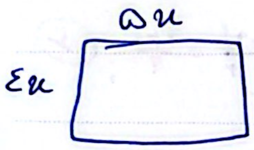
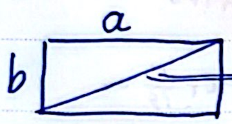
سینا دیباجی یازدهم یکشنبه A 18,5



$$\frac{S_{\text{طلایی}}}{S_{\text{اولیه}}} = \frac{\left(\left(1+\frac{\sqrt5}{2}\right)\times 4x\right)\times 4x}{5x\times 4x} = \frac{2+2\sqrt5}{5} = 0/4 + 0/4\sqrt5 \quad ①$$

$$= \boxed{0/4(1+\sqrt5)}$$

2



$\sqrt{a^2+b^2} =$ قطر

$$\frac{\sqrt{a^2+b^2}}{a} = \frac{1+\sqrt5}{2} \xRightarrow{\text{توان ۲}} \frac{a^2+b^2}{a^2} = \left(\frac{1+\sqrt5}{2}\right)^2 \quad ②$$

2

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

$$\Rightarrow \left(\frac{b}{a}\right)^2 = \frac{2+2\sqrt5}{4} = \frac{1+\sqrt5}{2} \Rightarrow \boxed{\left(\frac{a}{b}\right)^2 = \frac{2}{1+\sqrt5}}$$

$$3a+\sqrt{2a^2+4a} = 2 \Rightarrow \sqrt{2a^2+4a} = 2-3a \xRightarrow{\text{توان ۲}} 2a^2+4a = 4-12a+9a^2 \quad ③$$

$$\Rightarrow 7a^2-16a+4=0 \Rightarrow \Delta = (-16)^2-4(7)(4) = 144 \Rightarrow \sqrt\Delta = \sqrt{144} = 12$$

$$\Rightarrow a = \frac{16\pm12}{\cancel{2(7)}\ 14} \Rightarrow \begin{cases} a=2 \to \text{غ ق ق} \leftarrow \text{صورت رادیکال را منفی می‌کند} \\ a=\frac{2}{7} \Rightarrow \frac{a+1}{a} = 1+\frac{1}{a} = 1+\frac{7}{2} = \boxed{4/5} \end{cases}$$

2

$$\frac{\sqrt{x+1}}{\sqrt{x-1}+3} - \frac{\sqrt{x+1}}{3-\sqrt{x-1}} = \frac{x-1}{\sqrt{x-1}} \Rightarrow \sqrt{x+1}\left(\frac{3-\sqrt{x-1}-3-\sqrt{x-1}}{(3+\sqrt{x-1})(3-\sqrt{x-1})}\right) = \sqrt{x-1} \quad ④$$

5

$$\Rightarrow \sqrt{x+1}\left(\frac{-2\cancel{\sqrt{x-1}}}{9-(x-1)}\right) = \cancel{\sqrt{x-1}} \Rightarrow \frac{-2\sqrt{x+1}}{10-x} = 1 \Rightarrow 2\sqrt{x+1} = x-10 \Rightarrow 4(x+1) = x^2-20x+100$$

$$\Rightarrow x^2-24x+96=0 \Rightarrow \Delta = (-24)^2-4(1)(96) = 192 \Rightarrow x = \frac{24\pm\sqrt{192}}{2(1)} = 12\pm4\sqrt3$$

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$$\Rightarrow \boxed{12+4\sqrt3}$$

$$\frac{1}{\sqrt{2-x}+2} - \frac{1}{2-\sqrt{2-x}} = \frac{2-x}{5\sqrt{2-x}} \Rightarrow \frac{2-\sqrt{2-x}-\sqrt{2-x}-2}{(2+\sqrt{2-x})(2-\sqrt{2-x})} = \frac{2-x}{5\sqrt{2-x}} \quad ⑤$$

2

$$\Rightarrow \frac{-2\sqrt{2-x}}{4-(2-x)} = \frac{2-x}{5\sqrt{2-x}} \Rightarrow -10(2-x) = (2+x)(2-x) \Rightarrow -20+10x = 4-x^2$$

$$\Rightarrow x^2+10x-24=0 \Rightarrow (x+12)(x-2)=0 \Rightarrow \begin{cases} x=-12 \\ x=2 \to \text{غ ق ق (مخرج کسر را صفر می‌کند)} \end{cases}$$

⇒ معادله ریشه ی ~~0~~ 1 ندارد

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$$\frac{1}{x^2}+\frac{1}{(1-x)^2}=\frac{160}{9} \Rightarrow \frac{(1-x)^2+x^2}{x^2(1-x)^2}=\frac{160}{9} \Rightarrow \frac{2x^2-2x+1}{(x-x^2)^2}=\frac{160}{9}$$ 4

$$\Rightarrow \frac{2(x^2-x)+1}{(x^2-x)^2}=\frac{160}{9} \xrightarrow{x^2-x=t} \frac{2t+1}{t^2}=\frac{160}{9} \Rightarrow 160t^2=18t+9$$

$$\Rightarrow 160t^2-18t-9=0 \Rightarrow t=\frac{18\pm\sqrt{(-18)^2-4(160)(-9)}}{2\times 160}=\frac{18\pm 6\sqrt{9+160}}{2\times 160}$$ 3

$$\Rightarrow t=\frac{18\pm 6\times 13}{2\times 160} \Rightarrow \begin{cases} t=-\frac{3}{16} \Rightarrow x^2-x=-\frac{3}{16} \Rightarrow x^2-x+\frac{3}{16}=0 \\ t=\frac{3}{10} \Rightarrow x^2-x=\frac{3}{10} \Rightarrow x^2-x-\frac{3}{10}=0 \end{cases}$$

$$\Rightarrow 1+1=\boxed{2}$$

7

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

$$-x^2+6x-8\geq 0 \Rightarrow x^2-6x+8\leq 0 \Rightarrow (x-2)(x-4)\leq 0 \Rightarrow 2\leq x\leq 4 \ (I)$$

$$-x^3+4x^2+25x-100\geq 0 \Rightarrow x^2(-x+4)+25(x-4)\geq 0 \Rightarrow (x-4)(25-x^2)\geq 0$$

$$\Rightarrow x\leq -5$$ یا $$4\leq x\leq 5 \ (II)$$ 2

$$(II),(I) \Rightarrow x=4 \Rightarrow \sqrt{4+\sqrt{0}}+\sqrt{16+\sqrt{0}}=4+2 \Rightarrow 2+4=4+2 \checkmark$$

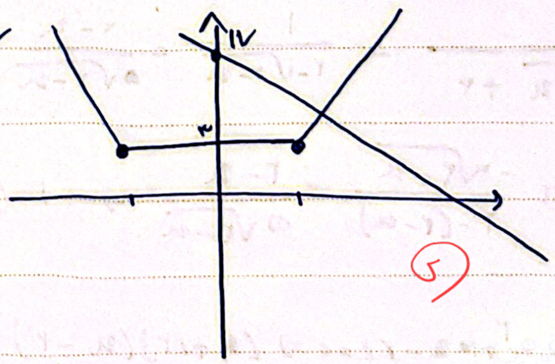
$$\Rightarrow \boxed{x=4}$$

8

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

$A(2,5) \quad B(-4,7)$

$$AB=\sqrt{(2-(-4))^2+(5-7)^2}=\sqrt{40}=\boxed{2\sqrt{10}}$$



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$$y = \frac{1}{2}x + 2 \Rightarrow \begin{array}{c|ccc} x & 0 & -4 & 2 \\ y & 2 & 0 & 3 \end{array}$$

$|x-2| = \frac{1}{2}x+2$

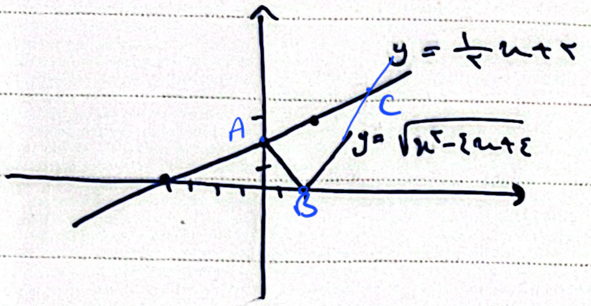
$A(0,2)\ B(2,0)\ C(8,6)$

$AB = 2\sqrt{2}$ $S = \frac{2\sqrt{2} \times 6\sqrt{2}}{2} = 12$

$BC = 6\sqrt{2}$

$$y = \sqrt{x^2 - 4x + 4} \Rightarrow \sqrt{(x-2)^2} \Rightarrow |x-2| = y$$

0/5



$$\Rightarrow S_\Delta = \frac{1}{2} \times 2 \times 2 = \boxed{2}$$

10

$$\text{پیروز} = x \Rightarrow \frac{1}{x}$$

$$\text{فرهاد} = x+9 \Rightarrow \frac{1}{x+9}$$

$$\Rightarrow \frac{1}{x} + \frac{1}{x+9} = \frac{1}{20}$$

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

2

$$x^2 - 31x = 180 \Rightarrow x(x-31) = 180 \Rightarrow \boxed{x = 36}$$