

آفرینت ۲۰

$$\begin{cases} r_{n-1} [a] > \varepsilon \\ r_{n+r} [n] \leq \varepsilon \end{cases} \Rightarrow \begin{cases} r_{n-1} \cdot a > \omega \\ r_{n+r} \cdot n \leq \omega \end{cases}$$

$$\Rightarrow f(n) - n + 1 > 0 \quad r_{n-1} - n + 1 \cdot a > \omega \xrightarrow{(1)} a > 0, n > \omega \rightarrow a > 0$$

$$r_{n+r} - n + 1 \cdot n \leq \omega \xrightarrow{(2)} r_{n+r} \geq 0 \rightarrow a > -\frac{\varepsilon}{r}$$

(1) $n > \omega$

(2) $n > -\frac{\varepsilon}{r} \text{ و } n \leq \omega \rightarrow -\frac{\varepsilon}{r} \leq n \leq \omega \Rightarrow D_f = [-\frac{\varepsilon}{r}, +\infty)$

$$\frac{r^r x^r + r^r n^{r+1} (n+r)}{(r n^r + r n^{r+1})^r} \Rightarrow \frac{r^r (\Lambda n^r + 1 r n^r + 4 n + 1)}{(r n + 1)^r}$$

$$\frac{r^r (r n + 1)^r}{(r n + 1)^r} = \frac{r^r}{r n + 1} \quad r n + 1 \neq 0 \rightarrow n \neq -\frac{1}{r}$$

$$D_f = R - \left\{ -\frac{1}{r} \right\}$$

$$\begin{cases} n \neq \pm 1 & \frac{x^r + r n^r - n - r}{n^r - 1} = \frac{(n-1)(n+1)(n+r)}{(n-1)(n+1)} \\ a = \pm 1 & \frac{a n + r}{n + b} \end{cases}$$

$$\Rightarrow n = 1 \rightarrow n + r = r \rightarrow \frac{a(1) + r}{(1) + b} = r \rightarrow \boxed{a = r b + 1}$$

$$n = -1 \rightarrow \frac{a(-1) + r}{(-1) + r} = 1 \rightarrow -a + r = b - 1$$

$$a = r b + 1 \rightarrow -r b - 1 + r = b - 1 \rightarrow \varepsilon b = r \rightarrow b = \frac{r}{\varepsilon}$$

$$\Rightarrow g(n) = n + r \rightarrow c = r \quad b + c = \frac{1}{r} + r = \frac{\omega}{r}$$

۱) در صورت مسئله $a^2 - 1 \in \mathbb{Z}$ به $n+1$ تبدیل شده، پس به $n-1$

تقسیم شده یعنی $n=1$ ، پس صورت و مخرج (n) است. چون $\mathbb{Z}$ تابع

برابرند پس دامنه های مخرج هم برابرند، پس $n=1$ ، پس مخرج $f(n)$

نیز هست، پس $n-c = n-1$ و $n^2 + an + b = (n-1)^2$

$$\Rightarrow n^2 - 2n + 1 = n^2 + an + b \rightarrow a = -2, b = 1, c = 1$$

$$a + b + c = 0 \checkmark$$

$$f(n+1) = (n+1-2)^2 (n+1-1) = (n-1)^2 (n)$$

$$f(-n+1) = (-n+1-2)^2 (-n+1-1)$$

$$n(n-1)^2 \cdot (n)(n+2)^2 = n(n^2 - (n+2) - n^2 - (n-2))$$

$$= n(-1n) = \boxed{-1n^2} \checkmark$$

$$f(-1) \rightarrow 1 - \sqrt{n} = -1 \rightarrow \sqrt{n} = 2 \rightarrow n = 4 \Rightarrow f(-1) = \sqrt{4} = 2 \quad (4)$$

$$f(1) \rightarrow 1 - \sqrt{n} = 1 \rightarrow \sqrt{n} = 0 \rightarrow n = 0 \Rightarrow f(1) = 1 \quad (1)$$

$$f(-1) + f(1) = 0 \quad \checkmark$$

$$n + \sqrt{n} = 4 \rightarrow b^2 + b - 4 = 0 \quad (b+3)(b-1) = 0 \quad b = 1 \quad (1) \quad \checkmark$$

$$\Rightarrow \sqrt{n} = 1 \rightarrow n = 1 \rightarrow f(4) = 1^2 + 1 = 2 \quad \checkmark$$

$$f(n) = n(n^2 + 1) \rightarrow f(n-1) = (n-1)((n-1)^2 + 1) \quad (1)$$

$$f(n-1) = (n-1)(n^2 - 2n + 2) \quad (2)$$

$$f(-n+1) = -(n-1)((-n+1)^2 + 1) = -(n-1)(n^2 - 2n + 2)$$

$$f(n-1) + f(-n+1) = 0 \quad \checkmark$$

$$\text{Für } a=1 \quad f(n) \text{ und } g(n) \text{ sind } \checkmark \quad (4)$$

$$D_g \Rightarrow g(n) = \sqrt{c-n} \rightarrow b=1 \quad (1)$$

$$f(n) = \sqrt{c-n} \rightarrow c-a=c \rightarrow a=c \quad \checkmark$$

$$f(x-g) \Rightarrow \cancel{K} \rightarrow \cancel{K} \rightarrow K = -1$$

$$K - 1 - 1 \cdot K = K \rightarrow -K - 1 = K \rightarrow K = -1 \quad \checkmark$$

$$\sqrt{x} \cdot \frac{1}{\sqrt{x}} = \frac{1}{\sqrt{x}} + 1 = 1 \quad \checkmark$$

$$D_g = [-1, +\infty) \quad \checkmark$$

$$D_f = (-\infty, 1] \Rightarrow m=1 \quad \checkmark$$

$$f(x) = x + n$$

$$g(x) = x + n - 1 \sqrt{x} = 4 \sqrt{x}$$

$$x + n = 4 \sqrt{x} \quad n = 4 \sqrt{x} - x \quad m+n = 4 + 1 \sqrt{x} \quad \checkmark$$