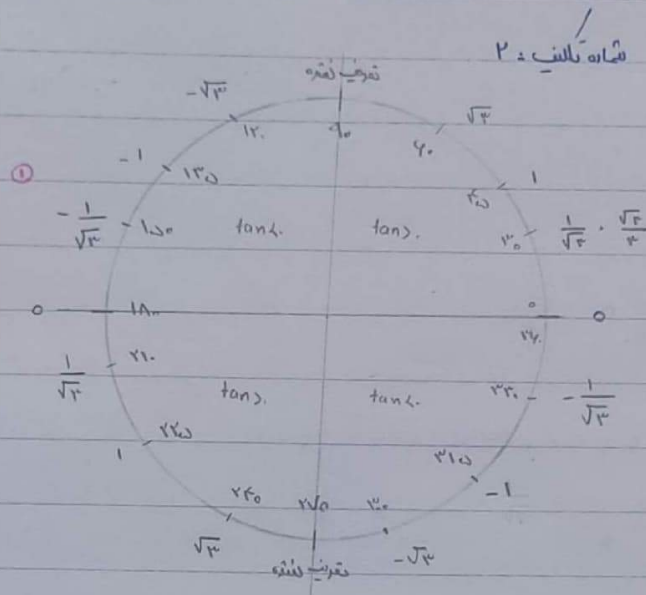




الف - $\frac{1}{r} - 1 - r = -\frac{\omega}{r} = -r\omega$

$\rightarrow +\frac{\sqrt{r}}{r} + \frac{\sqrt{r}}{r} + \frac{r\sqrt{r}}{r} = \frac{\omega\sqrt{r}}{r}$

ج - $-\frac{\sqrt{r}}{r} + \frac{r\sqrt{r}}{r} - r\left(\frac{\sqrt{r}}{r}\right) = \frac{r\sqrt{r}}{r}$

د - $\underbrace{\cos\left(\sin\frac{\pi}{r}\right)}_1 + \underbrace{\sin\left(\frac{\pi}{r}\cos\frac{\pi}{r}\right)}_1 = 1 + 1 = r$

ه - $a^r + ra = ra + r \sim a^r + a - r = 0 \quad \left\{ \frac{(a-1)(a+r)}{-r} \sim a=1 \right\}, f(1) = \omega$

و - $rx^r - b \mid x+1 \geq r \sim \begin{cases} x+1 \geq r \rightarrow x \geq 1 \\ x+1 \leq -r \rightarrow x \leq -r \end{cases}$

$x = -r \mid a-b = a-r \sim -a-b = -rf \sim a+b = rf$

ز - الف - $x^r(x-r) = 0 \rightarrow x=0 \quad x=r \quad P_f = R - \{0, r\}$

$\rightarrow rx^r + rx^r + rx + r = 0 \xrightarrow{+r} x^r + rx^r + x + r \sim x^r(x+r) + (x+r) \sim \overbrace{(x+r)}^{-r} \overbrace{(x^r+1)}^{\checkmark}$

$P_f = R - \{-r\}$

ح - الف - $x^r - 1 \geq 0 \sim x^r \geq 1 \quad \left\{ \begin{array}{l} x \leq -1 \\ x \geq 1 \end{array} \right\} \cap \overline{x \geq r}$

$x-r \geq 0 \sim x \geq r$

ط - $4-4x \geq 0 \rightarrow r \geq x$

$4x-r > 0 \rightarrow 4x > r$

$x > \frac{1}{4}r$

$\cap \rightarrow \frac{1}{4}r < x \leq r$

⑧ $\sqrt{4x-a} + \sqrt{b-rx}$

$$\begin{cases} 4x-a \geq 0 \rightarrow x \geq \frac{a}{4} \\ b-rx \geq 0 \rightarrow x \leq \frac{b}{r} \end{cases} \rightarrow \frac{a}{4} \leq x \leq \frac{b}{r}$$

$$\frac{a}{4} = \frac{b}{r} = r \rightarrow a=4r \quad b=4r \sim \frac{b^r}{a^r} = \frac{1}{r}$$

⑨ $\sqrt{\frac{x^r-x-4}{x^r-13x^r+49}}$ $\xrightarrow{\text{عوضه}} x^r=t \quad t^r-13t+49 \sim (t-7)(t-7) \rightarrow \begin{matrix} x^r=7 & x=\pm \sqrt[7]{7} \\ x^r=9 & x=\pm \sqrt[9]{9} \end{matrix}$

$\xrightarrow{\text{عوضه}} \frac{(x-r)(x-r)}{-r} \quad \frac{(x-r)(x-r)}{r}$

Sign chart for $\frac{(x-r)(x-r)}{-r}$ with critical points $-r, -r, r, r$. The sign sequence is $+, -, -, +, +, +$. The domain is $D_f = (-\infty, -r) \cup (r, r) \cup (r, +\infty)$.

$\frac{x^r-x-4}{x^r-13x^r+49} \rightarrow \frac{x-1}{x+1}$ (for $x^r=7$) and $\frac{x-1}{x+1}$ (for $x^r=9$)

$x^r-x-4=0 \rightarrow \frac{(x-r)(x+r)(x-1)}{r}$

⑩ $r[x]-t \geq 0 \quad r[x] \geq t \rightarrow [x] \geq r \sim [r, +\infty)$

$r[x]-4 \geq 0$

$[x] \geq \frac{4}{r} \xrightarrow{r/4} x \geq r \sim [r, +\infty)$

⑪ $\sqrt{\frac{x+1}{x-1}} + \sqrt{\frac{4-x}{x^r+rx+r}}$ $\rightarrow x \leq 4 \left\{ \begin{array}{l} -1 \leq x \leq 4, x \neq r \\ [-1, r) \cup (r, 4] \end{array} \right.$

$x \geq -1, x \neq r$

⑫ $\sqrt{[x]-t} + \sqrt{r-[x]}$

$\begin{cases} [x]-t \geq 0 & x \geq t \\ r-[x] \geq 0 & x \leq r \end{cases} \rightarrow \emptyset$