{4} \Rightarrow FC = 4$$

$$\frac{1}{4} = \frac{DE}{FC} = \frac{1}{4} \Rightarrow FC = 4$$

$$4x = 4x + 4$$

$$x = \frac{4}{4} = 1$$

$$BC = 4x + 4 = \frac{10}{4} + 4 = \frac{19}{2}$$



$$BC = 4$$

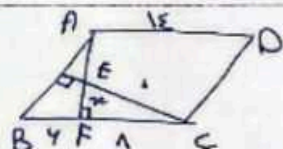
$$AC^2 = EH^2$$

$$AC = EH$$

$$AB^2 = 14 \times 4$$

$$AB = 14$$

$$\frac{AB}{AC} = \frac{14}{4} = \frac{7}{2}$$



$$\triangle AFE \sim \triangle EFC$$

$$\frac{AE}{EC} = \frac{EF}{FC} = \frac{AF}{FE}$$

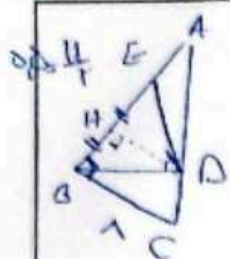
$$EA = x^2 + 14x$$

$$x^2 + 14x - EA = 0$$

$$(x+14)(x-1) = 0$$

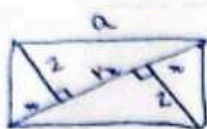
$$x = 1$$

$$AF = 1 + 1 = 2$$



$$DH \parallel BC : \frac{AD}{AB} = \frac{DE}{BC} = \frac{x}{11+x}$$

$$\begin{aligned} \epsilon + 11x &= 40, \quad \epsilon + 11x = 40 \\ 11x &= 40 - \epsilon \end{aligned}$$



$$a^2 = 4x^2 + 2^2 \rightarrow a^2 = 14x^2 \quad a = \sqrt{14}x$$

$$b^2 = x^2 + 2^2 \rightarrow b^2 = 5x^2 \rightarrow b = \sqrt{5}x$$

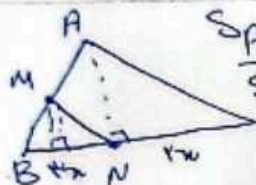
$$2 = \sqrt{5}x$$

$$a^2 + b^2 = 14x^2 + 5x^2 = 19x^2$$

$$2^2 = 4x^2$$

$$2 = \sqrt{4}x$$

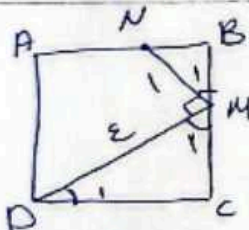
$$\frac{S_{\triangle}}{S_{\square}} = \frac{a \cdot b}{x \cdot 2} = \frac{\sqrt{14}x \cdot \sqrt{5}x}{x \cdot 2} = \frac{\sqrt{70}}{2} \quad \text{--- (1)}$$



$$\frac{S_{\triangle ABC}}{S_{\triangle BMN}} = \frac{h_1 \cdot \frac{1}{3}BC}{h_2 \cdot \frac{1}{3}BC} = \mu \quad \Delta h_1 = 9h_2$$

$$h_1 \parallel h_2 \Rightarrow \frac{h_2}{h_1} = \frac{BM}{AB} = \frac{1}{9} \rightarrow \frac{AM}{AB} = \frac{8}{9}$$

$$\frac{BM}{AB} = \frac{BM}{AM} = \frac{1}{8}$$



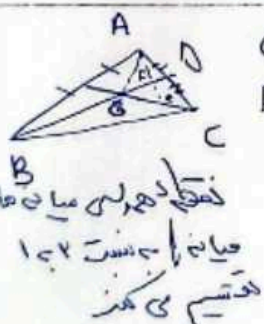
$$m_1 + m_2 = 90 \quad \begin{cases} m_1 = 90 \\ m_2 = 90 \end{cases} \rightarrow \triangle CMN \sim \triangle BMN$$

$$\frac{MC}{BN} = \frac{MD}{NM} = \frac{CD}{BM} = \frac{1}{2}$$

$$BM = \frac{1}{2}CD \quad MC = \frac{1}{2}CD$$

$$\left(\frac{1}{2}CD\right)^2 + \left(\frac{1}{2}CD\right)^2 = 14 \quad \left(\frac{1}{2} + \frac{1}{2}\right)CD^2 = 14 \quad \frac{1}{2}CD^2 = 14 \quad \frac{1}{2}CD = \sqrt{14} \quad CD = \sqrt{14}$$

$$S = (CD)^2 = \frac{14 \cdot 14}{2} = 98$$



$$\begin{aligned} GD &= \frac{1}{3}BD \\ FD &= \frac{1}{3}GD \end{aligned} \quad \left. \begin{aligned} GD &= \frac{1}{3}BD \\ FD &= \frac{1}{3}GD \end{aligned} \right\} \quad FD = \frac{1}{9}BD$$

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