

پروژه ریاضی (روز)

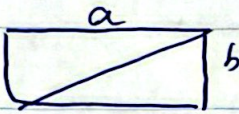
مسئله هفتم

سوال ۱ ←

$$\frac{\text{ضرایب}}{\text{درجه}} = \frac{((1+\sqrt{5}) \times 5) \times 5}{5 \times 5 \times 5} = \frac{2+2\sqrt{5}}{5} = \frac{2}{5} + \frac{2}{5}\sqrt{5}$$

$$= \frac{2(1+\sqrt{5})}{5}$$

سوال ۲ ←



$\sqrt{a^2 + b^2} = 1$ $\frac{\sqrt{a^2 + b^2}}{a} = \frac{1+\sqrt{5}}{2}$ (نسبت طلایی)

$$\Rightarrow \frac{b^2}{a^2} = \frac{2+2\sqrt{5}}{5} \Rightarrow \left(\frac{b}{a}\right)^2 = \frac{2+2\sqrt{5}}{5} = \frac{1+\sqrt{5}}{2}$$

$\frac{a^2 + b^2}{a^2} = \frac{(1+\sqrt{5})^2}{4}$

$$\frac{a^2 + b^2}{a^2} = \frac{1 + 2\sqrt{5} + 5}{4} = \frac{6 + 2\sqrt{5}}{4} = \frac{3 + \sqrt{5}}{2}$$

$$\left(\frac{a}{b}\right)^2 = \frac{2}{1+\sqrt{5}}$$

سوال ۳ ←

$$ra + \sqrt{ra^2 + 8a} = 2 \Rightarrow \sqrt{ra^2 + 8a} = 2 - ra \Rightarrow ra^2 + 8a = 4 - 4ra + r^2a^2$$

$$\Rightarrow ra^2 - 4ra + 8a = 4 \Rightarrow a = rx$$

$$a = \frac{r}{x} \Rightarrow \frac{a^2}{a} = 1 + \frac{1}{a} = 1 + \frac{1}{\frac{r}{x}} = 1 + \frac{x}{r} = \frac{r+x}{r}$$

سوال ۴ ←

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

$$\Rightarrow \frac{-2\sqrt{2-x}}{4-(2-x)} = \frac{2-x}{2\sqrt{2-x}} \Rightarrow -1 \cdot (2-x) = (2+x)(2-x) \Rightarrow x^2 + 4x - 2 = 0$$

$$\Rightarrow (x+1)(x-2) \Rightarrow x = -1 \text{ یا } x = 2$$

خارج از دامنه است ← $x = 2$

سوال ۵ ←

$$\frac{1}{x^2} + \frac{1}{(1-x)^2} = \frac{14}{9} \Rightarrow \frac{(1-x)^2 + x^2}{x^2(1-x)^2} = \frac{14}{9} \Rightarrow \frac{2x^2 - 2x + 1}{(x-x^2)^2} = \frac{14}{9}$$

Scanned with

$$\Rightarrow \frac{2(x^2 - x) + 1}{(x^2 - x)^2} = \frac{14}{9} \quad \frac{x^2 - x = t}{t+1} = \frac{14}{9} \rightarrow 14 \cdot t = 14 + 9$$

$$\rightarrow 14 \cdot t = 14 + 9 \rightarrow t = \frac{14 + 9}{14} \rightarrow t = -\frac{1}{14} \rightarrow x^2 - x + \frac{1}{14} = 0$$

$$\rightarrow 1 + 1 = \frac{2}{1}$$

$$\sqrt{x} + \sqrt{-x^2 + 4x + 1} = 0 \quad \leftarrow \text{سراں}$$

$$-x^2 + 4x + 1 \geq 0 \rightarrow x^2 - 4x - 1 \leq 0 \Rightarrow (x-2)(x-1) \leq 0 \Rightarrow 1 \leq x \leq 2 \quad \textcircled{I}$$

$$-x^2 + (x^2 + 4x - 1) \geq 0 \Rightarrow x^2(-x+4) + 2(x-1) \geq 0 \Rightarrow (x-1)(2+x) \geq 0 \Rightarrow x \leq -2 \text{ or } x \geq 1 \quad \textcircled{II}$$

$$\rightarrow (x-1)(2+x) \geq 0 \rightarrow x \leq -2 \text{ or } x \geq 1 \quad \textcircled{II}$$

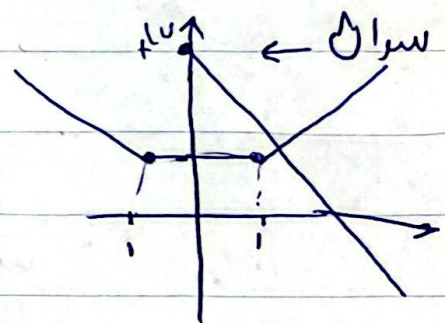
$$\textcircled{II} \perp \textcircled{I} \rightarrow x=1 \Rightarrow \sqrt{1} + \sqrt{0} + \sqrt{14 + \sqrt{0}} = 1 + 1 = 2 + 1 = 3 \quad \checkmark$$

$$x=1$$

$$y = |x+1| + |x-1|, \quad 3y + x = 14$$

$$A(2,0) \quad B(-1,5)$$

$$AB = \sqrt{2 - (-1)^2 + (0 - 5)^2} = \sqrt{10}$$



$$y = \frac{1}{3}x + \frac{14}{3} \Rightarrow \frac{x}{y} = \frac{0}{14} = \frac{1}{2}$$

$$|x-2| = \frac{1}{3}x + \frac{14}{3} \rightarrow A(0, \frac{14}{3}) \quad B(2, 0) \quad C(14, 4) \quad AB = \sqrt{2} \quad BC = 4\sqrt{2}$$

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

$$\rightarrow \frac{1}{x+9} = \frac{1}{x} \rightarrow 10x + 10 = x^2 + 9x \Rightarrow x^2 - x - 10 = 0$$

$$x(x-10) = 10 \Rightarrow x = 10 \text{ or } x = -1$$