

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

نصف مفتوح: $[a, b)$

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

$$f(x) + g(x) = \sqrt{x - r} + r + \sqrt{x - r} + r = 2\sqrt{x - r} = a + b\sqrt{x + c} \Rightarrow a = 0, b = 2, c = -r \quad \frac{a+b}{c} = \frac{2}{-r} = -\frac{2}{r}$$

$$f(x) = \frac{x+r}{x^2 - rx + r}$$

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

$$g(r) = 1$$

$$g(0) = r$$

$$f(r) = \frac{r}{r - r + r} = 1$$

$$f(0) = \frac{r}{r}$$

$$g(x) = \left\{ (r, 1), (1, 0), (r, 0), (0, r) \right\}$$

$$f(x) = \left\{ (1, r), (r, 1), (r, r), (1, 1) \right\}, \quad g(x) = \left\{ (r, r), (1, 1), (r, 1), (1, r) \right\}$$

$$الف) f(rx) = \left\{ (\frac{1}{r}, r), (\frac{r}{r}, 1), (r, r), (\frac{1}{r}, 1) \right\}$$

$$ب) f(x^2) = \left\{ (1, r), (\sqrt{r}, 1), (r, r) \right\}$$

$$ج) r f(x) + 1 = \left\{ (r, 1), (1, r), (r, 1), (1, r) \right\}$$

$$\Rightarrow \frac{rf}{g} = \left\{ (1, -r), (r, -1) \right\} \rightarrow \text{ليس له حل } -1 = x$$

$$h = rf + g = \left\{ (r, 0), (r, 0), (-r, r) \right\}$$

$$f(x) = \frac{\sqrt{rx - x}}{x - r}$$

$$\Rightarrow \sqrt{rx} \geq x \Rightarrow rx \geq x^2 \Rightarrow -x^2 + rx \geq 0 \Rightarrow \frac{0}{-1} + \frac{r}{1} = 0 \Rightarrow D_f = [0, r] - \{r\}$$

$$g(x) + 1 = [x] + [-x] + 1 = \begin{cases} x \geq 0, g(x) = 1 \\ x < 0, g(x) = 0 \end{cases}$$

$$[0, +\infty) \cap [0, r] - \{r\} = [0, r] - \{r\}$$

$$f(x) = \sqrt{-x^2 + 0x - r}$$

$$\frac{1}{-1} + \frac{r}{1} = 0$$

$$g(x) = \left\{ (1, r), (r, r), (r, 1), (1, 1) \right\} \quad \frac{f(x)}{g(x)} = \left\{ (r, \frac{1}{r}), (1, 0), (r, 0), (1, 0) \right\}$$

$$الف) y = x^3 - 3x^2 + 3x + 1 \Rightarrow y = (x-1)^3 + 1 \Rightarrow (x-1)^3 = y-1 \Rightarrow x-1 = \sqrt[3]{y-1} \Rightarrow x = \sqrt[3]{y-1} + 1 \quad y \in \mathbb{R}$$

$$\Rightarrow R_f = \mathbb{R}$$

$$ب) y = \frac{1}{x^2 - 2x}$$

$$\Rightarrow y(x^2 - 2x) = 1 \Rightarrow x^2 - 2x + 1 - 1 = \frac{1}{y} \Rightarrow (x-1)^2 - 1 = \frac{1}{y} \Rightarrow x-1 = \sqrt{\frac{y+1}{y}}$$

$$\Rightarrow x = \sqrt{\frac{y+1}{y}} + 1 \rightarrow \frac{-1}{1} + \frac{0}{-1} = 0 \Rightarrow R_f = \mathbb{R} - [1, 0]$$

$$f(x) = x^5 - 4x + 10 \quad \Rightarrow \quad e^{x^4} \left| \frac{-\frac{1}{4}x^4}{-\frac{1}{4}x^4} \right|_y \quad \Rightarrow \quad R_f = \left[\frac{1}{4}, +\infty \right)$$

$$-1) y = -x^4 + 4x + 10 \quad \Rightarrow \quad e^{x^4} \left| \frac{\frac{1}{4}x^4}{4} \right|_y \quad \Rightarrow \quad R_f = \left[-\infty, \frac{1}{4} \right)$$

$$ع) \sqrt{x^5 - 4x + 10} \quad \Rightarrow \quad e^{x^4} \left| \frac{1}{1} \right|_y \quad \Rightarrow \quad \sqrt{[1, +\infty)} = \underline{[1, +\infty)} \quad \text{دنيا المستقيم داخل برآئین رانایه است بر روی فیه شده از زیر ایلد}$$

$$د) y = \sqrt{-x^4 + 4x + 10} \quad \Rightarrow \quad e^{x^4} \left| \frac{1}{9} \right|_y \quad \Rightarrow \quad \sqrt{[-\infty, 9]} = \underline{[0, 3]}$$

$$\text{الف) } y = x - 6x^4 + 4x + 1 \quad \xrightarrow{\text{بزرگترین مقدار}} \quad R_f = \mathbb{R} \quad \text{ب) } y = x - 6x^4 + 4x + 1 \quad \Rightarrow \quad R_f = \mathbb{R}$$

$$ج) y = \sqrt{x^5 - 4x^4 + 4x + 1} \quad R_f = \sqrt{1R} = 1R^+ \quad \text{د) } y = (x^5 - 4x^4 + 4x + 1)^4 \quad \Rightarrow \quad R_f = (\mathbb{R})^4 = 1R^+$$

$$\text{الف) } y = \frac{4x + 1}{x - 1} \quad \alpha = 1^+ \quad \alpha = 1 \quad \Rightarrow \quad R_f = 1R - \left\{ \frac{5}{4} \right\} = 1R - \{1\}$$

$$\text{ب) } y = \frac{4x + 1}{x + 1} \quad \alpha = 1^+ \quad \alpha = 1 \quad \Rightarrow \quad R_f = 1R - \left\{ \frac{5}{4} \right\} = 1R - \{1\}$$