

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

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

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

$$f(n) = \frac{n+r}{x^2-5n+r} \Rightarrow (x-1)(x-3) \neq 0 \Rightarrow D_f = \mathbb{R} - \{1, 3\} \quad D_g = \{-1, 1, 3, 5\}$$

$$D_{f+g} = D_f \cap D_g = \{x \mid f(x) \text{ و } g(x) \text{ تعریف شده باشند}\} = \{x \mid \{x, -\frac{1}{x}\} \cap \{1, 3, -1, -\frac{1}{3}\} \neq \emptyset\} = \{x \mid \{x, -\frac{1}{x}\} \cap \{1, 3, -1, -\frac{1}{3}\} \neq \emptyset\}$$

$$f(x) \cap g(x) = \left\{ \left(\frac{1}{3}, 3\right), \left(\frac{3}{5}, -1\right), \left(-\frac{1}{3}, 4\right) \right\}$$

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

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

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

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

$$h(x) \cap g(x) = \left\{ (2, 4), (3, 4), (3, 2) \right\}$$

$$f(n) = \frac{\sqrt{4n}-n}{n-r} \Rightarrow g(n) = [n] + [-n] \quad (n) \left(\frac{1}{g+1} \right) = \frac{\sqrt{4n}-n}{n-r} \quad -2$$

$$\textcircled{1} *n \geq 0 \Rightarrow n \geq 0 \quad \textcircled{2} \sqrt{4n}-n \geq 0 \Rightarrow n^2-2n \leq 0 \Rightarrow [0, 2] \quad \textcircled{3} n-r \neq 0 \Rightarrow n \neq r$$

$$\textcircled{2} [n] + [-n] + 1 \neq 0 \Rightarrow \begin{cases} [n] + [-n] = -1 \Rightarrow n \notin \mathbb{Z} \\ [n] + [-n] = 0 \Rightarrow n \in \mathbb{Z} \\ [n] + [-n] = 1 \Rightarrow n \in \mathbb{Z} \end{cases} \Rightarrow \frac{1}{g+1} \in \left\{ -1, 1, 3 \right\}$$

$$h(n) = \frac{f(n)}{g(n)} = \frac{\sqrt{4n}-n}{g(n)} \quad -n^2+2n-2 \geq 0 \Rightarrow n^2-2n+2 \leq 0 \Rightarrow (n-1)(n-1) \leq 0 \Rightarrow n=1$$

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

$$\text{الف) } y = x^3 - 3x^2 + 3x - 1 \Rightarrow y = x^3 - 3x^2 + 3x - 1 + 1 = (x-1)^3 + 1 \quad y-1 = (x-1)^3 \quad -v$$

$$x-1 = \sqrt[3]{y-1} \Rightarrow x = \sqrt[3]{y-1} + 1 \Rightarrow \mathbb{R}_f = \mathbb{R} \quad \text{د}$$

$$\text{ب) } y = \frac{1}{x^2 - 2x} \Rightarrow y(x^2 - 2x) = 1 \Rightarrow yx^2 - 2yx - 1 = 0 \quad \text{عقبات}$$

$$y \neq 0 \Rightarrow x = \frac{2y \pm \sqrt{4y^2 + 4y}}{2y} \Rightarrow \frac{2y \pm 2\sqrt{y^2 + y}}{2y} \Rightarrow \frac{1 \pm \sqrt{1+y}}{y}$$

$$\mathbb{R}_f = \mathbb{R} - (-1, 0] = (-\infty, -1] \cup (0, +\infty) \quad \text{د}$$

$$\text{الف) } \text{Min}|_4 \Rightarrow \mathbb{R}_f = [4, +\infty) \quad -1$$

$$\text{ب) } \text{Max}|_4 \Rightarrow \mathbb{R}_f = (-\infty, 12]$$

$$\text{ج) } \text{Min}|_{-v} \Rightarrow [-v, +\infty) \Rightarrow \mathbb{R}_f = [-1, +\infty) \quad \text{د}$$

$$\text{د) } \text{Max}|_4 \Rightarrow (-\infty, 4] \Rightarrow \mathbb{R}_f = [-1, 3]$$

$$\text{الف) } x^3 - 5x^2 + 3x + 1 \Rightarrow \text{برگشتنی و/یا منفرجه} \Rightarrow \mathbb{R}_f = \mathbb{R} \quad -9$$

$$\text{ب) } x^3 - 4x^2 + 3x + 2 \Rightarrow \text{برگشتنی و/یا منفرجه} \Rightarrow \mathbb{R}_f = \mathbb{R}$$

$$\text{ج) } \sqrt{x^3 - 4x^2 + 3x + 1} \Rightarrow \sqrt{} \Rightarrow \mathbb{R} = [-1, +\infty) \quad \text{د}$$

$$\text{د) } (x^3 - 4x^2 + 3x + 1)^2 \Rightarrow \mathbb{R} \Rightarrow (\mathbb{R})^2 = [-1, +\infty)$$

$$\text{الف) } \frac{x^2 + 1}{x - 2} \Rightarrow x = \frac{(y-1)}{y-2}, \frac{y+1}{y-2} \Rightarrow y \neq 2 \Rightarrow \mathbb{R}_f = \mathbb{R} - \{2\} \quad -1.$$

$$\text{ب) } \frac{x^2 + 1}{x + 1} \Rightarrow x = \frac{(y-1)}{y-2}, \frac{1-y}{y-2} \Rightarrow y \neq 2 \Rightarrow \mathbb{R}_f = \mathbb{R} - \{2\}$$