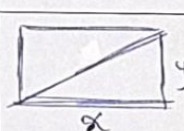


$$\frac{x}{y} = \frac{\omega}{r} \rightarrow y = \frac{\omega}{r} x \quad x \cdot y = x \times \frac{\omega}{r} x = \frac{\omega}{r} x^2$$

$$\frac{x'}{y} = \frac{1+\sqrt{\omega}}{r} \rightarrow y = \frac{1+\sqrt{\omega}}{r} x' \quad x \cdot y = x \cdot \frac{1+\sqrt{\omega}}{r} x = \frac{1+\sqrt{\omega}}{r} x^2$$

$$\frac{s_r}{s_l} = \frac{\frac{1+\sqrt{\omega}}{r} x^2}{\frac{\omega}{r} x^2} \rightarrow \frac{1+\sqrt{\omega}}{\omega} = \frac{r+2\sqrt{\omega}}{\omega}$$



$\sqrt{x^2 + y^2} = r$ $\frac{\sqrt{x^2 + y^2}}{x} = \frac{1+\sqrt{\omega}}{r}$ $y = \frac{x}{d} \rightarrow \frac{\sqrt{x^2 + \frac{x^2}{d^2}}}{x} = \frac{1+\sqrt{\omega}}{r} \Rightarrow \frac{\sqrt{1 + \frac{1}{d^2}}}{1} = \frac{1+\sqrt{\omega}}{r}$

$\left(\frac{x}{y}\right) = d \quad y = \frac{x}{d}$

$$\sqrt{1 + \frac{1}{d^2}} = \frac{1+\sqrt{\omega}}{r} \quad 1 + \frac{1}{d^2} = \frac{r+2\sqrt{\omega}}{r} \quad \frac{1}{d^2} = \frac{r+2\sqrt{\omega}}{r} \rightarrow \frac{r(r+2\sqrt{\omega})}{r^2} \rightarrow$$

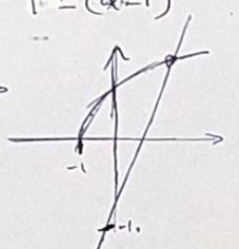
$$d^2 = \frac{r}{r+2\sqrt{\omega}} \quad \text{مختار نسبت طول به عرض} \rightarrow \left(\frac{x}{y}\right)^2 = \frac{r}{r+2\sqrt{\omega}}$$

$$ra + \sqrt{ra^2 + ka} = r \rightarrow \sqrt{ra^2 + ka} = r - ra \quad ra^2 + ka = r^2 - 2ra + r^2$$

$$ra^2 - 2ra + r^2 = 0 \quad a^2 - 2a + r = 0 \quad (a-1)(a-r) \rightarrow \begin{cases} a_1 = \frac{1r}{1} = r \\ a_2 = \frac{r}{1} \end{cases}$$

$$\frac{a+1}{a} \rightarrow \frac{r+1}{r} = \frac{r}{r} \quad \frac{\frac{r}{r}+1}{\frac{r}{r}} = \frac{q}{\frac{r}{r}} = \frac{q}{r}$$

$$\frac{\sqrt{x+1}}{\sqrt{x-1}+3} - \frac{\sqrt{x+1}}{3-\sqrt{x-1}} = \frac{x-1}{\sqrt{x-1}} \quad x \neq 1 \quad \frac{\sqrt{x+1}(3-\sqrt{x-1}-3-\sqrt{x-1})}{3^2-(x-1)} = \frac{x-1}{\sqrt{x-1}}$$

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


$\left[\checkmark \right] \text{ریشه مثبت}$

$$\frac{1}{\sqrt{r-x}+2} - \frac{1}{2-\sqrt{r-x}} = \frac{r-x}{\omega\sqrt{r-x}} \quad \frac{1}{\sqrt{t}+2} - \frac{1}{2-\sqrt{t}} = \frac{t}{\omega\sqrt{t}}$$

$$(2-\sqrt{t})(\omega\sqrt{t}) - (\sqrt{t}+2)(\omega\sqrt{t}) = (t)(\sqrt{t}+2)(2-\sqrt{t}) \rightarrow$$

$$\sqrt{t} - \omega t - \omega t - 10\sqrt{t} = 2 + \sqrt{t} - t^2 + 4t - 2 + \sqrt{t} \quad t^2 - 14t = 0 \quad t(t-14) = 0$$

$$t=0 \rightarrow r-x=0 \quad \boxed{x=r} \quad \left[\checkmark \right] \text{ریشه مثبت}$$

$$t=14 \rightarrow r-x=14 \quad x=-12 \times$$

$$\frac{1}{x^2} + \frac{1}{(1-x)^2} = \frac{140}{9} \rightarrow \left(\frac{1}{x(1-x)} \right)^2 - 2 \left(\frac{1}{x(1-x)} \right) = \frac{140}{9}$$

$$t - 2t = \frac{140}{9} \quad t - 2t + 1 = \frac{149}{9} \quad (t-1)^2 = \frac{149}{9} \rightarrow t-1 = \pm \frac{\sqrt{149}}{3} \quad t = \frac{14 \pm \sqrt{149}}{3}$$

$$\frac{1}{x(1-x)} = \frac{14}{3} \quad -x^2 + x = \frac{14}{3} \quad x^2 - x + \frac{14}{3} = 0 \quad \left(x - \frac{1}{3}\right) \left(x - \frac{14}{3}\right) \quad S_1 = 1$$

$$\frac{1}{x(1-x)} = -\frac{10}{3} \quad -x^2 + x = -\frac{10}{3} \quad x^2 - x - \frac{10}{3} = 0 \quad S_2 = 1 \quad S_1 + S_2 = \boxed{2}$$

$$\sqrt{x^2 - x^2 + 4x^2 + 2\omega x - 100} + \sqrt{x^2 - x^2 + 4x - 11} = x + 2$$

$$-x^2 + 4x^2 + 2\omega x - 100 \geq 0 \quad -(\omega - 2)(x^2 + 9x + 10) \rightarrow -(\omega - 2)(x+2)(x+5) \geq 0 \quad (1)$$

$$-x^2 + 4x - 11 \geq 0 \quad (x-2)(x-11) \leq 0 \quad (2)$$

$$(1) \cap (2) \Rightarrow \text{مجموع اشتراکی ندارد} \quad \emptyset$$

$$y = |x+2| + |x-1| \quad 3y + x = 14 \quad y = \frac{14-x}{3}$$

$$\begin{array}{c|c|c} -x-2-x+1 = \frac{14-x}{3} & x+2-x+1 = \frac{14-x}{3} & x+2+x-1 = \frac{14-x}{3} \\ \hline -2x-1 = \frac{14-x}{3} & 2 = \frac{14-x}{3} & 2x+1 = \frac{14-x}{3} \\ -6x-3 = 14-x & 6 = 14-x & 6x+3 = 14-x \\ -5x = 17 & x = 8 & 7x = 11 \\ x = -\frac{17}{5} & x = 8 & x = \frac{11}{7} \end{array}$$

$$AB = \sqrt{(2+2)^2 + (\omega-1)^2} = \sqrt{4 + (\omega-1)^2}$$

$$\Rightarrow \sqrt{4 + (\omega-1)^2} = \sqrt{40}$$

$$\begin{array}{l} 3y - x = 14 \quad y = \omega \\ (-17, \omega) \end{array} \quad \begin{array}{l} 3y + x = 14 \quad y = \omega \\ (2, \omega) \end{array}$$

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

$$\frac{1}{x} x + 2 = -x + 2 \quad \frac{1}{x} x + 2 = x - 2$$

$$\frac{1}{x} x = 0 \quad x = 1$$

$$x = 0 \quad \rightarrow \frac{1}{x}(1) + 2 = 3$$

$$\frac{1}{x}(0) + 2 = 2 \quad (0, 2)$$

$$\frac{1}{x} x + 2 = x - 2 \quad x = 1 \quad \rightarrow \frac{1}{x}(1) + 2 = 3$$

$$(1, 4)$$

$$S_1 = \frac{1 \times 2}{1} = 2 \quad S_2 = \frac{2 \times 2}{2} = 2 \quad S_1 + S_2 = \boxed{4}$$

$$\frac{1}{t-9} + \frac{1}{t} = \frac{1}{10} \quad (10)(t) + (t-9)(10) = (t)(t-9)$$

$$10t + 10t - 110 = t^2 - 9t \quad t^2 - 19t + 110 = 0 \quad (t-14)(t-5) = 0$$

$$t = 14 \rightarrow \text{جواب} = t-9 \Rightarrow 14-9 = \boxed{5}$$

$$t = 5 \rightarrow \text{جواب} = t-9 \Rightarrow 5-9 = -4 \quad \times$$