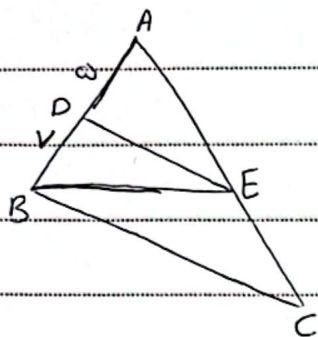




BC || DE

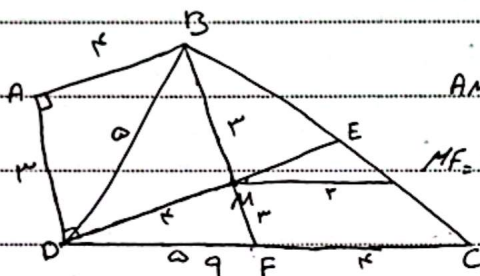
①

$$\frac{S_{BCE}^{\Delta}}{S_{BDE}^{\Delta}} = ?$$

ارتفاع یکسان - نسبت مساحت ها = نسبت قاعده ها

$$DE \parallel BC \rightarrow \frac{AB}{AD} = \frac{AC}{AE} = \frac{BC}{DE} = \frac{12}{5}$$

$$\frac{S_{BCE}^{\Delta}}{S_{BDE}^{\Delta}} = \frac{\frac{1}{2} \times h \times BC}{\frac{1}{2} \times h \times DE} = \frac{BC}{DE} = \frac{12}{5} = 2.4$$



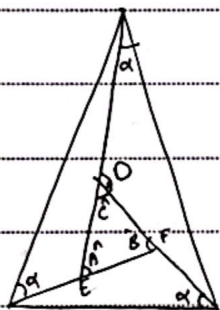
AMBC → متوازی → BM = 3, DM = 5

②

MF = 3 = BM ← D, M, F هم خطی ← D₁ = D₂

BFC → MF ← FC = 5, DF = 5

دو ضلع را به هم وصل کرده پس لایفه قاعده است و برابر ۲ است



$$\angle EFD = \hat{B} - \alpha + \alpha = \hat{B}$$

③

$$\angle DEF = \hat{A} - \alpha + \alpha = \hat{A} \rightarrow \triangle ABC \sim \triangle DEF$$

$$\angle EDF = \hat{C} - \alpha + \alpha = \hat{C}$$

$$\rightarrow \frac{ED}{AB} = \frac{3}{12} \rightarrow x = \frac{3 \times 12}{12} = 9, 4$$

$$MC^2 = 3^2 + 9 \rightarrow MC = 3\sqrt{5}$$

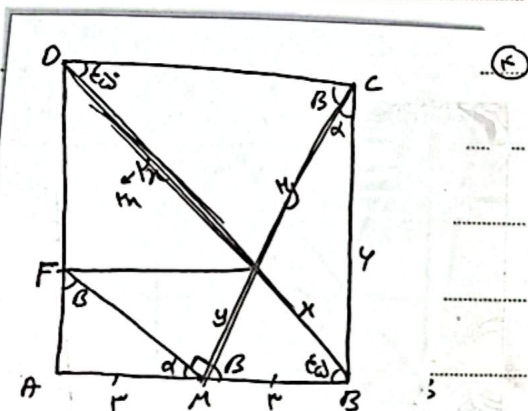
$$\tan F = \frac{3}{AF} = \tan M = \frac{BC}{MB} = 2 \rightarrow AF = \frac{3}{2}$$

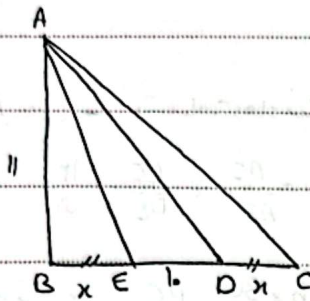
$$FM^2 = AF^2 + AM^2 \rightarrow MF = \frac{3\sqrt{5}}{2}$$

$$DEC, MEB \text{ مثلث های قائمه } \rightarrow \frac{4}{3} = 2 \rightarrow y = 3\sqrt{5}$$

$$S_{FME} = \frac{1}{2} ME \times MF = \frac{15}{4}$$

$$\rightarrow y = \sqrt{5}$$





$$\frac{AE}{10+x} = \frac{AD}{AC} = \frac{10}{AE} \rightarrow AE^2 = 10(10+x)$$

$$10 + x^2 = 100 + 10x$$

$$\rightarrow 10 + x^2 + (-10x) = 0 \rightarrow x^2 - 10x + 10 = 0$$

$$(x-5)(x-2) = 0 \rightarrow x = 5 \checkmark$$

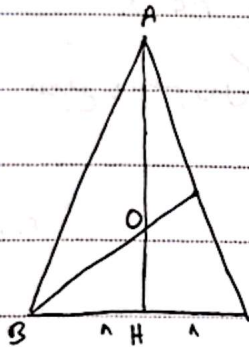
$$x = 2 \checkmark \rightarrow DC = 12 \checkmark$$

5

$$\triangle DFC \rightarrow EF^2 = DF \times FC \rightarrow 4^2 = 1 \times FC \rightarrow FC = 16$$

(4)

$$\triangle ABC \rightarrow BC^2 = CF \times CA \rightarrow 14 \times (14 + 5) = 14 \times 19 \rightarrow BC = 17\sqrt{2}$$



$$AH = 14, HO = 9 \rightarrow 14 \times 9 = 10 \times 10 \rightarrow 10 = 14 \times 9$$

(V) 10

$$AH = 14, HO = 9$$

$$BOH = 14 + \frac{9}{14} = \frac{140}{9} \rightarrow \frac{\sqrt{16}}{9} = BO$$

$$\frac{BD}{BO} = 1 \rightarrow \frac{BO}{\frac{\sqrt{16}}{9}} \rightarrow BD = \sqrt{16}$$

15

$$DE = OE$$

(N)

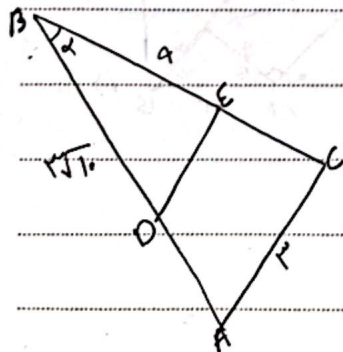
$$OB = OC$$

$$\hat{O}_1 = \hat{O}_2$$

$$\triangle BOE \cong \triangle COE \rightarrow BE = CE \rightarrow BC = 14 + 5 = 19 \rightarrow BC = 19 \rightarrow EC = 5$$

$$\left. \begin{array}{l} \hat{D} = \hat{E} = 90^\circ \\ \hat{B}_1 = \hat{C}_1 \end{array} \right\} \triangle AEC \cong \triangle BCD \rightarrow \frac{r}{\sqrt{10}} = \frac{4}{AE} = \frac{\sqrt{10}}{5} \rightarrow AE = \sqrt{10} \rightarrow S = \frac{\sqrt{10} \times \sqrt{10}}{2} = 5$$

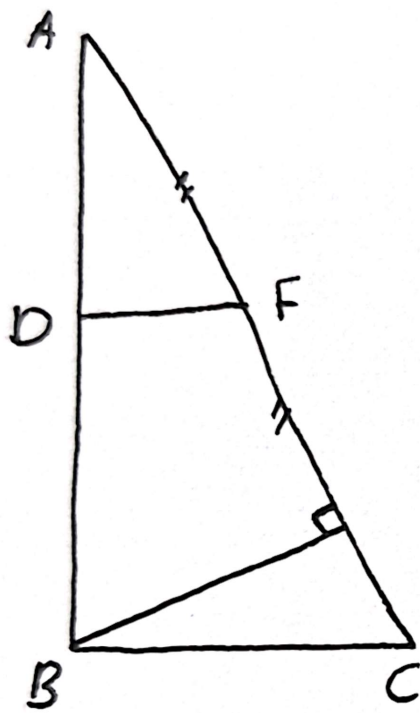
20



$$\tan \alpha = \frac{r}{9} = \frac{1}{\sqrt{10}} \rightarrow \cos \alpha = \frac{\sqrt{10}}{11}$$

$$BE = BC \times \frac{BD}{BC} \times \frac{BE}{BD} = 9 \times \frac{\sqrt{10}}{11} \times \frac{r}{\sqrt{10}} = \frac{11}{11} = 1$$

(9)



مسألة

(10)

$$\triangle ABH \rightarrow BE \times AB = BH \times AH$$

$$5 = \frac{BH \times 10}{1} = \frac{14 \times 10}{1} \rightarrow BH = 9,4$$

$$14^2 = 10^2 + AE^2 \rightarrow 2AE = AH \rightarrow AE = 4,8$$

$$DE = \frac{9,4 \times 4,8}{14} = 2,6 \times 14 = 17,12$$