

طول مستطیل = $\frac{5}{4}$ مساحت مستطیل طلایی = ?
عرض مستطیل = مساحت مستطیل اولی

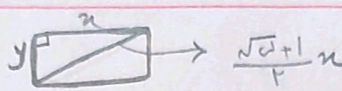
① $\frac{L}{w} = \frac{w}{L} \rightarrow L = w^2 \rightarrow w = \sqrt{L} \Rightarrow S_1 = 20n^2$

$\frac{S_2}{S_1} = \frac{1(\sqrt{5}+1)n^2}{20n^2} = \frac{2\sqrt{5}+2}{5}$

② $\frac{L}{w} = \frac{\sqrt{5}+1}{2} \rightarrow L = 2(\sqrt{5}+1)n \Rightarrow S_2 = 1(\sqrt{5}+1)2n^2$

مقدار طلایی = $\frac{\text{طول مستطیل}}{\text{عرض مستطیل}}$

$\left(\frac{\text{طول}}{\text{عرض}}\right)^2 = ?$



$\rightarrow n^2 + y^2 = \left(\frac{\sqrt{5}+1}{2}\right)^2 n^2 \rightarrow y^2 = \frac{2+2\sqrt{5}}{2} n^2 \rightarrow \frac{n^2}{y^2} = \frac{1}{1+\sqrt{5}} = \frac{2(\sqrt{5}-1)}{4} = \frac{\sqrt{5}-1}{2}$

$3a + \sqrt{2a^2 + 4a} = 2 \quad \frac{a+1}{a} = ?$

$3a + \sqrt{2a^2 + 4a} = 2 \rightarrow \sqrt{2a^2 + 4a} = 2 - 3a \rightarrow 2a^2 + 4a = (2 - 3a)^2 \rightarrow 2a^2 + 4a = 4 - 12a + 9a^2 \rightarrow 7a^2 - 16a + 4 = 0 \rightarrow (7a-4)(a-1) = 0$
 $\rightarrow \begin{cases} 7a-4=0 \rightarrow a=\frac{4}{7} \\ a-1=0 \rightarrow a=1 \end{cases}$ $\frac{a+1}{a} = \frac{4}{7} \rightarrow \frac{4}{7} + 1 = \frac{11}{7}$

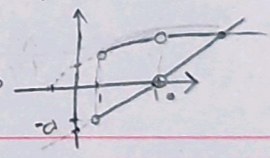
$\frac{a+1}{a} \xrightarrow{a=\frac{4}{7}} \frac{\frac{4}{7}+1}{\frac{4}{7}} = \frac{11}{4} = \frac{11}{4}$

$\frac{\sqrt{x+1}}{\sqrt{x-1}+3} - \frac{\sqrt{x+1}}{3-\sqrt{x-1}} = \frac{x-1}{\sqrt{x-1}} \rightarrow \sqrt{x+1} \left(\frac{1}{\sqrt{x-1}+3} - \frac{1}{3-\sqrt{x-1}} \right) = \frac{x-1}{\sqrt{x-1}}$

مسئله ۴ جعفر بن محمد بن عقیق
D: x > 1

$\Rightarrow \frac{1}{\sqrt{x-1}+3} - \frac{1}{3-\sqrt{x-1}} = \frac{\sqrt{x-1}}{\sqrt{x+1}} \rightarrow \frac{3-\sqrt{x-1}-3-\sqrt{x-1}}{9-(x-1)} = \frac{\sqrt{x-1}}{\sqrt{x+1}} \rightarrow \frac{-2\sqrt{x-1}}{10-x} = \frac{\sqrt{x-1}}{\sqrt{x+1}}$

$\Rightarrow \left(\frac{-2}{10-x} \right) = \frac{1}{\sqrt{x+1}} \rightarrow \frac{-2}{10-x} = \frac{1}{\sqrt{x+1}} \rightarrow \sqrt{x+1} = \frac{10-x}{2} \rightarrow x+1 = \frac{(10-x)^2}{4} \rightarrow 4x+4 = 100-20x+x^2 \rightarrow x^2-24x+96=0$



مسئله ۵ جعفر بن محمد بن عقیق
(x = sqrt(2-x))

$\frac{1}{\sqrt{2-x}+2} - \frac{1}{2-\sqrt{2-x}} = \frac{2-x}{5\sqrt{2-x}}$

2-x > 0 -> 2 > x
طبق شرط داده شده

مسئله ۶ جعفر بن محمد بن عقیق
(t = sqrt(2-x))

$\frac{1}{t+2} - \frac{1}{2-t} = \frac{t^2}{5t} \rightarrow \frac{2-t-2-t}{5-t^2} = \frac{t}{5} \rightarrow \frac{-2t}{5-t^2} = \frac{t}{5} \rightarrow -10 = 5-t^2 \rightarrow t^2 = 15$

$\Rightarrow t = \pm\sqrt{15} \rightarrow \sqrt{2-x} = \sqrt{15} \rightarrow 2-x = 15 \rightarrow x = -13$

$\frac{1}{x^2} + \frac{1}{(1-x)^2} = \frac{14}{9}$

$\rightarrow \frac{1-x+n^2+n^2}{x^2(1-x)^2} = \frac{-2(n-n^2)+1}{(n-n^2)^2} \rightarrow \frac{1-2t}{t^2} = \frac{14}{9} \rightarrow 9-14t = 14t^2 \rightarrow 14t^2+14t-9=0$

$\rightarrow (10t+3)(14t-3)=0 \rightarrow t = -\frac{3}{10} = n-n^2 \rightarrow n^2-n+\frac{3}{10}=0 \rightarrow p=1$

$\rightarrow t = \frac{3}{14} = n-n^2 \rightarrow n^2-n+\frac{3}{14}=0 \rightarrow p=1$

۲

$$\sqrt{x} + \sqrt{-x^3 + 4x^2 + 20x - 100} + \sqrt{x^2 + \sqrt{-x^2 + 4x - 4}} = x + 2$$

$$\begin{aligned} & \downarrow \\ & -x^2(n-4) + 20(n-4) \\ & \rightarrow (n-4)(20-n)(4+n) \\ & \downarrow \\ & + \quad - \quad + \quad - \\ & \downarrow \\ & D_1: (-\infty, -4] \cup [4, \infty) \end{aligned}$$

$$\begin{aligned} & \downarrow \\ & -(x-2)(n-4) \\ & \downarrow \\ & - \quad + \quad - \\ & \downarrow \\ & D_2: [2, 4] \end{aligned}$$

$$\Rightarrow D_1 \cap D_2 = \{4\}$$

$$\sqrt{4+0} + \sqrt{14+0} \stackrel{?}{=} 4$$

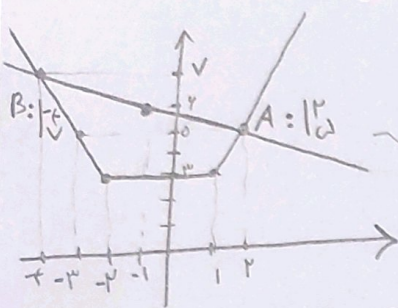
$$2 + 2 = 4 \quad \checkmark$$

$$\Rightarrow \boxed{\{4\}} \text{ یک جواب دارد}$$

۵

$$y = |x+2| + |x-1|, \quad 3y + x = 17$$

$$\hookrightarrow \begin{cases} 17 \\ 0 \end{cases} \text{ و } \begin{cases} -1 \\ 2 \end{cases}$$



$$A: \begin{cases} 2x+1 = \frac{17-x}{3} \rightarrow 4x+3 = 17-x \rightarrow x=2 \rightarrow \begin{cases} 5 \\ 4 \end{cases}$$

$$B: \begin{cases} -2x-1 = \frac{17-x}{3} \rightarrow -4x-3 = 17-x \rightarrow x=-4 \rightarrow \begin{cases} 5 \\ 4 \end{cases}$$

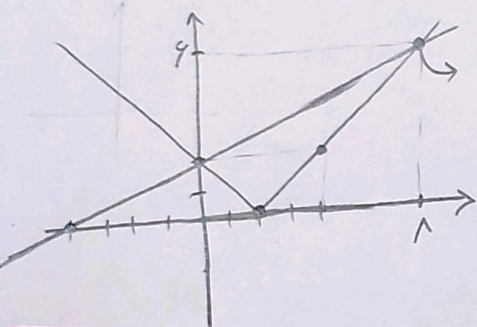
$$9 = AB \text{ انداره پاره خفا}$$

$$2\sqrt{10} = \sqrt{4^2 + 2^2}$$

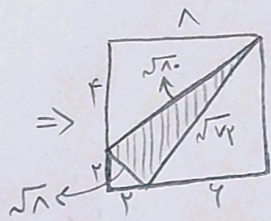
۵

$$y = \sqrt{x^2 - 4x + 4}, \quad y = \frac{1}{x}x + 2$$

$$\hookrightarrow |x-2|$$



$$\frac{x}{x} + 2 = x - 2 + \frac{x}{x} = 4 \rightarrow x = 4$$



منطق
فصل اول
طبیعیات

$$\Rightarrow S = \frac{\sqrt{4} \times \sqrt{4}}{2} = 12$$

۵

$$\text{عبور به تنهایی} = 9 \quad \text{عبور به همراه} = 20 \quad \text{عبور به تنهایی} = ?$$

$$\text{مقدار به تنهایی} = n \quad \text{مقدار به همراه} = 9 + n$$

$$\frac{1}{n} + \frac{1}{9+n} = \frac{1}{2} \rightarrow \frac{9+n+n}{(9+n)(n)} = \frac{1}{2} \rightarrow \frac{9+2n}{9n+n^2} = \frac{1}{2} \rightarrow 2 \cdot (9+2n) = 9n+n^2 \rightarrow$$

$$18 + 4n = 9n + n^2 \rightarrow n^2 - 5n - 18 = 0 \rightarrow (n-9)(n+2) = 0 \rightarrow \begin{cases} n=9 \quad \checkmark \\ n=-2 \quad \times \end{cases}$$

$$\boxed{\text{عبور به تنهایی} = 39}$$

۵