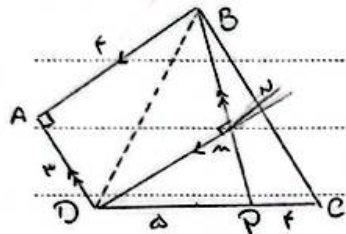


$$\frac{DE}{BC} = \frac{AD}{AB} = \frac{4}{12}$$

$$\frac{S_{\triangle BCE}}{S_{\triangle ADE}} = \frac{\frac{1}{2} h \times BC}{\frac{1}{2} h \times DE} = \frac{12}{4} = 3$$

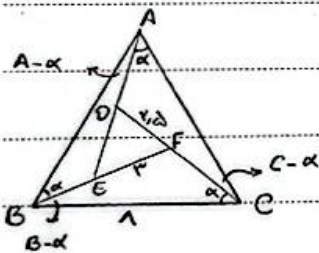


نلاحظ ان  $\triangle BDE \sim \triangle ABC$  و  $\triangle CDE \sim \triangle ABC$  و  $\triangle BDE \sim \triangle CDE$  و  $\triangle BDE \sim \triangle CDE$

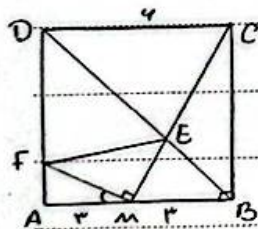
$$BD^2 = AB^2 + AD^2 = 12^2 + 4^2 = 160 \rightarrow BD = 4\sqrt{10}$$

$$BDE \rightarrow BD = DE = x \quad PC = DC - DE = 4 - x = 6$$

$$\frac{BM}{MP} = \frac{BN}{NC} \rightarrow MN \parallel PC \Rightarrow \frac{MN}{PC} = \frac{4}{6} \rightarrow MN = 4$$



$$\frac{y}{x} = \frac{4}{6} \rightarrow x = 4, y = 6$$



$$BM \parallel CD \rightarrow \triangle BME \sim \triangle DEC \rightarrow \frac{ME}{CE} = \frac{BM}{DC} = \frac{4}{6} = \frac{2}{3}$$

$$\Rightarrow BCM : MC^2 = BC^2 + BM^2 = 4^2 + 4 = 20 \rightarrow CM = 2\sqrt{5}$$

$$\Rightarrow ME = \sqrt{5}, CE = 2\sqrt{5}$$

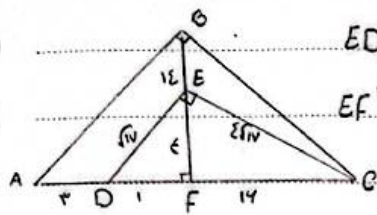
$$\triangle AMF \sim \triangle BCM \Rightarrow \frac{AM}{BC} = \frac{MF}{MC} = \frac{4}{6} = \frac{2}{3} \rightarrow MF = \frac{4}{3}\sqrt{5}$$

$$S_{\triangle EMF} = \frac{1}{2} ME \times MF = \frac{1}{2} \times \sqrt{5} \times \frac{4}{3}\sqrt{5} = \frac{10}{3} = 3\frac{1}{3}$$

$$\triangle ABE \Rightarrow AE^2 = AB^2 + BE^2 = 11 + 2^2 \rightarrow AE = \sqrt{15}$$

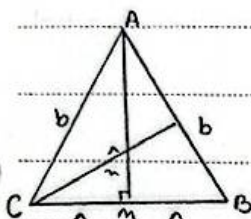
$$\triangle AEC \sim \triangle ACD \Rightarrow \frac{AE}{ED} = \frac{EC}{AB} \Rightarrow AE^2 = ED \times EC \rightarrow 15 = 10 + 2^2$$

$$\Rightarrow x^2 - 10x + 11 = 0 \rightarrow x = 3\sqrt{11}$$



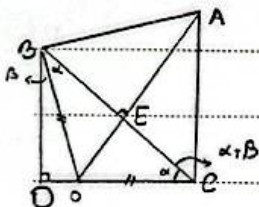
$$\begin{aligned} ED &= \sqrt{1+14} = \sqrt{15} \\ EF^2 &= DF \times FC \rightarrow FC = 14 \\ BF^2 &= \epsilon \times 14 \rightarrow BF = \epsilon \\ BC^2 &= 1^2 + 14^2 = 197 \rightarrow BC = \sqrt{197} \end{aligned}$$

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$$\begin{aligned} b^2 + b^2 &= 14^2 \rightarrow b^2 = 196 \rightarrow b = 14 \\ \sqrt{(14\sqrt{2})^2 + (14\sqrt{2})^2} &= \sqrt{14^2} = 14 \end{aligned}$$

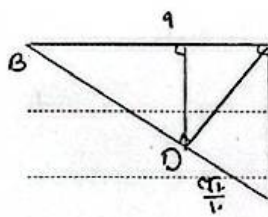
7



$$\begin{aligned} BC &= \sqrt{1+14} + 14\sqrt{2} = 14\sqrt{2} = 14\sqrt{2} \rightarrow BE = EC = \sqrt{2} \\ \frac{1}{\sqrt{2}} &= \frac{\epsilon}{AE} = \frac{14\sqrt{2}}{a} \Rightarrow AB = 14\sqrt{2} \end{aligned}$$

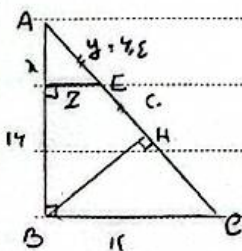
1

$$S_{ABE} = \frac{AE \times CE}{2} = \frac{14\sqrt{2} \times \sqrt{2}}{2} = 14$$



$$\begin{aligned} \sqrt{9+14} &= 5\sqrt{10} \\ \triangle DAC \sim \triangle ABC &\rightarrow \frac{AC}{AB} = \frac{DA}{AC} = \frac{DC}{BC} \rightarrow \frac{1}{5\sqrt{10}} = \frac{AD}{14} = \frac{DC}{14} \rightarrow \frac{9\sqrt{10}}{10} \\ \triangle DEB \sim \triangle ABC &\rightarrow \frac{ED}{AC} = \frac{EB}{BC} = \frac{BD}{AB} \rightarrow \frac{ED}{14} = \frac{EB}{14} = \frac{BD}{14} \rightarrow \frac{9\sqrt{10}}{10} \\ \Rightarrow EB \times 5\sqrt{10} &= 14 \left( 5\sqrt{10} - \frac{9\sqrt{10}}{10} \right) \rightarrow EB \times 5\sqrt{10} = 14 \times \frac{41\sqrt{10}}{10} \rightarrow EB = 11 \end{aligned}$$

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$$\begin{aligned} \triangle ABC \sim \triangle ADE &\rightarrow \frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC} \rightarrow \frac{14}{14} = \frac{y}{14} = \frac{z}{14} \\ \triangle ABC \sim \triangle BHC &\rightarrow \frac{BH}{AB} = \frac{HC}{BC} = \frac{BC}{AC} \rightarrow \frac{BH}{14} = \frac{10-y}{14} = \frac{14}{14} \\ \rightarrow 14(10-y) &= 14 \times 14 \rightarrow 140 - 14y = 196 \rightarrow y = 4.5 \\ \frac{4.5}{14} &= \frac{z}{14} \rightarrow z = 4.5 \end{aligned}$$

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