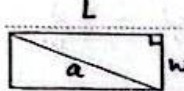


$$\sigma_{\text{sub}} = \frac{1}{(w)_{\text{ox}}} = \frac{1+\sqrt{a}}{Y}$$

$$S = r_x \times \Delta x = r_0 x^r$$

$$\frac{L'}{r_x} = \frac{1+\sqrt{a}}{Y} \Rightarrow L' = r_x (1+\sqrt{a}) \Rightarrow S' = r_x \times r_x (1+\sqrt{a})$$

$$\Rightarrow \frac{S'}{S} = \frac{r_x \times r_x (1+\sqrt{a})}{r_0 x^r} = \frac{Y}{a} (1+\sqrt{a})$$



$$a = \sqrt{L^2 - w^2} \Rightarrow \frac{\sqrt{L^2 - w^2}}{L} = \frac{1+\sqrt{a}}{Y} \Rightarrow \frac{L^2 - w^2}{L^2} = \frac{(1+\sqrt{a})^2}{Y^2}$$

$$\Rightarrow r_x L^2 - r_x w^2 = r_x L^2 + L^2 \sqrt{a} \Rightarrow w^2 = L^2 \left(\frac{1+\sqrt{a}}{Y} \right)^2$$

$$\Rightarrow \frac{L^2}{w^2} = \frac{Y}{1+\sqrt{a}} = \frac{\sqrt{a}-1}{Y}$$

$$r_x a + \sqrt{r_x^2 + r_a^2} = Y \Rightarrow \sqrt{r_x^2 + r_a^2} = Y - r_x \Rightarrow r_x^2 + r_a^2 = 9a^2 - 12a + r_x^2 \Rightarrow 9a^2 - 12a + r_x^2 = 0$$

$$\Rightarrow a^2 - 4a + \frac{r_x^2}{9} = 0 \Rightarrow (a-12)(a-\frac{r_x^2}{9}) = 0 \Rightarrow a = \frac{r_x^2}{9} = 4, a = \frac{Y}{V}$$

$$\frac{a+1}{a} = \frac{\frac{4}{V}}{\frac{Y}{V}} = \frac{4}{Y} = 6, 0$$

$$\frac{\sqrt{x+1}}{\sqrt{x-1}+Y} - \frac{\sqrt{x+1}}{Y-\sqrt{x-1}} = \frac{x-1}{\sqrt{x-1}}$$

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

$$\Rightarrow -2\sqrt{x+1} = 10-x \Rightarrow \sqrt{x+1} = \frac{10-x}{2}$$

$$(x \geq 1) \Rightarrow -2\sqrt{x+1} = 10-x \Rightarrow \sqrt{x+1} = \frac{10-x}{2} \Rightarrow x^2 - 20x + 99 = 0$$

$$x = \frac{20 \pm \sqrt{400-396}}{2} = 12 \pm \sqrt{1} = 12 \pm 1 \Rightarrow x = 11, 13$$

$$\sqrt{Y-x} = t \Rightarrow \frac{1}{t+Y} - \frac{1}{Y-t} = \frac{Y-t-t-Y}{t^2} = \frac{-2t}{t^2} = \frac{-2}{t}$$

$$\frac{Y-x}{\Delta t} = \frac{t^r}{\Delta t} = \frac{t}{a} \Rightarrow \frac{-2}{t} = \frac{1}{a} \Rightarrow t = -2a$$

$$\Rightarrow Y-x = 12 \Rightarrow x = -12$$

$$t = \sqrt{Y-x} \Rightarrow \sqrt{Y-x} = \sqrt{12} \Rightarrow Y-x = 12 \Rightarrow x = -12$$

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

$$\Rightarrow \frac{X(t^2 + \frac{1}{t})}{(\frac{1}{t} - t^2)^2} = \frac{14}{9} \rightarrow 9t^2 t^4 - 14t^2 + 11 = 0 \rightarrow t^2 = \frac{14 \pm 12}{4 \times 9} \rightarrow \frac{11}{9} \rightarrow t = \pm \sqrt{\frac{11}{9}}$$

$$\frac{1}{14} \rightarrow t = \pm \frac{1}{t}$$

$$x = t + \frac{1}{t} \rightarrow x = \frac{1}{t}, x = \frac{11}{t}, x = \frac{1}{t} + \sqrt{\frac{11}{9}}, x = \frac{1}{t} - \sqrt{\frac{11}{9}}$$

$$\Rightarrow \frac{1}{t} + \frac{11}{t} + \frac{1}{t} + \sqrt{\frac{11}{9}} + \frac{1}{t} - \sqrt{\frac{11}{9}} = 11$$

$$\textcircled{1} -x^2 + 5x + 12x - 100 \geq 0 \rightarrow -(x-5)(x-20) \geq 0 \quad \begin{matrix} - & + & + \\ + & - & + & - \end{matrix} \rightarrow D = (-\infty, -5] \cup [20, \infty)$$

$$\textcircled{2} -x^2 + 4x - 1 \geq 0 \rightarrow -(x-2)(x-1) \geq 0 \quad \begin{matrix} - & + & + \\ - & + & - \end{matrix} \rightarrow D = [1, 2]$$

$$1, 2 \rightarrow x = 1 \Rightarrow \sqrt{1} + \sqrt{14} = 1 + 5 \checkmark \Rightarrow x = 1 \cup 14$$

$$xy + x = 14 \rightarrow y = \frac{14-x}{x}$$

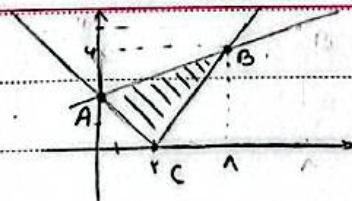
$$y = |x+2| + |x-1| \rightarrow \begin{cases} x+1 & ; x \geq 1 \\ 3 & ; -2 < x < 1 \\ -x-1 & ; x \leq -2 \end{cases}$$

$$\begin{cases} A \Rightarrow x \leq -2 \rightarrow -x-1 = \frac{14-x}{x} \rightarrow 14-x = -x^2-4x \rightarrow x^2+3x-14=0 \Rightarrow x = -5, y = 3 \Rightarrow A = (-5, 3) \\ B \Rightarrow x \geq 1 \rightarrow x+1 = \frac{14-x}{x} \rightarrow 14-x = x^2+x-1 \Rightarrow x^2+2x-15=0 \Rightarrow x = 3, y = 4 \Rightarrow B = (3, 4) \end{cases}$$

$$AB = \sqrt{\Delta x^2 + \Delta y^2} = \sqrt{3^2 + 4^2} = \sqrt{25} = 5$$

$$y = \sqrt{x^2 - 6x + 9} = |x-3|$$

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



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

$$B \rightarrow x-x = \frac{1}{x} x + 3 \Rightarrow 3-4 = x+3 \Rightarrow x = -1, y = 4$$

$$C = (3, 0)$$

$$S = \frac{1}{2} \begin{vmatrix} 3 & 0 & 1 \\ 0 & 3 & 1 \\ 1 & 4 & 1 \end{vmatrix} = \frac{1}{2} (14 + 12 + 0 - 6 - 0 - 0) = \frac{1}{2} \times 20 = 10$$

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$$\begin{aligned} \left. \begin{array}{l} \text{مخرج} \rightarrow x \rightarrow \frac{1}{x} \text{ قسمة} \\ \text{مخرج} \rightarrow x+4 \rightarrow \frac{1}{x+4} \text{ قسمة} \end{array} \right\} \frac{1}{x} + \frac{1}{x+4} = \frac{1}{20} \Rightarrow \frac{x+4+x}{x^2+4x} = \frac{1}{20} \quad -10 \\ \Rightarrow 20x + 10(x+4) = x^2 + 4x \rightarrow x^2 - 16x - 40 = 0 \\ \Rightarrow \underbrace{(x-20)}_{20} \underbrace{(x+2)}_{-2x} = 0 \rightarrow x = \underline{20} \quad \text{مخرج} \end{aligned}$$