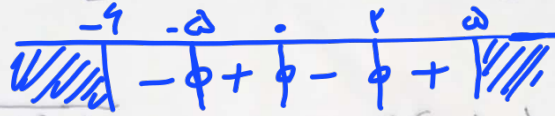


$$D_f = [r, \omega] + \{-\omega\}$$



① $y = \sqrt{x} f(x) \Rightarrow x f(x) \geq 0$ $D_f = [-\omega, 0] \cup [r, \omega]$

② $y = \sqrt{\frac{-x}{f(x)}} \Rightarrow f(x) \neq 0$ $D_f = (-\infty, r) - \{0\}$



$$f(x) = x^r - r x + r - r(r)$$

$$r^r + r + r - r = 10 \Rightarrow f(-r) \neq 0$$

✓ ③

$$f(1) = r + r = 1$$

$$f(\omega) = \omega - r = r$$

$$f(r) = r + r = r$$

$$\left. \begin{array}{l} r + r = 1 \\ r + r = r \end{array} \right\} \Rightarrow \boxed{r + r = 1} \quad \text{✓} \quad \text{④}$$

① $-f(x) = 4x + r - f(x-1)$ $-rax + a + b = 4x + r$

$$f(x) = -4x - r + f(x-1)$$

$$\begin{cases} -ra = 4 \\ a + b = r \end{cases} \rightarrow \begin{cases} a = -r \\ b = \omega \end{cases}$$

$$f(1) = -4 - r + r = -4$$

$$a - b = -1$$

$$f(x-1) = 4x + a - b + f(x-1)$$

$$4x + a - b = -10 \Rightarrow \boxed{a - b = -14}$$

$$u^r + f_x = (u^r + f_{x-1}) - f = (u+r)^r - f$$

$$f(u) = \frac{(u+r)^r - f + \infty}{(u+r)^r - f + \nu} = \frac{(u+r)^r + 1}{(u+r)^r + \nu}$$

⑤ $f(\sqrt{r}-r) = \frac{r}{r}$

$$f(u) = \frac{u^r + 1}{u^r} + f\left(\frac{1}{u}\right) \quad f(-r) = 11$$

$$f(1) = r \quad f(u) = u^r + r$$

$$f(-r) = \frac{(-r)^r + 1}{-r} \Rightarrow \frac{(-r)^r}{-r} - \frac{1}{-r} = \text{صفر}$$

⑤ $f\left(\frac{1}{-r}\right) = \frac{\frac{1}{(-r)^r} + 1}{\frac{1}{-r}} = \frac{\frac{1}{(-r)^r}}{\frac{1}{-r}} - \frac{1}{\frac{1}{-r}} = \frac{1}{(-r)^r} \cdot (-r) - (-r) = \frac{-r}{(-r)^r} + r = \frac{-1}{(-r)^{r-1}} + r$

$$f(u) = \frac{u^r + 1}{u^r} + f\left(\frac{1}{u}\right) = \left\{ (2, 0), (1, -r), (0, r), (r, 1) \right\}$$

⑤ $\rightarrow \left\{ (r, 0), (1, -\sqrt{r}), (0, \frac{r}{r}) \right\}$

$$\frac{g}{f} = \frac{\left\{ (0, \frac{r}{r}), (r, 0) \right\}}{\left\{ (2, 0), (1, -r), (0, r), (r, 1) \right\}} \rightarrow \left\{ (1, -\frac{\sqrt{r}}{r}), (0, \frac{r}{r}) \right\}$$

⑤ الف $\{2, 2\}, \{2, 1\}, \{-2, 2\}, \{1, -2\}$ ✓

ب $\{(2, 2), (3, 2), (-2, 2), (1, -1)\}$

ج $\{(2, 2), (3, 2), (-2, 2), (1, 2)\} \rightarrow \{(1, 1), (\frac{r}{r}, 2), (-\frac{2}{r}, 2), (\frac{1}{r}, -r)\}$

د $\{2, 1\}, \{2, 2\}, \{-2, 2\}, \{1, -2\}$

⑤ الف $\{(2, 2), (1, 2), (1, 2), (3, 2), (2, 2)\}$

$$\{(2, 2), (1, 2), (1, 2), (3, 2), (2, 2)\}$$

$$\{(1, 0), (2, 1), (-1, 2), (-2, -2), (2, -1)\}$$

$$\rightarrow \{(2, 2), (3, -2)\}$$