

$$f(m) \begin{cases} r_{n-1} & [n] > r \\ r_{n+r} & [n] \leq r \end{cases}$$

$$y = \sqrt{f(m) - n + 1} \quad (1)$$

$$f(m+1) \begin{cases} r_n & n > \omega \longrightarrow r_n \geq n \checkmark \\ r_{n+r} & n < \omega \end{cases}$$

$$D_f = \left[ -\frac{r}{r}, +\infty \right)$$

$$\begin{aligned} r_{n+r} &> n \\ r_n &> -\varepsilon \\ n &\geq -\frac{r}{r} \end{aligned}$$

$$\frac{r r_n r + r r_{n+r} + (1/r + r)}{(r_n + r_{n+1})^2} = \frac{r}{(r_{n+1})^2}$$

(2)

$$\begin{aligned} r_{n+1} &\neq 0 \\ n &\neq -\frac{1}{r} \end{aligned}$$

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

$$g(m) = m + C \quad f(m) = \begin{cases} \frac{m^r + r m^r - m - r}{m^r - 1} & m \neq \pm 1 \\ \frac{a m + r}{m + b} & m = \pm 1 \end{cases} \quad (3)$$

$$\begin{aligned} m = \pm 1 \quad C-1 &= \frac{r-a}{b-1} = 1 \quad \longleftarrow \text{کمی ساده تر} \checkmark \\ C+1 &= \frac{r+a}{b+1} = r \longrightarrow r+a = r b + r \end{aligned}$$

$$r - r a$$

$$n \neq \pm 1$$

$$\frac{m^r + r m^r - m - r}{m^r - 1} = m + C$$

$$\frac{r+a}{r} = \frac{r-a}{1}$$

$$a = r/2$$

$$b = 0/\omega$$

$$\cancel{m^r + r m^r - m - r} = \cancel{m^r - m} + C m^r - C$$

$$(C = r)$$

$$b + C = r/\omega$$

$$g(x) = \frac{x^r - 1}{x^r + ax + b}$$

note  $\rightarrow$   $\frac{d}{dx} \log(x^r)$

$$f(x) = \frac{x+1}{x-c} \rightarrow P_f = \mathbb{R} - \{c\} = D_g$$

$$c^r + ac + b = 0 \rightarrow 1 + a + b = 0$$

$$\frac{x^r - 1}{x^r + ax + b} = \frac{(x+1)(x-1)}{(x-c)(x-1)} = \frac{1(x+1)}{(x-c)}$$

$$c=1$$

$$(x-1)^r = x^r - rx + 1$$

$$\begin{aligned} b &= 1 \\ a &= -r \\ c &= 1 \end{aligned}$$

$$a + b + c = 0$$

$$f(x) = (x-1)^r (x-1)$$

$$g(x) = f(x+1) + f(1-x)$$

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

$$f(1-x) = (1-x-r)^r (1-x-1)$$

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

$$g(x) = x(x-r)^r - x(r+x)^r = x \left( \cancel{x^r} - \cancel{rx^{r-1}} - \cancel{r^2 x^{r-2}} - \dots - \cancel{r^{r-1} x} - \cancel{r^r} \right)$$

$$= -x r^r$$

$$f(1-x) = \begin{cases} \sqrt[r]{x+r} & x \leq -r \\ r\sqrt{x} & x > -r \end{cases}$$

$$\begin{aligned} 1-rx &= r \\ -r &= rx \\ \Rightarrow x &= -1 \end{aligned}$$

$$\begin{aligned} 1-rx &= -1 \\ r &= rx \\ \Rightarrow x &= 1 \end{aligned}$$

$$\begin{aligned} f(1) &= r^r \\ f(1) &= 1 \end{aligned} \quad \text{②}$$

$$f(9) = f(4 + \sqrt{5}) = 209 + 17 = 226$$

(v)

$$f(m) = m^3 + m$$

(^)

$$f(m-1) = (m-1)^3 + (m-1)$$

$$f(1-m) = (1-m)^3 + (1-m)$$

$$f(m-1) + f(1-m) = (m-1)^3 + (m-1) + (1-m)^3 + (1-m) = 0$$

و چون  $f(x)$  و  $f(-x)$  زوج و فرد است پس  $f(x) = f(-x)$  و  $f(x) = -f(-x)$

$$f(m) = \sqrt{m^2 - 1} + k - 1$$

$$b - 1 \geq 0$$

$$b > 1$$

(9)

$$1 - m^2 \geq 0$$

$$1 \geq m^2$$

$$1 \geq m$$

$$g(m) = \sqrt{b - m^2} + 1$$

$$f - g = \{(1, k)\} \rightarrow D_f \cap D_g = \{1\}$$

$$1\sqrt{m^2 - 1} + 1 - 1 - \sqrt{b - m^2} - 1 = 0 \quad | : (1, k) |$$

$$1\sqrt{m^2 - 1} + 1 - 1 - \sqrt{b - m^2} - 1 = 0$$

$$\sqrt{m^2 - 1} = \sqrt{b - m^2}$$

$$m^2 - 1 = b - m^2$$

$$b = 1$$

$$m = \frac{1}{2}$$

$$k = -1$$

$$1 - 1 + 1 = 1$$

$$(-\infty, m]$$

$$f(m) = \sqrt{m^2 - 1} + m$$

$$D_f \cap D_g = [-1, 1]$$

(10)

$$g(m) = \sqrt{1 - m^2}$$

$$[-1, +\infty)$$

$$m = 1$$

$$f-g = \sqrt{m-a} + n - \sqrt{r+m+r}$$

$$\begin{aligned} m &= r \\ m &= v \end{aligned}$$

$$\sqrt{v-r} + n - \sqrt{\lambda} = 9\sqrt{r}$$

$$r + n = \lambda\sqrt{r}$$

$$n = \lambda\sqrt{r} - r$$

$$m+n = \boxed{\omega + \lambda\sqrt{r}}$$