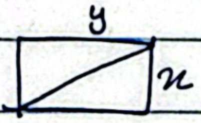
زینا علمایی   دفتر B

① $\frac{L}{W}=\frac{\sqrt{5}+1}{2}$ $\frac{L}{2x}=\frac{\sqrt{5}+1}{2} \to L=2x(\sqrt{5}+1)$

$S=4x+4x(\sqrt{5}+1) \Rightarrow \frac{4x+4x(\sqrt{5}+1)}{4x+5x}=0{,}4(\sqrt{5}+1)$

② 

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

$\Rightarrow \frac{x^2+y^2}{y^2}=\frac{6+2\sqrt{5}}{4} \to 2x^2+2y^2=3y^2+y^2\sqrt{5}$

$x^2=y^2(\frac{1+\sqrt{5}}{2}) \to \frac{y^2}{x^2}=\frac{\sqrt{5}-1}{2}$

③ $3a+\sqrt{2a^2+4a}=2$

$\sqrt{2a^2+4a}=2-3a \longrightarrow 2a^2+4a=9a^2+4-12a \to 7a^2-16a+4=0$

$a=\frac{16\pm12}{14}$ $\begin{cases} a=2 \times \\ a=\frac{2}{7} \checkmark \end{cases}$ $\frac{\frac{2}{7}+\frac{7}{7}}{\frac{2}{7}}=\frac{9}{2}$

④

$\frac{\sqrt{x+1}}{\sqrt{x-1}+3}-\frac{\sqrt{x+1}}{3-\sqrt{x-1}}=\frac{x-1}{\sqrt{x-1}}$

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

$\Rightarrow -2\sqrt{x+1}\times(x-1)=(x-1)(10-x)$

$-2\sqrt{x+1} = 10 - x \to 4(x+1) = x^2+100-20x \to x^2-24x+96=0$

$x = \dfrac{24 \pm 8\sqrt{3}}{2} = 12 \pm 4\sqrt{3}$ یک ریشه +

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(۵)

$\dfrac{1}{\sqrt{2-x}+2} - \dfrac{1}{2-\sqrt{2-x}} = \dfrac{2-x}{5\sqrt{2-x}}$ $\quad t = \sqrt{2-x}$

$\dfrac{1}{t+2} - \dfrac{1}{2-t} = \dfrac{-2t}{4-t^2}$ $\quad \dfrac{2-x}{5\sqrt{2-x}} = \dfrac{t^2}{5t} = \dfrac{t}{5}$

$\dfrac{-2t}{4-t^2} = \dfrac{t}{5} \to -10 = 4 - t^2$ $\quad x+2=-10$

$x=-12$ ریشه مثبت ندارد

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(۶)

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(۷)

$-x^3+4x^2+25x-100 = -(x^3-4x^2-25x+100)$

$= -(x-4)(x^2-25) = -(x-4)(x-5)(x+5) \geq 0$

$(x-4)(x-5)(x+5) \leq 0$ $\quad$ $-5 \quad 4 \quad 5$: $- \mid + \mid - \mid +$ $\quad x \in (-\infty, -5] \cup [4, 5]$

$-x^2+6x-8 = -(x-2)(x-4) \geq 0 \to (x-2)(x-4) \leq 0 \to$ $2 \quad 4$: $+ \mid - \mid +$

$x \in [2, 4]$

$1 \to \{4\}$ $\quad x=4$, $\sqrt{4+0} + \sqrt{16+0} = 2+4 = 6$

$y=|x+2|+|x-1|$ $\begin{cases} 2x+1 & x\geq 1 \\ 3 & -2\leq x<1 \\ -2x-1 & x<-2 \end{cases}$ (۸)

$y=\frac{10-x}{3}$

$x\leq -2 \rightarrow -2x-1=\frac{10-x}{3}$

$6x-3=10-x \rightarrow -5x=30 \quad x=-6 \quad y=4 \quad A(-6,4)$

$2x+1=\frac{10-x}{3} \rightarrow 6x+3=10-x \rightarrow x=1 \quad y=3 \quad B(1,3)$

$AB=\sqrt{7^2+1}=\sqrt{50}=5\sqrt{2}$

$y=\sqrt{x^2-6x+9}=|x-3| \quad y=\frac{1}{2}x+2$ (۹)

$x-3=\frac{1}{2}x+2 \rightarrow 2x-6=x+4 \rightarrow x=10 \quad y=7$

$3-x=\frac{1}{2}x+2 \rightarrow 6-2x=x+4 \rightarrow x=\frac{2}{3} \quad y=\frac{13}{3}$

$\begin{vmatrix} 2 & 0 & 1 \\ 0 & 2 & 1 \\ 10 & 7 & 1 \end{vmatrix} \rightarrow \frac{1}{2}\times 21=\frac{21}{2}$

(16)

$$\frac{1}{B} + \frac{1}{F} = \frac{1}{20} \Rightarrow \frac{1}{B} + \frac{1}{B+9} = \frac{1}{20}$$

$$B \cdot 9 = F$$

$$B^2 + 9B = 20B + 180 \Rightarrow B^2 - 11B - 180 = 0$$

$$B = \frac{11 \pm 31}{2} \longrightarrow \frac{42}{2} = 21 \text{ cm}$$