

Bilinear - (Solved)

$$y = \sqrt{f(n) - n + 1} \quad f(n) = \begin{cases} r_{n-1} & [n] > r \\ r_{n+r} & [n] \leq r \end{cases} \rightarrow \begin{cases} r_{n-1} & n > a \\ r_{n+r} & n \leq a \end{cases} \quad (1)$$

For $n \geq 0$, $r_{n-1} - n + 1 \geq 0 \Rightarrow n \geq 0 \rightarrow n \geq a \cap n \geq 0 \quad (1)$

For $n \leq a$, $r_{n+r} - n + 1 \geq 0 \Rightarrow r_{n+r} \geq n - 1 \Rightarrow r_{n+r} \geq -r \Rightarrow n \geq -\frac{r}{r} \rightarrow -\frac{r}{r} \leq n \leq a \quad (2)$

$(1) \cup (2) \rightarrow n \geq a \cup -\frac{r}{r} \leq n \leq a \rightarrow \boxed{Dy = [-\frac{r}{r}, +\infty)}$

$$y = \frac{r x^r + r y x^r + 1(n+r)}{(r_{n+r} + r_{n+1})^r} \rightarrow \frac{r(1n^r + 1r_{n+r} + 1(n+1))}{(r_{n+1})^r} = \frac{r(r_{n+1})^r}{(r_{n+1})^r} = \frac{r}{r_{n+1}} \quad (3)$$

$Dy = r_{n+1} \neq 0 \quad r_{n+1} \neq -1 \quad n \neq -\frac{1}{r} \quad Dy = 1R - \left\{ -\frac{1}{r} \right\}$

$$f(n) = \begin{cases} \frac{n^r + r_{n+r} - n - r}{n^r - 1} & n \neq \pm 1 \\ \frac{a+r}{n+b} & n = \pm 1 \end{cases} \quad g(n) = n + c \quad b + c = ? \quad (4)$$

if $n = 1 \rightarrow \frac{a+r}{r+b} = r \Rightarrow a+r = r(r+b) \Rightarrow a+r = r^2 + rb \Rightarrow a - rb = r^2 - r$

if $n = -1 \rightarrow \frac{-a+r}{-1+b} = -1 \Rightarrow -a+r = -1+b \Rightarrow -1+b = -a+r \Rightarrow b-a = r-1$

$b + c = \frac{1}{r} + r = \frac{a}{r} = r, a$

$$f(n) = \frac{n+1}{n-c} \quad g(n) = \frac{n^r - 1}{n^r + an + b} \quad \frac{n+1}{n-c} = \frac{n^r - 1}{n^r + an + b} \rightarrow \frac{n+1}{n-c} = \frac{(n-1)(n+1)}{(n-1)(n+1)} \rightarrow C = 1 \quad (5)$$

$n^r + an + b = (n-1)^r = n^r - rn + 1 \Rightarrow a = -r, b = 1$

$C = 1 \quad a = -r \quad b = 1 \quad a + b + C = 1 + 1 - r = 0$

$$f(n) = (n-r)^r (n-1) \quad g(n) = f(n+1) + f(1-n) \quad (6)$$

$f(n+1) = (n+1-r)^r (n+1-1) = (n^r + r - rn) n = n^r - rn^r + rn \quad (7)$

$f(1-n) = (1-n-r)^r (1-n-1) = (n^r + r + rn) (-n) = -n^r - rn^r - rn \quad (8)$

$(7) + (8) \rightarrow g(n) = n^r - rn^r + rn - n^r - rn^r - rn = \boxed{-1n^r}$

$$f(1-rn) = \begin{cases} \sqrt[n]{rn} + r & n \leq 0 \\ r\sqrt[n]{n} & n > 0 \end{cases} \quad f(1) + f(r) = r + 1 = (a) \quad (9)$$

$f(-1) \Rightarrow 1 - rn = -1 \Rightarrow -rn = -2 \Rightarrow n = 1 \quad r\sqrt[1]{1} = r$

$f(r) \Rightarrow 1 - rn = r \Rightarrow -rn = r-1 \Rightarrow n = -1 \quad \sqrt[r]{-1} + r = 1$

$$f(n+\sqrt{n}) = n^k + kn \quad f(4) = 141 \quad (V)$$

$$n + \sqrt{n} = 4 \rightarrow \sqrt{n} = 4 - n \xrightarrow{\text{تربيع}} n = 16 + n^2 - 12n \Rightarrow n^2 - 12n + 16 = 0$$

$$(n-4)(n-9) = 0 \quad \begin{matrix} \xrightarrow{n=4} \\ \xrightarrow{n=9} \end{matrix} \quad \text{if } n=4 \rightarrow 4 + \sqrt{4} = 4 \quad \checkmark \quad \text{if } n=9 \rightarrow 9 + \sqrt{9} \neq 4 \quad \text{مرفوض}$$

$$f(4) = 4^k + k \times 4 = 16 + 4k = 141 \quad \left(\text{لأن } n=4 \text{ هو الحل الوحيد} \right)$$

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

$$f(n-1) = (n-1)^k + n-1 = n^k + kn - kn^k - 1 + n-1 = n^k - kn^k + kn - 1$$

$$f(1-n) = (1-n)^k + 1-n = 1 - n^k - kn + kn^k + 1 - n = -n^k + kn^k - kn + 1 \quad \text{مرفوض}$$

$$f(n-1) + f(1-n) = n^k - kn^k + kn - 1 - n^k + kn^k - kn + 1 = 0$$

$$f(n) = \sqrt{ka - kn} + k - 1 \quad g(n) = \sqrt{b - kn} + k \quad (9)$$

$$f \circ g = \{(1, k)\} \quad ka - \frac{b}{k} - k = ?$$

$$\begin{cases} kn - ka > 0 & -ka > -kn & \frac{ka}{k} < n \\ b - kn > 0 & kn \leq b & n \leq \frac{b}{k} \end{cases}$$

$$n \leq \frac{b}{k} \quad \frac{b}{k} = 1 \rightarrow b = k \quad = \text{Calc of } f \circ g \text{ is } f \circ g = \{(1, k)\} \text{ if } f \circ g = \{(1, k)\} \text{ if } f \circ g = \{(1, k)\}$$

$$n > \frac{ka}{k} \quad \frac{ka}{k} = 1 \rightarrow a = \frac{k}{k} \quad f(1) - g(1) = k - 1 - k = -1$$

$$-k - 1 = k \quad k = -1 \quad ka - \frac{b}{k} - k = k \times \frac{k}{k} - \frac{k}{k} - (-1) = k - 1 + 1 = k \quad (10)$$

$$f(n) = \sqrt{m-n} + n \quad g(n) = \sqrt{kn+r} \quad D_{f \circ g} = [-1, \infty) \quad (10)$$

$$f \circ g(x) = 4\sqrt{x} \quad m+n=? \quad D_{f \circ g} = [-1, \infty)$$

$$kn+r > 0 \quad kn > -r \quad n > -1 \quad D_g = [-1, \infty)$$

$$m-n > 0 \quad n \leq m \quad m=\infty \rightarrow D_f = (-\infty, \infty)$$

$$f(x) - g(x) = \sqrt{v-x} + x - \sqrt{4+x} = v+x - 4\sqrt{x} - 4\sqrt{x} \rightarrow x = 1\sqrt{x} - 1$$

$$m+n = 1\sqrt{x} - 1 + v = \boxed{v + 1\sqrt{x}}$$