

۲. آخرین عالی نویسی

$$f(n) = \sqrt{(\sqrt{n-4}+2)^2} \quad g(n) = \sqrt{(\sqrt{n-4}-2)^2} \quad n \geq 4$$

$$f(n) + g(n) = a + b\sqrt{n+c} \Rightarrow |\sqrt{n-4}+2| + |\sqrt{n-4}-2| = a + b\sqrt{n+c}$$

$$\sqrt{n-4}+2 + \sqrt{n-4}-2 \rightarrow 2\sqrt{n-4} = a + b\sqrt{n+c} \quad \frac{a+b}{c} = \frac{2}{-4} = -\frac{1}{2}$$

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$$f(n) : \{(2, -4), (0, \frac{2}{4})\} \quad g(n) : \{(2, -\frac{1}{4}), (0, 4)\}$$

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الف) $f(2n) \rightarrow \{(\frac{1}{2}, 2), (\frac{3}{2}, -1), (2, 2), (-\frac{1}{2}, 4)\}$

ب) $f(n^2) \rightarrow \{(1, 2), (\sqrt{3}, -1), (2, 2), (-1, 2), (-\sqrt{2}, -1), (-2, 2)\}$

ج) $2g^2(n) + 1 \rightarrow \{(-2, 19), (1, 3), (3, 9), (-1, 1)\}$

د) $\frac{xy}{y} \rightarrow \{(1, -4), (3, -1)\}$

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$$2f : (2, 2), (3, 2), (4, 18), (-2, 0)$$

$$h = 2f + g \rightarrow \{(2, 5), (3, 5), (-2, 4)\}$$

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① $(\frac{f}{g+1})(n) \rightarrow g+1 \neq 0 \quad \underline{g \neq -1}$

if $n \in \mathbb{Z} \rightarrow g(n) = 0$
if $n \notin \mathbb{Z} \rightarrow g(n) = -1$

② $\forall n \geq 0, n \geq 0, n \neq 2$

③ $\sqrt{4n} - n \geq 0 \quad \sqrt{4n} \geq n \xrightarrow{\text{توان ۲}} 4n \geq n^2 \quad \frac{0}{+1-1+} \quad \underline{0 \leq n \leq 4}$

① $\cap$ ② $\cap$ ③ $\rightarrow \{0, 1, 3\} \quad n^2 - 4n \leq 0 \quad [0, 4]$

۵

$$f(m) : \{(1,0), (2, \sqrt{2}), (4,0)\}$$

$$\frac{f(m)}{g(m)} \rightarrow \{(1,0), (2, \sqrt{2}), (4,0)\}$$

6

$$y = x^3 - 3x^2 + 3x \quad R: \mathbb{R} \quad (m-1)^3 + 1 = y \quad y-1 = (m-1)^3$$

$$m-1 = \sqrt[3]{y-1} \quad m = 1 + \sqrt[3]{y-1}$$

$$y = \frac{1}{x^2 - 2x} \quad yx^2 - 2yx - 1 = 0 \quad \frac{2y \pm \sqrt{b^2 - 4ac}}{2y} \quad b^2 - 4ac \geq 0$$

$$R_f : (-\infty, -1] \cup (0, +\infty) \quad 4y^2 + 4y \geq 0 \quad y^2 + y \geq 0 \quad y(y+1) \geq 0 \quad \frac{-1 \pm 1}{2}$$

7

$$a) \frac{-b}{2a} = \frac{-4}{-2} = 2 \quad f-11+1 = 4 \quad R_f : [4, +\infty)$$

$$b) \frac{-b}{2a} = -\frac{4}{-2} = 2 \quad -9+11+3 = 12 \quad R_f : [12, +\infty)$$

$$c) \frac{-b}{2a} \rightarrow -\frac{-4}{-2} = +2 \quad f-11+3 = -5 \rightarrow [-5, +\infty) \rightarrow R_f : [-5, +\infty)$$

$$d) \sqrt{-x^2+4x} \quad \frac{-b}{2a} = -\frac{4}{-2} = +2 \quad -9+11=2 \quad R_f = [2, 3]$$

8

$$a) R_f : \mathbb{R}$$

$$b) R_f : \mathbb{R}$$

$$c) R_f : [0, +\infty)$$

$$d) \mathbb{R} \xrightarrow{\text{تحويل}} [-, +\infty)$$

9

$$الف) \mathbb{R} - \{2\}$$

$$ب) \mathbb{R} - \{2\}$$

10