

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

$$= 2n + 2\sqrt{4} = 2n + 4 \rightarrow f(n) + g(n) = \sqrt{2n + 4} = \sqrt{2}(\sqrt{n + 2})$$

$$\rightarrow a = 0, b = \sqrt{2}, c = \sqrt{2} \rightarrow \frac{a+b}{c} = \frac{0 + \sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{\sqrt{2}}$$

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$$f(n) = \frac{n+2}{n^2 - 2n + 3} \rightarrow n^2 - 2n + 3 \neq 0 \rightarrow n \neq 1, 3$$

$$f, g \rightarrow n = 2, 0$$

$$\rightarrow \frac{g}{f} \rightarrow \left. \begin{array}{l} f(2) = \frac{4}{-1} = -4 \\ f(0) = \frac{2}{3} \end{array} \right\} \frac{g}{f} = \left\{ \left(2, \frac{1}{4}\right), \left(0, 9\right) \right\}$$

$$1) f(n) = \left\{ \left(\frac{1}{4}, 2\right), \left(\frac{3}{4}, -1\right), (2, 2), \left(-\frac{1}{4}, 9\right) \right\}$$

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

$$3) g(n) + 1 = \left\{ (-2, 19), (1, 3), (3, 9), (-1, 1) \right\}$$

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

$$h = 2f + g \rightarrow h = \left\{ (2, 5), (3, 5), (-2, 9) \right\}$$

$$g(n) = [n] + [-n] \rightarrow n \begin{cases} \in \mathbb{Z} \leq 0 \\ \in \mathbb{N}, \text{اعداد طبیعی} = -1 \end{cases}$$

$$g+1 \neq 0 \rightarrow n \neq \frac{0}{-1} = -1$$

$$n \neq 2, \sqrt{\sqrt{2n} - n} \rightarrow 2n \geq 0 \rightarrow n \geq 0, \sqrt{2n} - n \geq 0$$

$$\rightarrow \sqrt{2n} \geq n \rightarrow 2n \geq n^2 \rightarrow 0 \geq n^2 - 2n \rightarrow \frac{n}{+} \frac{0}{-} \frac{2}{+} \rightarrow D_{f(n)} = [0, 2] - \{2\}$$

$$\rightarrow D_f = \left\{ [0, 2] - \{2\} \mid n \in \mathbb{Z} \right\} \rightarrow D_f = \{0, 1, 2\}$$

$$h(n) = \frac{f(n)}{g(n)} \rightarrow f(1) = 0, f(2) = 2, f(4) = 0, f(5) = 1$$

$$h = \left\{ (1, 0), (2, \frac{2}{-1}), (4, 0) \right\}$$

$$f(n) = \sqrt{1 - 4 - n} = \sqrt{-n}$$

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

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$$y(x-1)^2 + 1, x^2 - 2x^2 + 2x \rightarrow y, (x-1)^2 + 1 \rightarrow (x-1)^2, y-1 \quad -v$$

$$\rightarrow x-1, \sqrt{y-1} \rightarrow x, \sqrt{y-1} + 1 \rightarrow y-1 \in \mathbb{R} \rightarrow y \in \mathbb{R}$$

$$b) \cancel{y, x^2 - 2x} \rightarrow y, \frac{1}{x^2 - 2x} \rightarrow x^2 - 2x, \frac{1}{y} \rightarrow (x-1)^2 - 1, \frac{1}{y}$$

$$\rightarrow (x-1)^2, \frac{1+y}{y} \rightarrow x-1, \sqrt{\frac{1+y}{y}} \rightarrow \frac{1+y}{y} > 0 \rightarrow \frac{y-1}{+0-0+}$$

$$\rightarrow R_f, (-\infty, -1] \cup (0, +\infty)$$

$$a) y, x^2 - 4x + 10 \rightarrow x, \frac{4}{x}, 2 - y, 9 \rightarrow \min \rightarrow [4, +\infty) \quad -1$$

$$b) y, x^2 + 4x + 3 \rightarrow \max \rightarrow \frac{-4}{-2}, 3 - y, 12 \rightarrow R_f, [-\infty, 12]$$

$$c) y, \sqrt{x^2 - 4x - 2} \rightarrow \min \rightarrow \frac{4}{2}, 2 - y, -4 \rightarrow R_f, [0, +\infty)$$

$$d) y, \sqrt{-x^2 + 4x} \rightarrow \max \rightarrow \frac{2-0}{-2}, 2 - y, 4 \rightarrow R_f, [0, 2]$$

$$a) y, x^3 - 6x^2 + 2x + 1 \rightarrow \mathbb{R} \quad -9$$

$$b) y, x^3 - 4x^2 + 2x + 2 \rightarrow \mathbb{R}$$

$$c) y, \sqrt{x^3 - 4x^2 + 6x + 1} \rightarrow [0, +\infty)$$

$$d) y, (x^3 - 4x^2 + 2x + 1)^2 \rightarrow [0, +\infty) \rightarrow \{ \frac{1}{2}, \frac{3}{2}, +\infty \}$$

$$a) y, \frac{2x+1}{x-2} \rightarrow R_f, \mathbb{R} - \{2\} \quad \frac{a}{c}, 2 \quad -10$$

$$b) y, \frac{2x+1}{x+1} \rightarrow R_f, \mathbb{R} - \{2\} \quad \frac{a}{c}, 2$$

$$Df \rightarrow \Delta n - n^r - \varepsilon \geq \cdot \rightarrow n^r - \Delta n + \varepsilon \leq \cdot \rightarrow 1 \leq n \leq \varepsilon$$

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$$Df \cap Dg = \{1, r, \varepsilon\}$$

$$\frac{f}{g} = h = \left\{ (1, 0) \left(r, \sqrt{\frac{r}{\varepsilon}}\right) (\varepsilon, 0) \right\}$$

$$f(n) = \sqrt{x-r+r\sqrt{n-r}+r} = \sqrt{(\sqrt{x-r}+r)^r} = |\sqrt{n-r}+r| = \sqrt{n-r}+r \quad (1)$$

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

$$f(n)+g(n) = \sqrt{n-r}+r+\sqrt{n-r}-r = 2\sqrt{n-r} \begin{matrix} \rightarrow a=0 \\ \rightarrow b=r \\ \rightarrow c=-\varepsilon \end{matrix} \rightarrow \frac{a+b}{c} = \frac{r}{-\varepsilon} = -\frac{1}{\varepsilon}$$