

(۲) $J = \sqrt{f(n) - n + 1}$ رانه: ؟ $\sqrt{2n-1-n+1} = \sqrt{n} \Rightarrow n \geq 0$

$f(n) = \begin{cases} 2n-1 & [n] > 0 \rightarrow \frac{n \geq 0}{n \geq 0} \rightarrow [0, +\infty) \\ 2n+3 & [n] \leq 0 \rightarrow \frac{n \leq 0}{n \geq -\frac{3}{2}} \rightarrow [-\frac{3}{2}, 0) \end{cases}$

$\sqrt{2n+3-n+1} = \sqrt{n+4} \Rightarrow 2n+4 \geq 0 \rightarrow n \geq -\frac{4}{2} = -2$

$D_f = [-\frac{3}{2}, 0) \cup [0, +\infty) = [-\frac{3}{2}, +\infty)$ D خارج نینیم

$$\frac{2^n n^2 + 2^n n + 11n + 3}{(2^n + 2n + 1)^2} = \frac{2^n (1n^2 + 12n^2 + 2n + 1)}{(2^n + 2n + 1)^2} = \frac{2^n (2n+1)^2}{(2n+1)^4} = \frac{2}{2n+1}$$

$2n+1 \neq 0 \rightarrow 2n \neq -1 \rightarrow n \neq -\frac{1}{2}$ $D = \mathbb{R} - \{-\frac{1}{2}\}$

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

$g(n) = n+c \Rightarrow n+2 \rightarrow c=2$

$g(1) = 3, g(-1) = 1$

$\frac{a+2}{1+b} = 3 \rightarrow a+2 = 3+3b \rightarrow -1 = 3b-a$

$\frac{-a+2}{-1+b} = 1 \rightarrow -a+2 = -1+b \rightarrow 3 = a+b$

$3 = 3b \rightarrow b = \frac{1}{3}$
 $a = \frac{8}{3}$

$b+c = \frac{1}{3} + 2 = \frac{7}{3}$

$f(n) = \frac{n+1}{n-c} \rightarrow c=1$

$g(n) = \frac{n^2-1}{n^2+an+b} = \frac{(n-1)(n+1)}{n^2+an+b}$

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

$a = -2$
 $b = 1$

$c+b+a = 1+1-2 = 0$

$f(n+1) = (n+1-3)^2 (n+1-1) = n(n-2)^2$

$f(1-n) = (1-n-3)^2 (1-n-1) = (-n-2)^2 (-n)$

$f(n+1) + f(1-n) = n(n-2)^2 + (-n-2)^2 (-n) = n^3 - 4n^2 + 4n - n^3 - 4n^2 - 4n = -8n^2$

$$1 - 2n = 3 \rightarrow -2 = 2n \rightarrow n = -1$$

$$f(3) = -1 + 2 = 1 \checkmark$$

$$1 - 2n = -1 \rightarrow 2 = 2n \rightarrow n = 1$$

$$f(-1) = 5 \times 1 = 5 \checkmark$$

$$f(3) + f(-1) = 5 + 1 = 6 \checkmark$$

(2) (4)

$$n + \sqrt{n} = 4 \rightarrow n = 9 \checkmark$$

$$f(4) = 5^4 + 3 \times 4 = 244 \checkmark$$

(2) (4)

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

$$n-1((n-1)^2 + 1) = (n-1)(n^2 - 2n + 1 + 1) = n^3 - 2n^2 + 2n - 1$$

$$(1-n)((1-n)^2 + 1) = (1-n)(n^2 - 2n + 1 + 1) = -n^3 + 2n^2 - 2n + 1$$

$$f(n-1) + f(1-n) = n^3 - 2n^2 + 2n - 1 - n^3 + 2n^2 - 2n + 1 = 0 \checkmark$$

(2) (4)

$$2f = 2\sqrt{a-x} + 2k - 2$$

$$2f - g = 2\sqrt{a-x} + 2k - 2 - \sqrt{b-x} - 2k \xrightarrow{x=1} k = 2k - 2 - 2k \rightarrow 2k = -2 \rightarrow k = -1$$

$$a - x \geq 0 \rightarrow x \geq \frac{a}{2}$$

$$a - \frac{b}{2} - k = 2 \times \frac{a}{2} - \frac{b}{2} + 1 = a - \frac{b}{2} + 1 = 1 \checkmark$$

$$b - x \geq 0 \rightarrow b \geq x \rightarrow \frac{b}{2} \geq x$$

$$\frac{a}{2} = 1 \rightarrow a = 2 \checkmark$$

$$\frac{b}{2} = 1 \rightarrow b = 2 \checkmark$$

(2) (4)

$$g(n) = \sqrt{2n+2}, f(n) = \sqrt{m-n} + n \in D_{f \times g} = [-1, 5], f-g(5) = 2\sqrt{2} \in m+n = ?$$

$$2n+2 \geq 0 \rightarrow 2n \geq -2 \rightarrow n \geq -1$$

$$m-n \geq 0 \rightarrow m \geq n \rightarrow m \geq 5 \checkmark$$

$$g(5) = \sqrt{4+2} = \sqrt{6} = 2\sqrt{2}$$

$$f(5) = \sqrt{5-5} + 5 = 5$$

$$f-g(5) = \sqrt{5-5} + 5 - 2\sqrt{2} = 5 - 2\sqrt{2} \rightarrow n = 1\sqrt{2} - 2$$

$$m+n = 5 + 1\sqrt{2} - 2 = 3 + 1\sqrt{2}$$

(2) (4)