

جواب

$$f(x) = \begin{cases} 2x-1 & [x] > F \\ x+F & [x] \leq F \end{cases}$$

Df? $[-\frac{F}{F}, +\infty)$

①

$$y = \sqrt{f(x) - x + 1} \rightarrow f(x) - x + 1 \geq 0 \rightarrow f(x) \geq x - 1$$

$$f(x) \rightarrow 2x-1 \geq x-1 \rightarrow x \geq 0 \quad \cap \quad [x] > F \rightarrow \omega \leq x$$

$$x \geq \omega$$

$$\rightarrow x+F \geq x-1 \rightarrow x \geq F-1 \rightarrow x \geq -\frac{F}{F} \cap [x] \leq F \rightarrow -\frac{F}{F} \leq x < F$$

$$y = \frac{2x^2 + 4x^2 + 1 \wedge x + F}{(x^2 + x + 1)^2} = \frac{2x^2 + 2x^2 + 4x + 1x^2 + 1x + F}{(x^2 + 1)^2} \quad \textcircled{2}$$

$$\frac{4x(x^2 + x + 1) + F(x^2 + x + 1)}{(x^2 + x + 1)^2} = \frac{4x}{x} + \frac{F}{x} = \frac{4x + F}{x} = \frac{4x + F}{x} = (x+1)$$

$$\rightarrow x+1=0 \rightarrow x=-\frac{1}{F} \rightarrow Df = R - \{-\frac{1}{F}\}$$

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$$y = \frac{r^n n^r + r^n n^r + 1 \wedge n + r}{(r^n + r^n + 1)^r} = \frac{r^n n^r + r^n n^r + 4n + 1r^n + 1r^n + r}{(r^n + 1)^r} \quad (1)$$

$$\frac{4n(r^n + r^n + 1) + r(r^n + r^n + 1)}{(r^n + r^n + 1)^r} = \frac{4n}{t} + \frac{r}{t} = \frac{4n+r}{t = (r^n + 1)}$$

$$\rightarrow r^n + 1 = 0 \rightarrow n = -\frac{1}{r} \rightarrow Df = R - \frac{1}{r} \}$$

Examples

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

$$b + c = ? \rightarrow -r + r = 0$$

$$\rightarrow n^r + r^n - n - r = n^r(n + r) - (n + r) = (n + r)(n^r - 1) \rightarrow (n + r)(n^r - 1)$$

$$\rightarrow n = 0 \rightarrow n + r = r \rightarrow f(n) \quad g(n) = n + c \rightarrow c = g(n)$$

$$f(n) = g(n) \Rightarrow c = r$$

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

$$a + r = r + rb$$

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

$$a - rb = 1, \quad a + b = r \rightarrow -rb = r - b \Rightarrow b = -r$$

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

$$(n - 1)(n + 1)$$

$$(n - 1)(n - b)$$

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

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$$(a-1)(x-b) = ax^2 + ax + b$$

(4)

$$ax^2 - (b+1)x + b = ax^2 + ax + b \rightarrow a = b+1$$

$$a+b+c = ? \rightarrow b+1+b+b = b-1$$

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

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

(5)

$$f(x+1) = (x+1-1)^r(x+1-1) = (x-1)^r x = (x^r - rx + r)x = x^{r+1} - rx^2 + rx$$

$$f(1-x) = f(1-x-1)^r(1-x-1) = (x+1)^r(-x) = (x^r + rx + r)(-x) = -x^{r+1} - rx^2 - rx$$

$$rx \rightarrow x^{r+1} - rx^2 + rx - x^{r+1} - rx^2 - rx = -2x^2$$

$$f(1-x) = \begin{cases} \sqrt[r]{x} + r & x \leq 0 \\ r\sqrt{x} & x > 0 \end{cases}$$

$$x \leq 0$$

$$x > 0$$

$$f(-1) + f(1) = r+1 = a$$

(9)

$$1 - \sqrt[r]{x} = -1 \rightarrow x = 1 \rightarrow r\sqrt{x} \quad x > 0 \rightarrow r\sqrt{1} = r$$

$$1 - \sqrt[r]{x} = r \rightarrow x = -1 \rightarrow \sqrt[r]{x} + r \quad x \leq 0 \rightarrow \sqrt[r]{-1} + r = 1$$

$$f(4) = 0$$

$$f(x+\sqrt{x}) = a^x + x^a$$

(10)

$$x + \sqrt{x} = 4 \rightarrow x \leq 4 \rightarrow x^4 + x^4 = 4$$

استدلال

$$x + \sqrt{x} = 4 \rightarrow t^2 + t - 4 = 0 \rightarrow (t+4)(t-1) = 0$$

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$$\sqrt{x} = t \rightarrow t = -4 \quad t = 1$$

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$$x = 1 \rightarrow x = 1$$

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Übung 10

$$f(x) = x^p + x$$

$$f(x-1) + f(1-x) = 0$$

①

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

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

②

$$f(x) = \sqrt{m+x} + x$$

$$D_{f \times g} = [-1, v]$$

$$m+n = 9$$

③

$$g(x) = \sqrt{v+x}$$

$$f-g(x) = 4\sqrt{r}$$

$$v + 1\sqrt{r} = r$$

$$m + 1\sqrt{r}$$

$$D_{f \times g} = D_f \cap D_g \rightarrow D_f = \{x \leq m\} \quad D_g = \{-1 \leq x \leq v\}$$

$$D_{f \times g} = [-1, v] \cap [-1, m] = [-1, \min(v, m)]$$

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

$$f(x) = \sqrt{v-x} + x \rightarrow f(r) = r + x \Rightarrow r + x = 1\sqrt{r} \rightarrow x = 1\sqrt{r} - r$$