

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

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

$$L: S_1 = 1$$

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

$$t^2 - 2t + 1 = \frac{16}{9} + 1$$

$$(t-1)^2 = \frac{16}{9} \Rightarrow \begin{cases} t-1 = \frac{4}{3} \rightarrow t = \frac{7}{3} \\ t-1 = -\frac{4}{3} \rightarrow t = -\frac{1}{3} \end{cases}$$

$$\Rightarrow S_1 + S_2 = 2 \quad \checkmark$$

$$\sqrt{x + \sqrt{-x^2 + 4x + 100}} + \sqrt{x^2 + \sqrt{-x^2 + 4x + 100}} = x + 1$$

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

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

$$\rightarrow (-\infty, -2] \cup [2, 4] \rightarrow \textcircled{1}$$

$$-(x-2)(x-4) \geq 0$$

$$(x-2)(x-4) \leq 0$$

$$\rightarrow [2, 4] \rightarrow \textcircled{2}$$

$$\textcircled{1} \cap \textcircled{2} \cap \textcircled{3} \rightarrow x = 4 \quad \checkmark$$

$$y = |x+1| + |x-1|$$

$$3y + x = 14$$

$$y = -\frac{x}{3} + \frac{14}{3}$$

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

$$5x = 11 \rightarrow x = \frac{11}{5}$$

$$y = \frac{14}{5}$$

$$A(2, 4), B(-1, 5)$$

$$d = \sqrt{3^2 + 4^2} = \sqrt{25} = 5$$

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

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

$$x-2 = \frac{1}{3}x + 2 \rightarrow 2x-4 = x+4$$

$$x = 8$$

$$y = 6$$

$$S_{\text{مربع}} = S_{ABC} - S_{ABD} = \frac{4 \times 4}{2} - \frac{4 \times 4}{2} = 0$$

$$11-4 = 7 \quad \checkmark$$

$$\frac{1}{x} + \frac{1}{x+9} = \frac{1}{10}$$

$$\frac{x+x+9}{x(x+9)} = \frac{1}{10} \rightarrow 10x+100 = x^2+9x$$

$$x^2-x-100 = 0 \rightarrow (x-10)(x+10) = 0$$

$$x = 10$$