



14, 15 آزمون

لارا عزیزی - ۷۰۶۰

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

$$g(n) = \sqrt{n-1}\sqrt{n-1} = \sqrt{n-1+1}\sqrt{n-1+1} = \sqrt{(\sqrt{n-1}-1)^2} = |\sqrt{n-1}-1| \xrightarrow{n \geq 1} \sqrt{n-1}-1$$

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

$$\rightarrow a=0, b=2, c=-1 \rightarrow \frac{a+b}{c} = \frac{0+2}{-1} = \boxed{-2} \quad (2)$$

$$f(n) = \frac{n+2}{n^2-4n+3}$$

(3)

$$g(n) = \{(1,1)(1,0)(2,0)(0,1)\} \rightarrow D_g = 1, 1, 2, 0$$

$$f(2) = \frac{2}{-1} = -2 \quad f(1) = \frac{3}{0} \propto \quad f(2) = \frac{0}{0} \propto \quad f(0) = \frac{2}{3}$$

$$\rightarrow \frac{g}{f} = \left\{ \left(-2, -\frac{1}{2} \right) \left(\frac{3}{0}, \frac{0}{0} \right) \left(\frac{0}{0}, \frac{2}{3} \right) \right\} = \left\{ \left(-2, -\frac{1}{2} \right) \left(0, \frac{2}{3} \right) \right\}$$

$$f(n) = \{(1,2)(2,-1)(2,2)(-1,2)\}$$

$$g(n) = \{(1,1)(2,2)(-2,2)(-1,0)\}$$

(4)

$$f(n) = \left\{ \left(\frac{1}{2}, 2 \right) \left(\frac{3}{2}, -1 \right) \left(2, 2 \right) \left(-\frac{1}{2}, 2 \right) \right\}$$

$$-) f(n^2) = \{(1,2)(-1,2)(\sqrt{2},-1)(-\sqrt{2},-1)(2,2)(-2,2)\}$$

$$ج) f^2(n)+1 = \{(1,2)(2,2)(-2,2)(-1,2)\}$$

$$د) \frac{f^2}{g} = \{(1,-1)(2,-1)(-1,-1)\} = \{(1,-1)(2,-1)\}$$

$$f(n) = \{(1,1)(2,1)(3,1)(4,1)\}$$

$$g = \{(0,5)(1,5)(2,5)(3,5)(4,5)\}$$

$$h = f + g = \{(1,6)(2,6)(3,6)(4,6)\}$$

$$f(n) = \frac{\sqrt{r_n - n}}{n - r}$$

$$g(n) = [n] \times [-n]$$

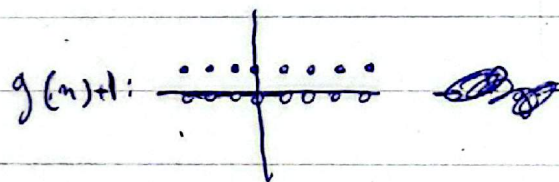
$$\left(\frac{f}{g+1}\right)(n)$$

$$\sqrt{r_n - n} \geq 0 \rightarrow \sqrt{r_n} \geq n \rightarrow r_n \geq n^2 \rightarrow n \leq r$$

$$n \geq 0$$

$$n \neq r$$

$$\rightarrow D_f = [-r, r] - \{r\}$$



$$\rightarrow D = \{0, 1, 2\}$$

$$f(n) = \sqrt{-n^2 + 4n - 4} = \sqrt{-(n^2 - 4n + 4)} = \sqrt{-(n-2)(n-2)} = \sqrt{-(n-2)^2} = |n-2|$$

$$g(n) = \{(1,2)(2,2)(3,2)(4,2)\}$$

$$h(n) = \frac{f(n)}{g(n)} = \left\{ \left(1, \frac{0}{2}\right) \left(2, \frac{\sqrt{0}}{2}\right) \left(3, \frac{0}{2}\right) \right\} = \left\{ (1,0) \left(2, \frac{\sqrt{0}}{2}\right) (3,0) \right\}$$

$$\text{ا) } y = n^3 - 3n^2 + 3n \rightarrow y = n^3 - 3n^2 + 3n + 1 - 1 \rightarrow y = (n-1)^3 + 1$$

$$\rightarrow y - 1 = (n-1)^3 \rightarrow \sqrt[3]{y-1} = n-1 \rightarrow \sqrt[3]{y-1} + 1 = n \rightarrow R_f = \mathbb{R}$$

y ≠ 0. بانرض y ≠ 0. بانرض y ≠ 0. بانرض y ≠ 0.

$$\text{ب) } y = \frac{1}{n^2 - 2n} \rightarrow y n^2 - 2y n - 1 = 0 \rightarrow n = \frac{2y \pm \sqrt{4y^2 + 4y}}{2} \rightarrow 4y^2 + 4y \geq 0$$

$$\rightarrow 4y(y+1) \geq 0 \rightarrow \frac{1}{y+1} \rightarrow R_f = (-\infty, -1] \cup [0, +\infty)$$

$$y \geq 0 \rightarrow 0 - 0 - 1 \leq 0 \times$$

$$\rightarrow 1) y = x^r - tx^{r+1} + 10 \rightarrow \text{Min} \left| \begin{array}{l} \frac{f}{x} = r \\ t - (r+1)x = 0 \end{array} \right. \rightarrow R_f = [4, +\infty)$$

①

$$\rightarrow 2) y = -x^r + tx^{r+1} + r \rightarrow \text{Max} \left| \begin{array}{l} \frac{f}{x} = r \\ -r + (r+1)x = 1r \end{array} \right. \rightarrow R_f = (-\infty, 1r]$$

$$3) y = \sqrt{x^r - tx^{r+1}} \rightarrow \text{Min} \left| \begin{array}{l} \frac{f}{x} = r \\ t - (r+1)x = -r \end{array} \right. \rightarrow R_f = \sqrt{[-r, +\infty)} = [0, +\infty)$$

$$4) y = \sqrt{-x^r + tx^{r+1}} \rightarrow \text{Max} \left| \begin{array}{l} \frac{f}{x} = r \\ -r + (r+1)x = r \end{array} \right. \rightarrow R_f = \sqrt{(-\infty, r]} = [0, r]$$

$$\rightarrow 5) y = x^r - 2x^{r+1} + r_{n+1} \rightarrow R_f = \mathbb{R}$$

②

$$\rightarrow 6) y = x^r - 2x^{r+1} + r_{n+1} + r \rightarrow R_f = \mathbb{R}$$

$$7) y = \sqrt{x^r - 2x^{r+1} + r_{n+1}} \rightarrow R_f = \sqrt{\mathbb{R}} = [0, +\infty)$$

$$8) y = (x^r - 2x^{r+1} + r_{n+1})^r \rightarrow R_f = \mathbb{R}^+ = [0, +\infty)$$

$$\rightarrow 9) y = \frac{r_{n+1}}{n-r} \rightarrow R_f = \mathbb{R} - \{r\}$$

③

$$\rightarrow 10) y = \frac{r_{n+1}}{n+1} \rightarrow R_f = \mathbb{R} - \{r\}$$

$$\text{الف)} \quad y = n^3 - 3n^2 + 2n - 1 + 1 = y = (n-1)^3 + 1 \quad (V)$$

$$y-1 = (n-1)^3 \rightarrow \sqrt[3]{y-1} = n-1 \rightarrow n = \sqrt[3]{y-1} + 1$$

$$R_f = \mathbb{R}$$

$$\text{ب)} \quad y = \frac{1}{n^2 - 2n} \rightarrow n^2 y - 2ny = 1 \rightarrow n^2 y - 2ny - 1 = 0$$

$$\underline{y \neq 0} \rightarrow n = \frac{2y \pm \sqrt{4y^2 + 4y}}{2y} \rightarrow 4y(y+1) \geq 0 \rightarrow \frac{-1}{+} \frac{0}{-} \frac{+}{+}$$

$$\underline{y = 0} \rightarrow 0 = 1 \quad x \text{ حقیقی وجود ندارد!} \rightarrow R_f = (-\infty, -1] \cup (0, +\infty)$$