۱۷

یازدهم سری B
تکلیف ۱۸

امیرمحمد فردجانی

---

(۲)

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

$\frac{x_2}{y} = \frac{1+\sqrt{5}}{2} = \varphi \to x_2 = \varphi \cdot y \to x_2 = \varphi \cdot 4 \to \left(\frac{1+\sqrt{5}}{2}\right) 4 \to 2 + 2\sqrt{5}$

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

---

(۲)

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

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

$\frac{6+2\sqrt{5}}{4} - 1 = \left(\frac{y}{x}\right)^2 \to \frac{2+2\sqrt{5}}{4} = \left(\frac{y}{x}\right)^2 \to \frac{2(1+\sqrt{5})}{2 \cdot 2} \to \frac{1+\sqrt{5}}{2} = \left(\frac{y}{x}\right)^2 \to \boxed{\left(\frac{x}{y}\right)^2 = \frac{2}{1+\sqrt{5}}}$ ✓

---

(۲)

$3a + \sqrt{2a^2+4a} = 2 \to \sqrt{2a^2+4a} = 2-3a \xrightarrow{\text{توان ۲}} 2a^2+4a = 9a^2+4-12a \to 7a^2-16a+4=0$

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

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

(۰٫۵)

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

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

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

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

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

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

(۱٫۵)

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

$\to -10\sqrt{(2-x)^2} = 4 - x^2 \to -10|2-x| = 4-x^2 \to x^2+10x-24 \to (x+12)(x-2) = 0 \left\langle \begin{matrix} 2 \\ -12 \end{matrix} \right.$ ریشه مخرج با

$\to x^2 - 10x + 16 = 0 \to (x-8)(x-2) = 0 \left\langle \begin{matrix} 2 \\ 8 \end{matrix} \right.$

$D = x < 2$

هیچ ریشه مثبتی نداره!

امیر محمد فروجهانی

---

(۲)

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

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

$x^2-x=t$

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

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

---

(۲)

$\sqrt{x+\sqrt{-x^3+4x^2+28x-100}} \geq 0 + \sqrt{x+\sqrt{-x^2+6x-8}}=x+2$

$(x+4)(x^2-28)$

(۴) ← ۸

$(x+4)(x^2-28)\geq 0$ $\quad -4 \quad -5 \quad 5$ $\quad - + - +$

$x^2 \geq -x^3+4x^2+28x-100 \to -x^3+3x^2+28x-100 \leq 0$

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

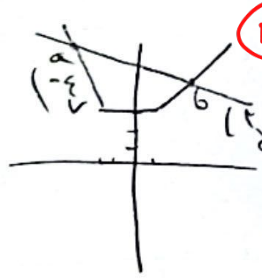
$x^2 \geq -x^2+6x-8 \to -2x^2+6x-8 \leq 0 \to x^2+9x+16\leq 0$

---

(۲)

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

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



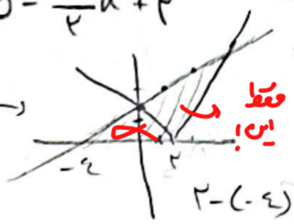
$\sqrt{(5-(-2))^2+(3+4)^2} \to \sqrt{40}$ ✓

---

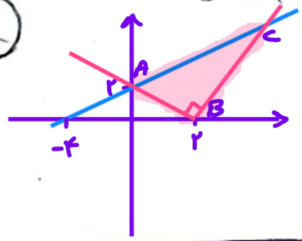
(۱)

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

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



$2-(-4)=6$ $\quad \frac{6\times 6}{2}$ ~~18~~



$AB=2\sqrt{2} \quad BC=6\sqrt{2} \to S=\frac{2\sqrt{2}\times 6\sqrt{2}}{2}=$ **12**

---

(۲)

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

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

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

$$\sqrt{x+1}\left(\frac{-2\sqrt{x-1}}{10-x}\right)=\sqrt{x-1}\Rightarrow -2\sqrt{x+1}=10-x \xrightarrow[x\geq 10]{\text{توان ۲}}$$

$$x^2-24x+94=0\rightarrow x=12\mp 4\sqrt{3}\rightarrow \boxed{\text{ق ق}\quad 12+4\sqrt{3}}$$