

$$ADC = \sqrt{4x^2 + 4x^2} = 2\sqrt{2}x = AC$$

$$ABE = \sqrt{4x^2 + x^2} = \sqrt{5}x = BE$$

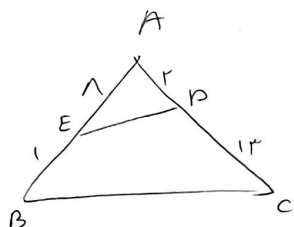
$$\triangle AFE \sim \triangle CFB \Rightarrow \frac{AF}{EF} = \frac{FE}{FB} = \frac{AE}{BC} = \frac{x}{3x} = \frac{1}{3}$$

$$EF = 2 \rightarrow 2 + 2z = \sqrt{5}x \Rightarrow z = \frac{\sqrt{5}}{2}x$$

$$AF = y \Rightarrow y + 2z = \sqrt{5}x$$

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

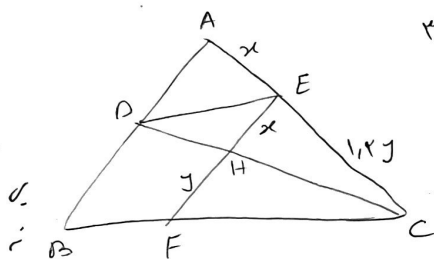
$$\frac{EF}{AF} = \frac{\frac{\sqrt{5}}{2}x}{\frac{\sqrt{5}}{2}x} = \frac{\sqrt{5}}{2}$$



$$\triangle AED \sim \triangle ACB \Rightarrow \frac{AE}{AC} = \frac{ED}{CB} = \frac{AD}{AB}$$

$$\frac{x}{1-x} = \frac{y}{1-y} \Rightarrow x^2 + x = y \rightarrow x^2 + x - y = 0 \rightarrow (x+y)(x-y) = 0$$

$$\frac{x}{1-x} = \frac{y}{1-y} \Rightarrow x = y \text{ or } x = -y$$



$$xy = 0 \rightarrow y = 0 \text{ or } x = 0$$

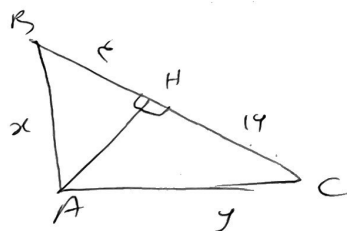
$$\triangle ABC : DE \parallel BC \Rightarrow \frac{AE}{AC} = \frac{DE}{BC} \Rightarrow \frac{x}{1-x} = \frac{DE}{1} \Rightarrow DE = \frac{x}{1-x}$$

$$\frac{x}{1-x} = \frac{DE}{1} \Rightarrow \frac{x}{1-x} = \frac{DE}{1} \Rightarrow x = DE(1-x) \Rightarrow x = DE - xDE \Rightarrow x + xDE = DE \Rightarrow x(1+DE) = DE \Rightarrow x = \frac{DE}{1+DE}$$

$$DE \parallel FC \Rightarrow \frac{DE}{FC} = \frac{EH}{HF} \Rightarrow \frac{DE}{FC} = \frac{x}{y} = \frac{1}{2} \Rightarrow DE = \frac{1}{2}FC$$

$$\textcircled{1}, \textcircled{2} \Rightarrow x + FC = \frac{1}{2}FC \Rightarrow x + FC = \frac{1}{2}FC \Rightarrow FC = \frac{1}{2}x = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$$

$$BC = BF + FC \Rightarrow 1 + \frac{1}{4} = \frac{5}{4}$$

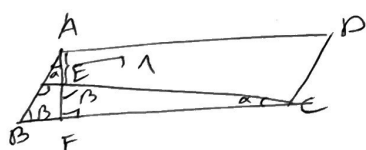


$$x^2 = BH \times BC \Rightarrow x = \sqrt{1 \times 1} = 1$$

$$y^2 = CH \times BC \Rightarrow y = \sqrt{1 \times 1} = 1$$

$$\frac{y}{x} = \frac{\sqrt{1 \times 1}}{\sqrt{1 \times 1}} = \frac{1}{1} = 1 \Rightarrow x = y$$

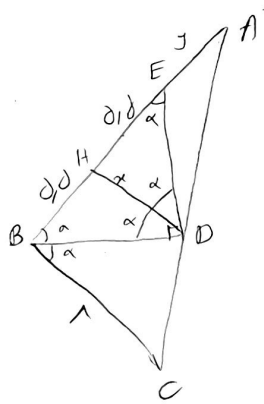
$$\frac{y}{x} = 1 \Rightarrow x = y$$



$$\triangle ABF \sim \triangle CEF \Rightarrow \frac{AF}{CF} = \frac{BF}{EF} \Rightarrow \frac{x+1}{1} = \frac{1}{y} \Rightarrow x+1 = \frac{1}{y}$$

$$x^2 + 1x = 1 \Rightarrow x^2 + 1x - 1 = 0 \Rightarrow (x+1)(x-1) = 0 \Rightarrow x = -1 \text{ or } x = 1$$

$$AF = x + AE = 1 + 1 = 2$$



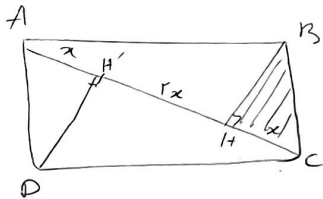
$$\angle \alpha = 40^\circ \rightarrow \alpha = 2\delta$$

$$BC \parallel DE, BD \parallel \rightarrow D = \angle \alpha \Rightarrow \angle EDB = \angle \alpha$$

$$\angle \alpha = \delta, \delta \times 2, \delta = \alpha = 2, \delta$$

$$\frac{AO}{AB} = \frac{OD}{BC} \rightarrow \frac{y + 2, \delta}{y + 11} = \frac{1/1}{1} = 14y + 11 = 11y + 121$$

$$\delta y = 33 \rightarrow y = \frac{33}{\delta} = 4, 9$$

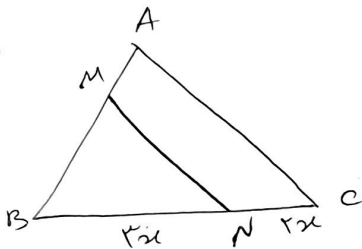


$$S_{BHC} = \frac{x \times BH}{r}$$

$$S_{ABC} = \frac{BH \times \Sigma x}{r}$$

$$S = S_{ABC} + S_{ADC} = BH \times \Sigma x$$

$$\frac{S}{BH \times \Sigma x} = \frac{BH \times \Sigma x}{\frac{x \times BH}{r}} \Rightarrow \frac{1}{x} = 1$$

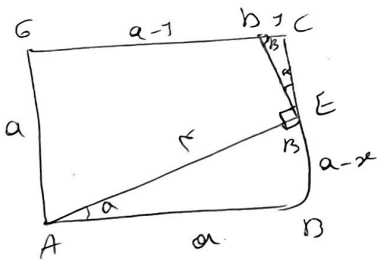


$$\frac{S_{ABC}}{S_{BMN}} = \frac{\frac{1}{r} \times AB \times BC \times \sin B}{\frac{1}{r} \times BM \times BN \times \sin B} = r$$

$$\Rightarrow \frac{AB \times \delta x}{BM \times r x} = r$$

$$\frac{AB}{BM} = \frac{r}{\delta} \Rightarrow \frac{AB - BM}{BM} = \frac{r}{\delta} \Rightarrow \frac{AM}{BM} = \frac{r}{\delta} \Rightarrow \frac{BM}{AM} = \frac{\delta}{r}$$

$$\Rightarrow 1, 20$$



$$\triangle DEC \sim \triangle EBA \Rightarrow \frac{DE}{EB} = \frac{EC}{AB} = \frac{DE}{EA}$$

$$\frac{y}{a-x} = \frac{x}{a} = \frac{1}{\Sigma} \rightarrow a = \Sigma x$$

$$a-x = \Sigma y \rightarrow \Sigma x - x = \Sigma y$$

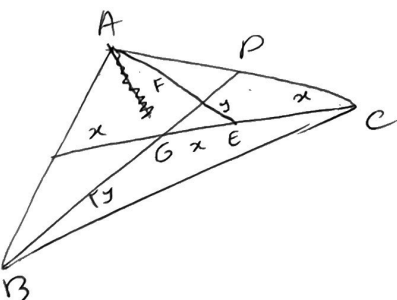
$$\rightarrow r x = \Sigma y$$

$$\frac{x}{y} = \frac{\Sigma}{r}$$

$$ABE \Rightarrow 14 = \alpha r + (a-x)r \Rightarrow 14 = 14xr + 9xr$$

$$xr = \frac{14}{23} \Rightarrow x = \frac{14}{23}, a = 5x, \alpha = \frac{14}{23}$$

$$S = ar = \frac{14 \times 14}{23 \times 5} = \frac{196}{115} = 1, 70$$



$$AGC \Rightarrow AE, GE \Rightarrow \text{میان} \Rightarrow \text{در تقاطع}$$

$$GF = \frac{r}{4} y, FD = \frac{1}{r} y$$

$$\frac{BD}{FD} = \frac{r}{1/r} = 9$$

محل برخورد میانها را علامت  
ABC  
ای تقاطع کنند