یازدهم بسر B
تکلیف ۱۸

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$\frac{x}{y} = \frac{5}{4}$

$\frac{x_2}{y} = \frac{1+\sqrt5}{2} = \varphi \to x_2 = \varphi \cdot y \to x_2 = \varphi \cdot 4 \to \left(\frac{1+\sqrt5}{2}\right)4 \to 2 + 2\sqrt5$

$\frac{S_2}{S_1} = \frac{x_2 \cdot y}{x_1 y} \to \frac{x_2}{x_1} = \frac{2+2\sqrt5}{5}$

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$\frac{d}{x} = \varphi = \frac{1+\sqrt5}{2}$

$\frac{x^2}{y^2}?$ $\quad d = \sqrt{x^2+y^2} \to \frac{d}{x} = \sqrt{1+\left(\frac{y}{x}\right)^2} = \varphi \to \varphi^2 = 1 + \left(\frac{y}{x}\right)^2 \to \frac{1+5+2\sqrt5}{4} = 1 + \left(\frac{y}{x}\right)^2$

$\frac{6+2\sqrt5}{4} - 1 = \left(\frac{y}{x}\right)^2 \to \frac{2+2\sqrt5}{4} = \left(\frac{y}{x}\right)^2 \to \frac{2(1+\sqrt5)}{2 \cdot 4} \to \frac{1+\sqrt5}{2} = \left(\frac{y}{x}\right)^2 \to \left(\frac{x}{y}\right)^2 = \frac{2}{1+\sqrt5}$

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$3a + \sqrt{3a^2+4a} = 2 \to \sqrt{3a^2+4a} = 2 - 3a \xrightarrow{\text{توان ۲}} 3a^2 + 4a = 9a^2 + 4 - 12a \to ۷a^2 - 16a + 4 = 0$

$\to a^2 - 16a + 28 = 0 \to (a-14)(a-2) = \frac{2}{7}✓ \quad \frac{14}{7} = 2$

$\frac{a+1}{a} \to \frac{\frac{2}{7}+1}{\frac{2}{7}} = \frac{9}{2} = 4/5$

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$\frac{\sqrt{x+1}}{\sqrt{x-1}+3} - \frac{\sqrt{x+1}}{3-\sqrt{x-1}} = \frac{x-1}{\sqrt{x-1}} \xrightarrow{\times(\sqrt{x-1}+3)(3-\sqrt{x-1})(\sqrt{x-1})}$

$\sqrt{x+1}\,(3-\sqrt{x-1})(\sqrt{x-1}) - (\sqrt{x+1}\,(\sqrt{x-1}+3)(\sqrt{x-1})) = (\sqrt{x-1}+3)(-\sqrt{x-1}+3)(x+1)$

$\to (x - 1 + 3\sqrt{x-1}) \to x\sqrt{x+1} - \sqrt{x+1} + 3\sqrt{x^2-1}$

$3\sqrt{x} - 3 - x + 1 \to 3\sqrt{x} - x - 2(\sqrt{x+1}) \to 3\sqrt{x^2+x} + x\sqrt{x+1} - 2\sqrt{x+1} - x\sqrt{x+1} + \sqrt{x+1} - 3\sqrt{x^2-x}$

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

$-x^2 + 9x + 9 \quad 9x - x^2 + x + 9 - x + 1$

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$\frac{1}{\sqrt{2-x}+2} - \frac{1}{2-\sqrt{2-x}} = \frac{2-x}{5\sqrt{2-x}} \xrightarrow{\text{طرفین وسطین}} \frac{2-\sqrt{2-x}-\sqrt{2-x}-2}{4-2+x} \to \frac{-2\sqrt{2-x}}{2+x} = \frac{2-x}{5\sqrt{2-x}}$

$\to -10\sqrt{(2-x)^2} = 4 - x^2 \to -10|2-x| = 4 - x^2 \to x^2 + 10x - 24 \to (x+12)(x-2) = 0 \to 2 ✓, -12$

$\to x^2 - 10x + 16 = 0 \to (x-8)(x-2) = 0 \to 2 ✓, 8 ✓$

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$\frac{1}{x^2}+\frac{1}{(1-x)^2}=\frac{160}{9} \xrightarrow{\times x^2(1-x)^2} (1-x)^2+x^2=\frac{160}{9}x^2(1-x)^2$

$1-2x+2x^2=\frac{160}{9}(x(1-x))^2 \to 1-2x+2x^2=\frac{160}{9}(x-x^2)^2 \to 1-2(x^2-x)=\frac{160}{9}(x^2-x)^2$

$x^2-x=t$

$1-2t=\frac{160}{9}t^2 \to 160t^2+18t-9=0 \xrightarrow{\Delta>0} t=-\frac{3}{16}$ $\quad x^2-x=\frac{3}{10} \to x^2-x-\frac{3}{10} \xrightarrow{\Delta>0} S=-\frac{b}{a}=1$

3 $\leftarrow x^2-x=-\frac{3}{16} \to x^2-x+\frac{3}{16}=0$ $\quad \Delta>0 \quad S=-\frac{b}{a}=1$

$\sqrt{x}+\sqrt{-x^3+4x^2+24x-100}\geq 0 + \sqrt{x}+\sqrt{-x^2+6x-8}=x+2 \longrightarrow$

$(x+4)(x^2-25)$

نتیجه

4 $\leftarrow 8$

$(x+4)(x^2-25)\geq 0$ $\quad x^2\geq -x^3+4x^2+24x-100 \to -x^3+3x^2+24x-100\leq 0$

$-4 \quad -5 \quad 25$

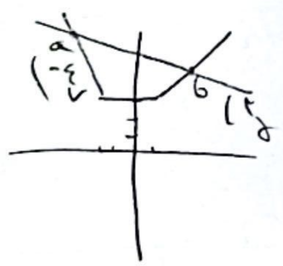
$-x^2+6x-8\geq 0 \to x^2-6x+8\leq 0 \to (x-4)(x-2)\leq 0$ $\quad [2,4]$

$x^2\geq -x^2+6x-8 \to -2x^2+6x+8\leq 0 \to$

$x^2+3x+4\leq 0$

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

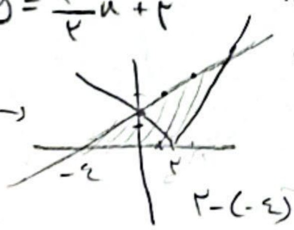
$-2x-1$	-2	3	1	$2x+1$



$\sqrt{(5-7)^2+(2-(-4))^2} \to \sqrt{40}$

$y=\sqrt{x^2-4x+4}$ $\quad y=\frac{1}{2}x+2$ $\quad x-2=\frac{1}{2}x+2 \to x=8,\ y=6$

$\sqrt{(x-2)^2} \to |x-2| \to$ $\quad -x+2=\frac{1}{2}x+2 \to x=0,\ y=2$



$\frac{6\times 6}{2}=18$

$2-(-4)=6$

$\frac{1}{x}+\frac{1}{x+9}=\frac{1}{20} \xrightarrow{\times 20x(x+9)} 20(x+9)+20x=x^2+9x \to 40x+180=x^2+9x$

$\to x^2-31x-180=0 \to (x+5)(x-36)=0 \longrightarrow -5,\ 36$ ✓