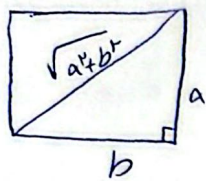


$$\frac{S_2}{S_1} \rightarrow \frac{a+x}{F} = \frac{\sqrt{a+1}}{r} \rightarrow x = r\sqrt{a+1} - r$$

$$\frac{S_2}{S_1} = \frac{F \times (r\sqrt{a+1} + r)}{a \times F} = \frac{r\sqrt{a+1} + r}{a}$$

$$= \frac{r\sqrt{a+1}}{10} = 0, F(\sqrt{a+1})$$



$$\frac{\sqrt{a^2+b^2}}{b} = \frac{\sqrt{a+1}}{r} \text{ تان } \frac{a^2+b^2}{b^2} = \frac{4+2\sqrt{a}}{r^2} \rightarrow 1 + \frac{a^2}{b^2} = \frac{4+2\sqrt{a}}{r^2}$$

$$\rightarrow \frac{a^2}{b^2} = \frac{4+2\sqrt{a}}{r^2} - 1 = \frac{1+2\sqrt{a}}{r^2} \rightarrow \left(\frac{b}{a}\right)^2 = \frac{1}{\frac{1+2\sqrt{a}}{r^2}} = \frac{r^2}{1+2\sqrt{a}}$$

$$\sqrt{2a^2+Fa} = r-3a \text{ تان } 2a^2+Fa = r^2+9a^2-12a \rightarrow \sqrt{2a^2-14a+F} = 0$$

$$2a^2-14a+F=0 \rightarrow \begin{cases} a = \frac{14}{2} = 7 \\ a = \frac{r^2}{2} \end{cases} \text{ غ } \rightarrow r-3 \times 7 < 0 \rightarrow \text{جاب رايان منفي نه كور}$$

$$\rightarrow \frac{a+1}{a} = \frac{\frac{r^2}{2}+1}{\frac{r^2}{2}} = \frac{9}{r^2} = \frac{9}{r^2}$$

$$\sqrt{x+1} \left(\frac{1}{\sqrt{x-1}+r} - \frac{1}{-\sqrt{x-1}+r} \right) = \frac{(x-1)(\sqrt{x-1})}{(\sqrt{x-1}+r)(-\sqrt{x-1}+r)} \rightarrow \sqrt{x+1} \left(\frac{r-\sqrt{x-1}-r-\sqrt{x-1}}{r^2-(x-1)} \right) =$$

$$\rightarrow \sqrt{x+1} \left(\frac{-2\sqrt{x-1}}{r^2-x+1} \right) = \sqrt{x-1} \rightarrow \frac{-2\sqrt{x+1}}{r^2-x+1} = 1 \rightarrow -2\sqrt{x+1} = r^2-x+1$$

$$x^2-20x+100 = 4x+4 \rightarrow x^2-24x+96=0 \rightarrow \begin{cases} x_1 = 12+\sqrt{48} \\ x_2 = 12-\sqrt{48} \end{cases}$$

کې رښه منبېه $\checkmark$ $\rightarrow$ $x=12+\sqrt{48}$ $\rightarrow$ $x-10 > 0$ $\rightarrow$ $x-10 > 0$

$$\sqrt{r-x} = t \rightarrow \frac{1}{t+r} - \frac{1}{r-t} = \frac{t^2}{a} \rightarrow \frac{-2t}{r-t^2} = \frac{t^2}{a}$$

$$F-t^2 = -10 \rightarrow t^2 = 14 \rightarrow r-x = 14 \rightarrow x = -12$$

تنها يك رښه منفي دارودرښت منبېه ندارد.

$$\frac{1}{x^t} + \frac{1}{x^{t-1}x+1} = \frac{140}{9} \rightarrow \frac{(1-x)^t + x^t}{x^t(1-x)^t} = \frac{140}{9} \rightarrow \frac{1-x^{t-1}x+1}{(x-x^t)^t} = \frac{140}{9}$$

$$\rightarrow \frac{1-x^{t-1}x+1}{(x-x^t)^t} = \frac{140}{9} \xrightarrow{x^t-x=t} \frac{t+1}{t^t} = \frac{140}{9} \rightarrow 140t^t = 18t+9 \rightarrow 140t^t - 18t - 9 = 0$$

$$\rightarrow t^t - 18t - 18 \times 10 = 0 \rightarrow t = \begin{cases} \frac{18}{140} = \frac{9}{70} \rightarrow x^t - x - \frac{9}{70} = 0 \xrightarrow{\Delta > 0} S_1 = 1 \\ -\frac{9}{140} = -\frac{9}{140} \rightarrow x^t - x + \frac{9}{140} = 0 \xrightarrow{\Delta > 0} S_2 = 1 \end{cases}$$

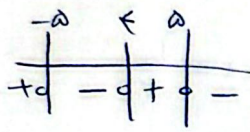
$$S_1 + S_2 = 2$$

زیر اینکال باید
مشتق باشد

$$\rightarrow -x^t + 4x - 1 \geq 0 \rightarrow x^t - 4x + 1 \leq 0 \rightarrow (x-2)(x-1) \leq 0$$

$$\rightarrow 1 \leq x \leq 2$$

$$-x^t + 4x^t + 10x - 10 \geq 0 \rightarrow x^t(-x + 4) + 10(x - 1) \geq 0 \rightarrow (x-1)(15-x^t) \geq 0$$



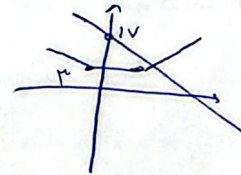
$$\rightarrow x \leq -1 \cup 1 \leq x \leq 15 \rightarrow \text{با توجه به } x \in \mathbb{R}^+ \rightarrow x \in [1, 15]$$

$$\text{و اما } \rightarrow \sqrt{1+10} + \sqrt{14+10} = 1+15 = 16 \checkmark x=15$$

$$2x+1 = \frac{-x+14}{x} \rightarrow 4x+1 = -x+14 \rightarrow x=3, y=0$$

$$-2x-1 = \frac{-x+14}{x} \rightarrow -4x-1 = -x+14 \rightarrow x=-5, y=1$$

$$AB = \sqrt{(3-(-5))^2 + (0-1)^2} = \sqrt{64+1} = \sqrt{65} = 2\sqrt{10}$$



$$y = \sqrt{x^2 - 4x + 5} = \sqrt{(x-2)^2 + 1} = |x-2| \quad y = \frac{1}{x} + 2$$

$$x \geq 2 \rightarrow x-2 = \frac{1}{x} + 2 \rightarrow \frac{1}{x} = 4 \rightarrow x = \frac{1}{4} \quad y = 4$$

$$x < 2 \rightarrow 2-x = \frac{1}{x} + 2 \rightarrow \frac{1}{x} = 0 \rightarrow x = \infty, y = 2$$

$$0 \leq x \leq 2 \rightarrow \text{مساحت} = \int_0^2 \left(\frac{1}{x} + 2 - \sqrt{x^2 - 4x + 5} \right) dx = 12 \quad S_1 + S_2 = 12 + 9 = 21$$

$$2 \leq x \leq 1 \rightarrow \text{مساحت} = \int_1^2 \left(\sqrt{x^2 - 4x + 5} - \left(\frac{1}{x} + 2 \right) \right) dx = 9$$

$$\text{از } x \rightarrow \frac{1}{x} \rightarrow \frac{1}{x}$$

$$x+9 \rightarrow \frac{1}{x+9}$$

$$\frac{1}{x} + \frac{1}{x+9} = \frac{1}{x} \rightarrow \frac{x+9+x}{x(x+9)} = \frac{1}{x} \rightarrow \frac{2x+9}{x^2+9x} = \frac{1}{x} \rightarrow 2x+9 = x^2+9x \rightarrow x^2-7x-9=0$$

$$\rightarrow x^2 - 7x - 9 = 0 \rightarrow \begin{cases} x = 9 \checkmark \\ x = -1 \end{cases} \quad \text{مساحت } 18$$