یکتا بخیاری

مقطع: یازدهم دختر A

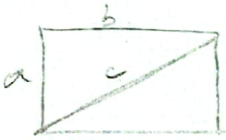
---

①

$\frac{1+\sqrt5}{2}$ نسبت طلایی $\Longrightarrow \dfrac{\frac{1+\sqrt5}{2}}{\frac{5}{4}} = \dfrac{1+\sqrt5}{2/5} \rightarrow 0/4 + 0/4\sqrt5$

---

②



$\frac{c}{b} = \frac{\sqrt5+1}{2} \rightarrow 2c = (\sqrt5+1)\,b$

$c = \frac{(\sqrt5+1)}{2}b$

$b^2+a^2=c^2$

$b^2+a^2 = \frac{(\sqrt5+1)^2 b^2}{4} \rightarrow a^2 = \frac{b^2(6+2\sqrt5)-4b^2}{4} \rightarrow a^2 = \frac{b^2(2+2\sqrt5)}{4}$

$\boxed{\frac{b^2}{a^2} = \frac{4}{2+2\sqrt5}} = \frac{2}{1+\sqrt5}$

---

③

$3a + \sqrt{2a^2+4a} = 2 \longrightarrow 3a-2 = -\sqrt{2a^2+4a} \rightarrow 9a^2+4-12a = 2a^2+4a$

$7a^2-16a+4=0$

$a^2-16a+28=0$

$(a-14)(a-2)$

$\times\ 2 \quad \cancel{\frac{14}{7}} \quad \frac{2}{7}\ \checkmark$

$\frac{a+1}{a} \rightarrow 1+\frac{1}{a} \rightarrow 1+\frac{7}{2} \rightarrow \frac{9}{2}$

---

④

الف جواب

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

$(\sqrt{x-1}+3)(3-\sqrt{x-1}) = 10-x \Longrightarrow \sqrt{x+1}\left(\frac{1}{\sqrt{x-1}+3} - \frac{1}{3-\sqrt{x-1}}\right) = \sqrt{x-1}$

$(\sqrt{x+1})\left(\frac{-2\cancel{\sqrt{x-1}}}{10-x}\right) = \cancel{\sqrt{x-1}} \rightarrow -2\sqrt{x+1} = 10-x \xrightarrow{\text{توان } 2} 4(x+1) = x^2-20x+100$

$x^2-24x+96=0 \rightarrow \Delta' = b'^2 - ac \xrightarrow{b'=\frac{b}{2}} \Delta' = (-12)^2 - 96 \rightarrow 48$

$x_{1,2} = \frac{-b' \pm \sqrt{\Delta'}}{a} \rightarrow x_1 = 12+4\sqrt3\ \checkmark \ / \ x_2 = 12-4\sqrt3\ \times$

---

⑤

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

$(2+\sqrt{2-x})(2-\sqrt{2-x}) \Rightarrow 4-(2-x) \rightarrow \boxed{2+x}$

$\frac{-2\cancel{\sqrt{2-x}}}{2+x} = \frac{\cancel{\sqrt{2-x}}}{5} \rightarrow -10 = 2+x$

$x=-12$

۰ جواب مثبت ؟

(6)

$$\frac{1}{x^2}+\frac{1}{(1-x)^2}=\frac{160}{9}\longrightarrow\frac{x^2+(x^2-2x+1)}{(x(1-x))^2}=\frac{160}{9}\rightarrow\frac{2\overbrace{(x^2-x)}^{t}+1}{(x-x^2)^2}=\frac{160}{9}$$

$$\frac{2t+1}{t^2}=\frac{160}{9}\xrightarrow[\text{صورت}]{\text{ترکیب در}}\frac{t^2+2t+1}{t^2}=\frac{169}{9}\rightarrow\left(\frac{1+t}{t}\right)^2=\frac{169}{9}$$

$$\frac{1+t}{t}=\begin{cases}\rightarrow\frac{-13}{3}\rightarrow t=\frac{-3}{16}=x^2-x\rightarrow x^2-x+\frac{3}{16}\Rightarrow \text{جمع جواب}=1\\ \rightarrow\frac{13}{3}\rightarrow t=0/3=x^2-x\rightarrow x^2-x-0/3=\Rightarrow \text{جمع جواب}=1\end{cases}$$

(2)

---

(7) تعداد ریشه

$$\sqrt{x+\sqrt{-x^3+4x^2+25x-100}}+\sqrt{x^2+\sqrt{-x^2+6x-8}}=x+2$$

I: $-x^2+6x-8\geq 0\rightarrow(-x+4)(x-2)\geq 0$ — $2\quad 4$; $-\ +\ -$ — $2\leq x\leq 4$

II: $-x^3+4x^2+25x-100\geq 0\rightarrow -x^2(x-4)+25(x-4)\geq 0\rightarrow$

$(x-4)(5+x)(5-x)\geq 0$ — $-5\quad 4\quad 5$; $-\ +\ -\ +$ — $4\leq x\leq 5$ یا $x\leq -5$

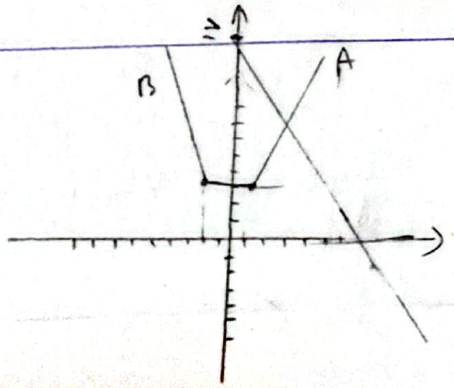
$\mathrm{I}\cap\mathrm{II}=4$

---

(8)

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

$y=\frac{17-x}{3}$



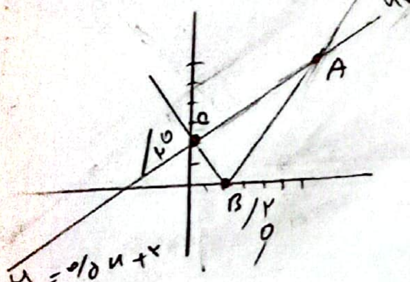
I: A قطع با شاخه ; $2x+1=\frac{17-x}{3}\rightarrow A\left(\begin{smallmatrix}2\\5\end{smallmatrix}\right)$

II: B ،، ،، : $-2x-1=\frac{17-x}{3}\rightarrow B\left(\begin{smallmatrix}-4\\7\end{smallmatrix}\right)$ $\quad AB=\sqrt{\Delta x^2+\Delta y^2}=2\sqrt{10}$

---

(9)

$y=\frac{1}{2}x+2\qquad y=\sqrt{x^2-4x+4}\quad\sqrt{(x-2)^2}=|x-2|$



$A\rightarrow x-2=0/5x+2\rightarrow x=8\rightarrow\left(\begin{smallmatrix}8\\6\end{smallmatrix}\right)$

$$S=\frac{1}{2}\left|\begin{vmatrix}8&6&1\\2&0&1\\0&2&1\end{vmatrix}\right|=12$$

---

(10) $\sqrt{x=36}\quad x=-5\ \times$

$$\frac{1}{x}+\frac{1}{x+9}=\frac{1}{20}\rightarrow\frac{2x+9}{x^2+9x}=\frac{1}{20}\longrightarrow x^2-31x-180\longrightarrow(x-36)(x+5)$$