

$$f(n) + g(n) = a + b\sqrt{n+c}$$

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

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

$$|\sqrt{n-4} + 2| + |\sqrt{n-4} - 2| = 2\sqrt{n-4} \Rightarrow \begin{matrix} a=0 \\ b=2 \end{matrix} \Rightarrow \begin{matrix} c=-4 \\ \frac{4+0}{-2} = -2 \end{matrix}$$

$$(2, \frac{4+2^2}{2-4+3}) (1, \frac{1+1^2}{1-4+3}) (3, \frac{9+3}{4-12+3}) (0, \frac{0+2}{0-0+3})$$

$$(2, -4) (0, \frac{4}{3})$$

$$\frac{g}{f} \Rightarrow \{(2, \frac{1}{2}) (0, \frac{12}{5})\}$$

$$f(n) = \frac{n+2}{n^2-4n+3} \Rightarrow n \neq 1, 3$$

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

$$الف) f(2n) = \{(\frac{1}{2}, 2) (\frac{3}{2}, -1) (\frac{5}{2}, 2) (\frac{7}{2}, 9) \}$$

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

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

$$د) \frac{2f}{g} = \{(1, -4) (3, -1) (-1, 2)\}$$

$$h = 2f + g$$

$$\{(2, 2(\frac{1}{2}+3)) (-2, 2(0)+4) (3, 2(\frac{1}{3}+3))\}$$

$$\{(2, 5) (-2, 4) (3, 5)\}$$

$$g+1 \neq 0$$

$$g \neq -1$$

$$g(n) \rightarrow \text{دستی} \rightarrow \mathbb{R} - \mathbb{Z}$$

$$\text{مستوی} \geq \text{بلندای} \text{ تا } 1 - \text{سور}$$

$$f(n) \rightarrow n \neq 2$$

$$n \geq 0 \quad \sqrt{3n-n}$$

$$\sqrt{3n-n} \geq 0 \leftarrow$$

$$\sqrt{3n} \geq n \Rightarrow 3n \geq n^2$$

$$n^2 - 3n \leq 0 \quad n(n-3) \leq 0$$

$$\Rightarrow D_f = \{0, 3\}$$

$$+ \quad - \quad + \quad +$$

$$f(n) = \left\{ (1, \sqrt{a_0 - 1 - k}) (2, \sqrt{a_0 - k - k}) (3, \sqrt{a_0 - k - k}) (\infty, \sqrt{a_0 - k - k}) \right\}$$

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

$$h(n) = \left\{ (1, \frac{0}{3}) (2, \frac{\sqrt{2}}{2}) (3, \frac{0}{4}) \right\} \Rightarrow h(n) = \left\{ (1, 0) (2, \frac{\sqrt{2}}{2}) (3, 0) \right\}$$

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الف) $y = n^3 - 3n^2 + 3n - 1 + 1$ البتة جون بنزئين قبل غيره $R_f = \mathbb{R}$ نتوان كنت

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

ب) $yn^2 - 2yn = 1 \Rightarrow yn^2 - 2yn - 1 = 0 \Rightarrow 4y^2 + 4y \geq 0 / y = 0$
 $\rightarrow -1 \neq 0$

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

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الف) $\frac{-b}{2a} = \frac{-(-4)}{2(1)} = 2 \Rightarrow 4 - 11 + 10 = 4 \Rightarrow a > 0 \Rightarrow \text{Min} \Rightarrow R_f = [4, +\infty)$

ب) $\frac{-b}{2a} = \frac{-(4)}{2(-1)} = 2 \Rightarrow -4 + 11 + 10 = 17 \Rightarrow a < 0 \Rightarrow \text{Max} \Rightarrow R_f = (-\infty, 17]$

ج) $\frac{-b}{2a} = \frac{-(-4)}{2(1)} = 2 \Rightarrow 4 - 11 - 10 = -17 \Rightarrow R_f = [0, +\infty)$

د) $\frac{-b}{2a} = \frac{-4}{2(-1)} = 2 \Rightarrow 11 - 9 = 2 \Rightarrow R_f = [0, 2]$

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الف) $\mathbb{R}$

ب) $\mathbb{R}$

ج) $[0, +\infty)$

د) $[0, +\infty)$

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الف) $\mathbb{R} - \{3\}$

ب) $\mathbb{R} - \{2\}$

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