

مستطیل طلایی: $\frac{L'}{W} = \frac{1+\sqrt{5}}{2}$ / $\frac{L}{W} = \frac{5}{4}$ / $L' = L + x \Rightarrow \frac{L+x}{W} = \frac{1+\sqrt{5}}{2}$ *

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$\frac{S_{\text{طلایی}}}{S} = \frac{(L+x)W}{LW} = \frac{1+\sqrt{5}}{2} \times \frac{4}{5} = \frac{2+\sqrt{5}}{5}$



$\frac{d}{L} = \frac{\sqrt{L^2 + W^2}}{L} = \frac{1+\sqrt{5}}{2} \Rightarrow \sqrt{L^2 + W^2} = L \left(\frac{1+\sqrt{5}}{2} \right) \rightarrow FL^2 + FW^2 = L^2 (1 + \sqrt{5} + \frac{5}{4})$

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$FW^2 = (9 - \epsilon + 2\sqrt{5})L^2 \rightarrow \frac{L^2}{W^2} = \frac{F}{4 - 2\sqrt{5}} = \frac{1+\sqrt{5}}{2}$

$\sqrt{12a^2 + \epsilon a} = 2 - \epsilon a \rightarrow |12a^2 + \epsilon a| = 9a^2 + \epsilon - 12a$

$12a^2 + \epsilon a = 9a^2 + \epsilon - 12a \rightarrow -11a^2 + 13a - \epsilon = 0 \rightarrow \Delta < 0 \rightarrow$ ریشه ندارد

$12a^2 + \epsilon a = 9a^2 + \epsilon - 12a \rightarrow 3a^2 - 19a + \epsilon = 0 \rightarrow a = 2 \rightarrow \sqrt{12} = 2 - \epsilon$

$a = \frac{2}{\sqrt{3}} \rightarrow \sqrt{\frac{4}{3}} = \frac{2}{\sqrt{3}} \rightarrow \frac{2}{\sqrt{3}} = \frac{2}{\sqrt{3}}$

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$\rightarrow \frac{a+1}{a} = \frac{\frac{2}{\sqrt{3}} + 1}{\frac{2}{\sqrt{3}}} = \frac{10}{8} = \frac{5}{4}$

$$\sqrt{x-1} \leq t \Rightarrow \frac{\sqrt{t^2+1}}{t+1} - \frac{\sqrt{t^2+1}}{t-1} \leq t \xrightarrow{t>0} 9 - t^2 - 2\sqrt{t^2+1}$$

$$\sqrt{t^2+1} = 1 + 2\sqrt{1} \Rightarrow t^2 \leq 11 + 4\sqrt{1} \Rightarrow t \leq \pm(11 + 4\sqrt{1}) \xrightarrow{t>0} \text{محدود}$$

$$\sqrt{1-x} \leq t \rightarrow \frac{1}{t+1} - \frac{1}{1-t} \leq \frac{t^2}{2t} \rightarrow \frac{t+1-1+t}{1-t^2} \leq \frac{t}{2}$$

$$\rightarrow 1+t \leq 1-t-t^2 \rightarrow t^2-4t \leq 0 \begin{cases} t \leq 4 \rightarrow x \leq -34 \\ t \leq 0 \rightarrow x \leq 2 \end{cases} \text{محدود}$$

$$\frac{1}{x} + \frac{1}{1-x} \leq t \rightarrow t^2 \leq \frac{1}{x^2} + \frac{1}{(1-x)^2} + 2\left(\frac{1}{x}\right)\left(\frac{1}{1-x}\right) \rightarrow \frac{1}{x^2} + \frac{1}{(1-x)^2} \leq t^2 - \frac{2}{x(1-x)}$$

$$\rightarrow t^2 - 2t \leq \frac{14}{9} \begin{cases} t_1 \leq \frac{14}{9} \rightarrow \frac{1}{x(1-x)} \leq \frac{14}{9} \rightarrow x \leq 1 \\ t_2 \leq -\frac{10}{9} \rightarrow \frac{1}{x(1-x)} \leq -\frac{10}{9} \rightarrow x \leq 1 \end{cases} \text{محدود}$$

$$x+1 \geq 0 \rightarrow x \geq -1 \quad (1)$$

$$-x^2 + 4x - 1 \geq 0 \rightarrow 2 \leq x \leq 6 \quad (2)$$

$$-x^2 + 4x^2 + 4x - 1 \geq 0 \vee (x-2)(x+1)(x-6) \geq 0 \rightarrow x \leq -1 \vee 2 \leq x \leq 6 \quad (3)$$

$$(1) \cap (2) \cap (3) \rightarrow x \leq 6 \quad \text{محدود}$$

$$\rightarrow 2+6 \leq 6+6 \leq 4 \rightarrow \text{محدود!}$$

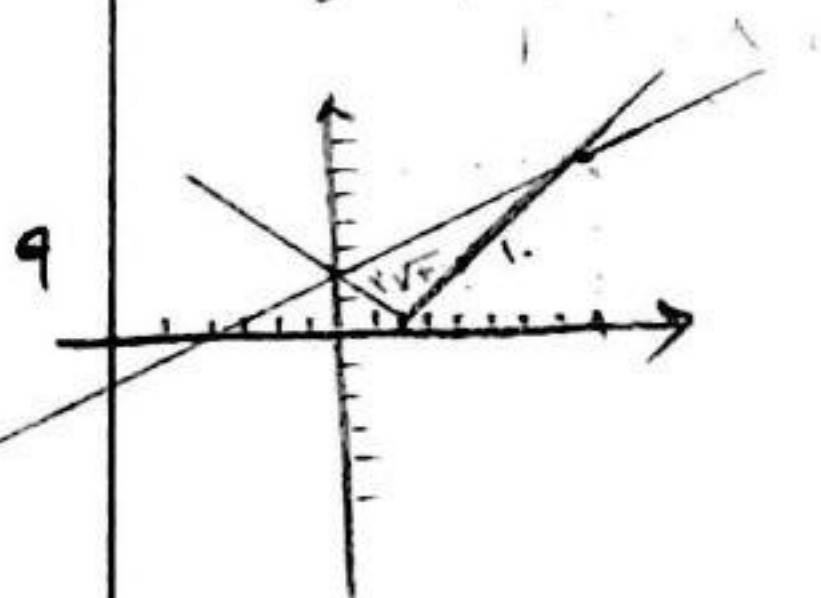
$$\begin{cases} y \leq x+1, x > 1 \\ y \leq x, -1 \leq x \leq 1 \\ y \leq -x-1, x \leq -1 \end{cases} \rightarrow \begin{cases} x+1 \leq y \\ x+y \leq 1 \end{cases} \Rightarrow x \leq 1, y \leq 0 \quad (A)$$

$$\begin{cases} y \leq x, -1 \leq x \leq 1 \\ y \leq -x-1, x \leq -1 \end{cases} \rightarrow \begin{cases} -x-1 \leq y \\ x+y \leq 1 \end{cases} \Rightarrow x \leq -1, y \leq 0 \quad (B)$$

$$\rightarrow AB = \sqrt{(1-1)^2 + (0-0)^2} = \sqrt{0} = 0$$

$$y \leq \sqrt{(x-1)^2}, |x-1| \rightarrow |x-1| \leq \frac{1}{2}x+1 \rightarrow x-1 \leq \frac{1}{2}x+1 \rightarrow x \leq 3, y \leq 1$$

$$x-1 \geq -\frac{1}{2}x-1 \rightarrow x \geq -1, y \leq 1$$



$$\rightarrow S = \frac{1 \times \sqrt{2} \times 1}{2} = \frac{\sqrt{2}}{2}$$

$$A(0,1) B(1,0) C(1,1)$$

$$AB = \sqrt{2} \quad BC = \sqrt{2} \quad S = \frac{\sqrt{2} \times \sqrt{2} \times \sin 90^\circ}{2} = 1$$

$$\frac{1}{B} + \frac{1}{F} \leq \frac{1}{r_1} \rightarrow \frac{1}{B} + \frac{1}{B+4} \leq \frac{1}{r_1} \rightarrow \frac{r_1 B + 4}{B^2 + 4} \leq \frac{1}{r_1}$$

$$\rightarrow r_1 B + 4 \leq B^2 + 4 \rightarrow B^2 - r_1 B \geq 0 \Rightarrow B \geq r_1$$