

$$f(n) = 2n-1 \quad [n] \geq \varepsilon \rightarrow n \geq \omega \rightarrow y = \sqrt{\frac{2n-1}{n}} \geq y = \sqrt{n} \geq 0 \rightarrow n \geq \omega \quad I$$

$$f(n) = 2n+r \quad [n] \leq \varepsilon \rightarrow n \leq \omega \rightarrow y = \sqrt{\frac{2n+r}{n}} \geq y = \sqrt{2n+\varepsilon} \geq 0 \rightarrow n \geq \frac{-\varepsilon}{r} \rightarrow \omega > n \geq \frac{-\varepsilon}{r} \quad II$$

$$I \cup II \Rightarrow n: \left[\frac{-\varepsilon}{r}, +\infty \right)$$

$$y = \frac{r(nm^2 + 12m^2 + 4m + 1)}{(m+1)^2} = \frac{r(m+1)^2}{(m+1)^2} \Rightarrow y = \frac{r}{m+1} \neq 0 \quad n \neq -\frac{1}{r}$$

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

$$f_0 = \frac{-r}{-1} = r = g(0) = c \rightarrow r = c \quad b+c = r + \frac{1}{r} = \left(\frac{\omega}{r} \right)$$

$$f(1) = \frac{a+r}{1+b}, \quad g(1) = 1 + \frac{r}{1+b} \rightarrow \frac{a+r}{1+b} = r \rightarrow a+r = r+b \rightarrow a-b+r = b \rightarrow a-b = b-r$$

$$f(-1) = \frac{-a+r}{-1+b}, \quad g(-1) = -1 + \frac{r}{-1+b} = 1 \rightarrow \frac{-a+r}{-1+b} = 1 \rightarrow -a+r = -1+b \rightarrow a = r-b$$

$$f(n) = g(n) \rightarrow \frac{(n-1)(n+1)}{n^2-1} = \frac{n+1}{n-1}$$

$$1) \text{ صواب و درست } \frac{n^2+am+b}{n^2-1} = \frac{n+1}{n-1} \rightarrow n^2+am+b = (n-1)(n-c) \Rightarrow (n-1)(n-c) = n^2+am+b$$

$$\begin{cases} n^2+am+b = (n-1)^2 = n^2-rn+1 \rightarrow a=-r, b=1 \\ a+b+c = -r+1+1 = 0 \text{ صفر} \rightarrow \text{جواب صحیح} \end{cases} \Rightarrow 1=c$$

$$\begin{cases} f(n+1) = (n+1-r)^r (n+1-1) = (n-r)^r (n) \\ f(1-n) = (1-n-r)^r (1-n-1) = (n+r)^r (-n) \end{cases} \Rightarrow g(n) = (n) \left((n-r)^r - (n+r)^r \right)$$

$$\Rightarrow g(n) = (n) \left(\frac{n-r+n+r}{n} \right) \left(\frac{n-r-n-r}{-2} \right) = -1n^r \rightarrow g(n) = -n^r$$

$$f(-1) = f(1-rn) \rightarrow -1 = 1-rn \rightarrow rn = 2 \rightarrow n = 2 \xrightarrow[r = \sqrt{x}]{x > 0} f(-1) = r\sqrt{1} = r$$

$$f(r) = f(1-rn) \rightarrow r = 1-rn \rightarrow -rn = 1-r \rightarrow n = 1 \xrightarrow[r = \sqrt{x} + r]{x < 0} f(r) = \frac{\sqrt{(-1)} + r}{-1} = 1$$

$$f(-1) + f(r) = r + 1 = \omega \text{ صير } \omega$$

$$f(4) = f(n+\sqrt{n}) \rightarrow 4 = n+\sqrt{n} \rightarrow -\sqrt{n} = n-4 \xrightarrow{(\cdot)^2} n = n^2 - 8n + 16$$

$$\rightarrow n^2 - 8n + 16 = 0 \rightarrow \begin{cases} n = 2 \rightarrow 2 + r = 4 \sqrt{0} \rightarrow f(4) = (r)^2 + r(r) = 4r \\ n = 4 \rightarrow 4 + r = 4 \sqrt{0} \rightarrow f(4) = (r)^2 + r(r) = 4r \end{cases}$$

$$\left. \begin{aligned} f(n-1) &= (n-1)^r + (1-n)^r \\ f(1-n) &= (1-n)^r + (n-1)^r \end{aligned} \right\} \Rightarrow (n-1)^r + (1-n)^r = n^r - r n^{r-1} + \dots + 1 - r n^{r-1} + \dots + n^r = 2n^r - 2r n^{r-1} + \dots$$

$$f(n) = \sqrt{a n - r a} + k - 1 \rightarrow n \geq \frac{r a}{a} \quad g(n) = \sqrt{b - c n} + r k \rightarrow \frac{b}{c} \geq n \quad \frac{b}{2} \geq 1$$

$$f(1) = \sqrt{a - r a} + k - 1 = k - 1 \quad g(1) = \sqrt{b - c} + r k = k \rightarrow r k - k = k - 1 \rightarrow r = 1$$

$$D_{f \circ g} : [-1, V] = D_f \cap D_g \quad g(n) = \sqrt{m+n} \geq 0, \quad f(n) = \sqrt{m-n} \geq 0 \quad V \geq n \geq -1$$

$$g(r) = \sqrt{r(r)} + r = r\sqrt{r} \quad f(r) = \sqrt{v-r} + n = r+n \rightarrow r+n = \sqrt{r} \rightarrow n = \sqrt{r} - r$$

$$m+n = \sqrt{r} - r + v = \sqrt{r} + \omega \text{ صير } \omega$$