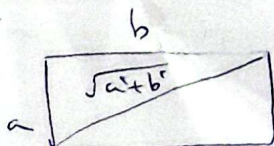


$$\frac{n}{c} = \frac{\sqrt{5}+1}{2} \Rightarrow n = 4(\sqrt{5}+1) \Rightarrow$$

$$n = 2(\sqrt{5}+1) \quad \text{طول وتر}$$

$$\frac{S_2}{S_1} = \frac{4 \times 2(\sqrt{5}+1)}{4 \times 5} = \frac{2(\sqrt{5}+1)}{5}$$

۱



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

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

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

۲

$$3a + \sqrt{2a^2 + 4a} = 2 \Rightarrow \sqrt{2a^2 + 4a} = 2 - 3a \Rightarrow$$

$$2a^2 + 4a = 4 - 12a + 9a^2 \Rightarrow 7a^2 - 16a + 4 = 0$$

$$\Delta = 256 - 112 = 144 \quad n_{1,2} = \frac{16 \pm 12}{14} \Rightarrow n = \frac{28}{14} = 2 \text{ یا } n = \frac{4}{14} = \frac{2}{7}$$

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

$$\frac{\sqrt{n+1}(3-\sqrt{n+1}) - \sqrt{n+1}(\sqrt{n-1}+2)}{(\sqrt{n-1}+2)(3-\sqrt{n+1})} = \frac{(\sqrt{n-1}-1)^2}{\sqrt{n-1}}$$

$$\frac{3\sqrt{n+1} - \sqrt{n^2-1} - \sqrt{n^2-1} - 3\sqrt{n+1}}{3-(n-1)} = \sqrt{n-1} \Rightarrow \frac{-2\sqrt{n^2-1}}{4-n} = \sqrt{n-1} \Rightarrow -2\sqrt{n-1} \times \sqrt{n+1} = (4-n)\sqrt{n-1}$$

۳

۴

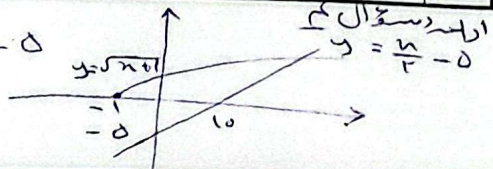
$$\sqrt{2-n} = a \Rightarrow \frac{1}{a+2} - \frac{1}{2-a} = \frac{a^2}{5a} \Rightarrow \frac{-2a}{4-a^2} = \frac{a}{5}$$

$$\Rightarrow 4 - a^2 = -10 \Rightarrow a^2 = 14 \Rightarrow 2-n = 14 \Rightarrow n = -12$$

✓ دایره ای یک بیس کعب و ناقصه بیس کعب

۵

$-2\sqrt{n+1} = 10-n$ $\sqrt{n+1} \neq 0$ $\sqrt{n+1} = \frac{n}{2} - 5$
با توجه به علامت جواب $n = -12$ را رد می‌کنیم.
پس جواب $n = -12$ می‌باشد.



$$\frac{1}{x^2} + \frac{1}{(1-x)^2} = \frac{16}{9} \Rightarrow \left(\frac{1}{x} + \frac{1}{1-x}\right)^2 - 2 \frac{1}{x(1-x)} = \frac{16}{9}$$

$$\Rightarrow \left(\frac{1}{x(1-x)}\right)^2 - 2 \left(\frac{1}{x(1-x)}\right) = \frac{16}{9} \Rightarrow \left(\frac{1}{x(1-x)}\right) = t$$

$$t^2 - 2t = \frac{16}{9} \Rightarrow t^2 - 2t + 1 = \frac{16}{9} + 1 \Rightarrow (t-1)^2 = \frac{25}{9} \Rightarrow t-1 = \pm \frac{5}{3} \Rightarrow t = 1 \pm \frac{5}{3}$$

$$\begin{cases} t-1 = \frac{5}{3} \Rightarrow t = \frac{8}{3} \\ t-1 = -\frac{5}{3} \Rightarrow t = -\frac{2}{3} \end{cases}$$

$$\frac{1}{x(1-x)} = \frac{16}{9} \Rightarrow -x^2 + x = \frac{16}{9}$$

$$-x^2 + 4x - 16 \geq 0 \Rightarrow -(x^2 - 4x + 16) \geq 0$$

$$x^2 - 4x + 16 \leq 0 \quad (x-2)(x-8) \leq 0$$

$$\frac{2}{1} \leq x \leq 8 \Rightarrow [2, 8]$$

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

$$S_1 + S_2 = 2$$

$$-x^2 + 4x^2 + 10x - 100 = (x-2)(20-x) = (x-2)(x+8)(8-x) \geq 0$$

$$\frac{2}{1} \leq x \leq 10 \Rightarrow [2, +\infty) \cup \{-8\}$$

$$AB = \sqrt{(2-(-8))^2 + (0-10)^2} = \sqrt{100 + 100} = 10\sqrt{2}$$

$$y = -x + 10 \quad y = x + 10 \quad y = -x + 10$$

$$-x^2 - 1 = \frac{-x+10}{x} \Rightarrow -x^2 - 1 = -x + 10 \Rightarrow x = 11 \Rightarrow A(11, 0)$$

$$AB = \sqrt{(2-(-8))^2 + (0-10)^2} = \sqrt{100 + 100} = 10\sqrt{2}$$

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

$$AB = \sqrt{(2-(-8))^2 + (0-10)^2} = 10\sqrt{2}$$

$$|x-2| = \frac{1}{x} \Rightarrow x-2 = \frac{1}{x} \Rightarrow x^2 - 2x - 1 = 0 \Rightarrow x = 1 \pm \sqrt{2}$$

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

$$\frac{1}{x} + \frac{1}{x+9} = \frac{1}{x_0} \Rightarrow \frac{x+9+x}{x(x+9)} = \frac{1}{x_0} \Rightarrow \frac{2x+9}{x^2+9x} = \frac{1}{x_0}$$

$$\Rightarrow x^2 + 9x = x_0 x + 18 \Rightarrow x^2 - x_0 x - 18 = 0$$

$$(x-18)(x+1) = 0$$

$$x = 18$$