



$$DE \parallel BC \rightarrow \triangle ADE \sim \triangle ABC \rightarrow \frac{S_{ADE}}{S_{ABC}} = \left(\frac{AD}{AB}\right)^2 = \left(\frac{1}{3}\right)^2 = \frac{1}{9} \rightarrow S_{ABC} = \frac{144}{1} S_{ADE}$$

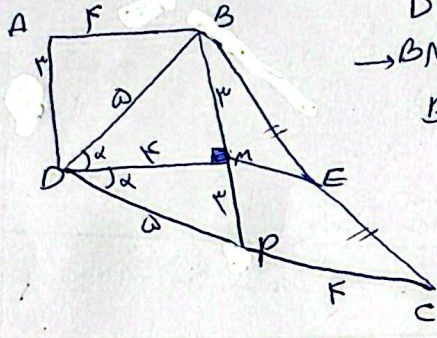
$$S_{ADE} = x \rightarrow S_{ABC} = \frac{144}{1} x$$

$$\frac{S_{ADE}}{S_{BDE}} = \frac{\frac{1}{2} \times EH \times \omega}{\frac{1}{2} \times EH \times \nu} = \frac{\omega}{\nu} \rightarrow \frac{x}{y} = \frac{\omega}{\nu} \rightarrow \frac{\omega}{\nu} = \frac{1}{2} \rightarrow \frac{\omega}{\nu} = \frac{1}{2}$$

$$S_{BCE} = S_{ABC} - S_{ADE} - S_{BDE} = \frac{144}{1} x - x - y = \frac{143x}{1}$$

$$S_{BCE} = \frac{143x}{1}$$

$$\frac{S_{BCE}}{S_{BDE}} = \frac{\frac{143x}{1}}{\frac{1}{2} \times EH \times \nu} = \frac{143}{1} \times \frac{1}{2} = \frac{143}{2}$$



$$DM \parallel AB \text{ و } BM \parallel AD \rightarrow \text{مستطیل } ABMD \rightarrow AD = \nu, AB = \kappa$$

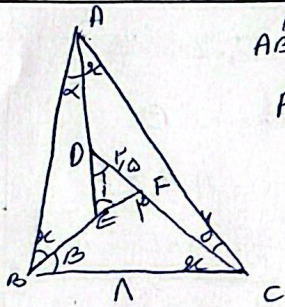
$$\rightarrow BM = \nu, DM = \kappa \rightarrow \sqrt{\kappa^2 + \nu^2} = \omega = BD$$

$$\angle BDC = \angle BDM \rightarrow \angle BDM = \angle DMP = \alpha$$

$$MD \parallel AC \rightarrow \angle BDP = \angle DMP = \alpha$$

$$\rightarrow BM = MP = \nu$$

$$BPC \rightarrow E, M \rightarrow ME \parallel PC \rightarrow ME = \frac{1}{2} PC = \frac{1}{2} \times \kappa = \frac{\kappa}{2}$$



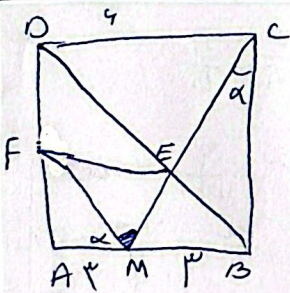
$$\triangle ABE \rightarrow \hat{E}_1 = x + \alpha = \hat{A}$$

$$\triangle ADC \rightarrow \hat{D}_1 = x + y = \hat{C}$$

$$\rightarrow \triangle ABC \sim \triangle DEF$$

$$\frac{DF}{BC} = \frac{EF}{AB} \rightarrow \frac{\nu \omega}{144} = \frac{\kappa}{AB}$$

$$\rightarrow AB = \frac{\nu \omega}{144} = 9,4$$



$$AM = BM = \nu \rightarrow \text{مستطیل } ABMD \rightarrow BM \parallel DC \rightarrow \triangle BME \sim \triangle DEC$$

$$\rightarrow \frac{ME}{CE} = \frac{BM}{DC} = \frac{\nu}{4} = \frac{1}{4}$$

$$BCM : CM^2 = BC^2 + BM^2 = 4^2 + \nu^2 = \kappa^2$$

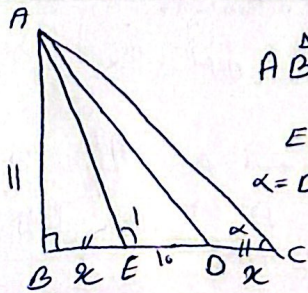
$$CM = \sqrt{16 + \nu^2}$$

$$ME = \sqrt{\nu^2}, CE = \nu \sqrt{2}$$

$$\triangle BCM \rightarrow \angle B = \hat{A} = 90^\circ \rightarrow \triangle BCM \sim \triangle AMF \rightarrow \frac{AM}{BC} = \frac{MF}{MC} \Rightarrow$$

$$\frac{\nu}{4} = \frac{MF}{\sqrt{16 + \nu^2}} \rightarrow MF = \frac{\nu}{4} \sqrt{16 + \nu^2}$$

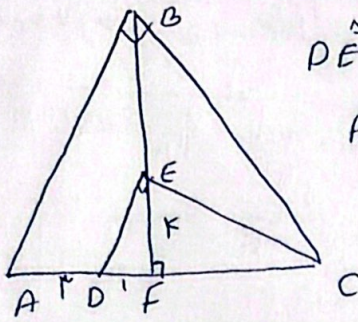
$$S_{MEF} = \frac{1}{2} \times \nu \times \frac{\nu}{4} \sqrt{16 + \nu^2} = \frac{\nu^2}{8} \sqrt{16 + \nu^2}$$



$$\triangle ABE : AE^2 = AB^2 + BE^2 = 11^2 + x^2 \rightarrow AE = \sqrt{121 + x^2}$$

$$E_1 = E_2 \text{ منتهی } \rightarrow \triangle AEC \sim \triangle AED \rightarrow \frac{AE}{ED} = \frac{EC}{AE} \rightarrow AE^2 = ED \times EC$$

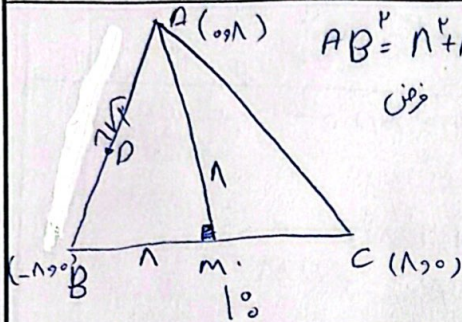
$$\alpha = \angle DAE = \angle ACD \rightarrow 11^2 + x^2 = 10(1 + x) \rightarrow x^2 - 10x + 11 = 0 \rightarrow x = \nu$$



$$D \hat{E} C : EF^2 = DF \times FC \rightarrow F^2 = 14 \times FC \rightarrow FC = 14$$

$$A \hat{B} C : BF^2 = AF \times FC = F \times 14 = 4F \rightarrow BF = 1$$

$$B \hat{F} C : BC^2 = BF^2 + FC^2 \rightarrow BC^2 = 1^2 + 14^2 = 1^2 (1 + 14) \Rightarrow BC = 1\sqrt{15}$$

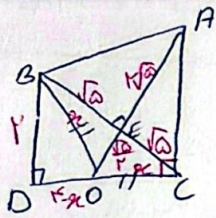


$$AB^2 = AM^2 + MB^2 \rightarrow AB = 1\sqrt{10}$$

$$D \rightarrow B(-1, 0) \quad C(1, 0) \quad A(0, 1) \quad M(0, \frac{1}{2}) \quad \rightarrow AM = \frac{1}{2} \rightarrow A(0, 1)$$

$$D \rightarrow \frac{1}{2} \rightarrow \left(\frac{0 + (-1)}{2}, \frac{1 + 0}{2} \right) = \left(-\frac{1}{2}, \frac{1}{2} \right)$$

$$CD \perp AB \rightarrow CD = \sqrt{(1 - (-\frac{1}{2}))^2 + (0 - \frac{1}{2})^2} = \sqrt{1 + \frac{1}{4}} = \sqrt{\frac{5}{4}} = \frac{\sqrt{5}}{2}$$



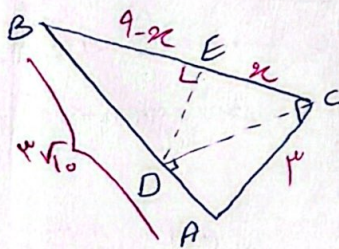
$$BD^2 + OD^2 = BO^2 \rightarrow 1^2 + (F - x)^2 = x^2 \rightarrow 1 + 14 - 14x + x^2 = x^2 \rightarrow 15 - 14x = 0 \rightarrow x = \frac{15}{14}$$

$$BC^2 = BD^2 + DC^2 \rightarrow BC^2 = 1 + 14 = 15 \rightarrow BC = \sqrt{15} \rightarrow EC = \frac{BC}{2} = \frac{\sqrt{15}}{2}$$

$$O \hat{E} C : OC^2 = EC^2 + EO^2 \rightarrow (1, 0)^2 = (\frac{\sqrt{15}}{2})^2 + EO^2 \rightarrow EO^2 = 1 - \frac{15}{4} = -\frac{11}{4}$$

$$\rightarrow 1, x^2 = 0 + EO^2 \rightarrow EO^2 = 14 \rightarrow EO = \sqrt{14}$$

$$S_{ABE} = \frac{1}{2} \times AE \times BE = \frac{1}{2} \times \sqrt{14} \times \sqrt{14} = 7$$

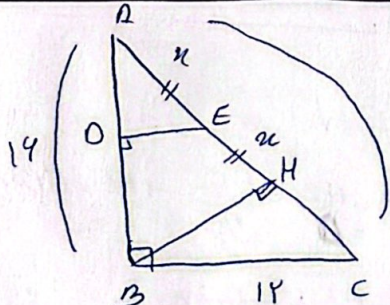


$$A \hat{B} C : AB^2 = AC^2 + BC^2 \rightarrow AB^2 = 9 + 16 = 25 \rightarrow AB = 5$$

$$A \hat{C} = AD \times AB \rightarrow 9 = AD \times 5 \rightarrow AD = \frac{9}{5}$$

$$\frac{AD}{AB} = \frac{EC}{BC} \rightarrow \frac{\frac{9}{5}}{5} = \frac{EC}{4} \rightarrow EC = \frac{9}{5}$$

$$BE = 9 \rightarrow AE = 14$$



$$AC = \sqrt{(14)^2 + (11)^2} = \sqrt{305} = 17$$

$$B \hat{H} \times AC = AB \times BC \rightarrow BH = \frac{17 \times 14}{17} = 14$$

$$\rightarrow AH = \sqrt{14^2 - 9^2} = 11 \rightarrow AE = \frac{AH}{2} = \frac{11}{2}$$

$$\rightarrow A \hat{D} E \sim A \hat{B} H \rightarrow \frac{DE}{AE} = \frac{AE}{AB} \rightarrow DE = \frac{AE^2}{AB} = \frac{121}{34}$$