

$$BC = \sqrt{k}$$

عرفان حقیقی یا درصدی A

$$\frac{AE}{BC} = \frac{k}{\sqrt{k}} = \frac{1}{\sqrt{k}}$$

$$AE + ED = k + \sqrt{k} \Rightarrow BC = \sqrt{k}$$

$$AE = k$$

$$\triangle FAE \sim \triangle FCB \Rightarrow \frac{EF}{FB} = \frac{AF}{FC} = \frac{AE}{BC}$$

$$\frac{AF}{FC} = \frac{1}{\sqrt{k}} \Rightarrow FC = \sqrt{k} AF$$

$$AC = AF + FC$$

$$AF + \sqrt{k} AF = AC = \sqrt{k} AF$$

$$\Rightarrow \frac{EF}{FB} = \frac{1}{\sqrt{k}} \quad \text{نسبت تساوی}$$

(استفاده از دستگاه مختصات)

$$A = (0, 90) \quad B = (0, 93) \quad E = (1, 0) \quad C = (3, 3)$$

مطلوبه F

$$F = (0, 90 + 0, 93) \quad y = -\sqrt{k} + \sqrt{k} \quad AC \text{ معادله}$$

$$AF = \sqrt{(0, 90 - 0)^2 + (0, 93 - 0)^2} = 0, 93 \sqrt{2}$$

$$EF = \sqrt{(1 - 0, 93)^2 + (0 - 0, 93)^2} = \sqrt{0, 042}$$

$$\frac{EF}{AF} = \frac{\sqrt{0, 042}}{0, 93 \sqrt{2}}$$

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$$E = C \left\{ \begin{array}{l} \Rightarrow AED \sim ACB \Rightarrow \frac{n}{n+1} = \frac{r}{10} \end{array} \right.$$

$$10n = r \Rightarrow n = \frac{r}{10} \quad \boxed{n=2} \quad \leftarrow \frac{r}{n+1} = \frac{n}{10}$$

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

$$AC = AE + EC = n + r \quad \left(\frac{r}{10} \right)$$

$$n = \frac{r}{10}$$

$$AC = \frac{r}{10} + r = 1,1r \Rightarrow \frac{DE}{BC} = \frac{AE}{AC} = \frac{\frac{r}{10}}{1,1r} = \frac{1}{11}$$

$$\Rightarrow BC = 11DE \quad \frac{DE}{FC} = \frac{E+1}{1-r} = n \Rightarrow \frac{DE}{FC} = \frac{1}{11}$$

$$\frac{DE}{FC} = \frac{\frac{r}{10}}{r} = \frac{1}{10} \Rightarrow FC = \frac{10}{11} DE \quad BC = BF + FC$$

$$BC = 11DE \quad BC = r + \frac{10}{11} DE \Rightarrow 11DE = r + \frac{10}{11} DE$$

$$11DE - \frac{10}{11} DE = r \Rightarrow \frac{121DE - 10DE}{11} = r \Rightarrow DE = \frac{11r}{111}$$

$$BC = 11 \times DE \Rightarrow BC = \frac{121r}{111} \quad \checkmark$$

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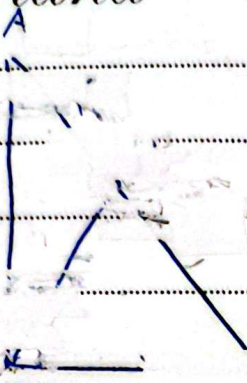
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$$AB^2 = BH \times BC$$

$$AC^2 = CH \times BC$$

$$AB^2 = r \times r \Rightarrow AB = r\sqrt{2}$$

$$AC^2 = 14 \times r \Rightarrow AC = 14\sqrt{r}$$

$$\frac{AC}{AB} = \frac{14\sqrt{r}}{r\sqrt{2}} = r$$

$$F = E = 9$$

بسط

$$ABF \sim CBE \Rightarrow \frac{BF}{AB} = \frac{BE}{CB}$$

$$BE = AB - AE = AB - 1 \Rightarrow \frac{1}{AB} = \frac{AB - 1}{17}$$

$$AB - 1 \times AB = 17 \Rightarrow AB^2 - 17AB = 17 \Rightarrow AB = 17$$

$$AF + BF = AB \Rightarrow AF = 19 - 4 = 15$$

$$AF = 6\sqrt{11}$$



$$\triangle CEF \sim \triangle ABE$$

$$\frac{CF}{AE} = \frac{CE}{AB} = \frac{1}{4}$$

$$AF = 10 - 1 = 9$$

$$\frac{AD}{DC} = \frac{AB}{BC} \Rightarrow \frac{AD}{BC} = \frac{11}{1} \Rightarrow AD = 11k$$

$$DC = 1k$$

$$ED \parallel BC \Rightarrow \triangle AED \sim \triangle ABC \Rightarrow \frac{AE}{AB} = \frac{AD}{AC}$$

$$AC = AD + DC \Rightarrow 11k + 1k = 12k$$

$$\frac{AE}{11} = \frac{11k}{12k} \Rightarrow AE = \frac{121}{12}$$

$$BM^2 = AM \times MC$$

$$BM^2 = n \times (r_n + n) = n \times r_n = r_n^2 \quad BM = n\sqrt{r}$$

$$S_{min} = \frac{1}{r} n \times n\sqrt{r} = \frac{n^2\sqrt{r}}{r}$$

$$S_{ABC} = \frac{1}{r} (r_n) (n\sqrt{r}) = r_n\sqrt{r} \Rightarrow r \times S_{ABC} = r_n^2\sqrt{r}$$

$$\frac{r_n^2\sqrt{r}}{\frac{n^2\sqrt{r}}{r}} = r \times r = 1 \quad \checkmark$$

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$$\frac{BN}{NC} = \frac{r}{r} \Rightarrow BN = rk \quad NC = rk \quad BC = 4k$$

$$S_{ABC} = r \times S_{BMN} \quad / \quad S_{BMN} = \frac{1}{2} \times BM \times BN \times \sin(B)$$

$$S_{ABC} = \frac{1}{2} \times AB \times BC \times \sin(B)$$

$$\frac{S_{ABC}}{S_{BMN}} = r \Rightarrow \frac{AM \times BC}{BM \times BN} = r$$

$$\frac{AB}{BM} \times \frac{1}{r} = r \Rightarrow \frac{AB}{BM} = \frac{r}{1} \quad / \quad AB = AM + BM$$

$$\frac{AM + BM}{BM} = \frac{r}{1} \Rightarrow \frac{AM}{BM} + 1 = \frac{r}{1} \Rightarrow \frac{AM}{BM} = \frac{r}{1}$$

$$\frac{BM}{AM} = \frac{1}{r} \quad \checkmark$$

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$$a = x + y \Rightarrow a^2 = x^2 + y^2 \Rightarrow S = a^2 = x^2 + y^2 \quad (9)$$

$$S = 14 + 1 \Rightarrow S = 15$$

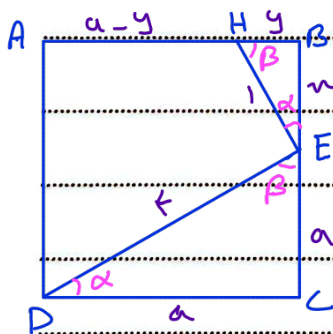
$$G \Rightarrow AG = 2GD$$

BD = DC د، نقطه D وسط قاع BC است پس

$$\frac{GE}{DC} = \frac{AG}{AD} = \frac{2}{3} \Rightarrow GE = \frac{2}{3} DC$$

$$BD = DC = FD + FC \quad \text{چون D وسط BC است پس}$$

$$\frac{BD}{FD} = \frac{3}{1} = 3$$

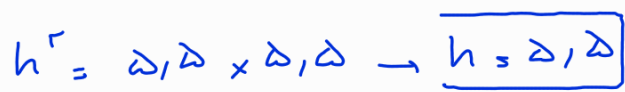


$$\triangle EBH \sim \triangle DCE \Rightarrow \frac{y}{a-n} = \frac{n}{a} = \frac{1}{f} \begin{cases} a = fn \\ a-n = fy \\ n = \frac{fy}{a} \end{cases}$$

$$\triangle DCE \xrightarrow{\text{پیتاگورس}} (f)^2 = (a-n)^2 + (n)^2 \Rightarrow n = \frac{f}{a} \begin{cases} a = 14 \\ a = 20 \end{cases}$$

$$S_{\square} = a^2 = \frac{204}{20}$$

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10

$$GF = \frac{P}{r} \sim \quad \Rightarrow \quad \frac{BD}{FD} = \frac{r_m}{\frac{1}{r}} \sim \boxed{9}$$

$$GF = \frac{r}{r} \sim \Rightarrow \frac{BD}{FD} = \frac{r}{\frac{1}{r}} \sim = \boxed{9}$$