

19/25 آئینہ -1

$$f(x) = \sqrt{x+\varepsilon} \sqrt{x-\varepsilon} \quad x \geq 1 \quad f(x) + g(x) = a + b\sqrt{x+c} \quad \frac{a+b}{c} =$$

$$g(x) = \sqrt{x-\varepsilon} \sqrt{x-\varepsilon}$$

$$t = \sqrt{x-\varepsilon} \rightarrow f(x) = \sqrt{t^2 + \varepsilon t + \varepsilon} = t + \varepsilon \quad , \quad g(x) = \sqrt{t^2 - \varepsilon t + \varepsilon} = t - \varepsilon$$

$$f(x) + g(x) = 2t = 2\sqrt{x-\varepsilon} = a + b\sqrt{x+c} \Rightarrow \frac{a+b}{c} = \frac{0+\varepsilon}{-\varepsilon} = \boxed{-\frac{1}{\varepsilon}}$$

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$$f(x) = \frac{x+\varepsilon}{x^2 - \varepsilon x + \varepsilon} \quad g(x) = \{(1,1)(1,0)(\cancel{2},\cancel{0})(0,\varepsilon)\} \quad \frac{g}{f}$$

$$f(x) = \frac{x+\varepsilon}{(x-\varepsilon)(x-1)} \quad -\frac{1}{\cancel{0}} + \frac{\varepsilon}{\cancel{0}} + \frac{\varepsilon}{\cancel{0}} \Rightarrow x \neq 1, \varepsilon$$

$$f(0) = \frac{\varepsilon}{\varepsilon} \Rightarrow \frac{g(0)}{f(0)} = \frac{\varepsilon}{\varepsilon} = \boxed{1}$$

$$f(\varepsilon) = \frac{\varepsilon}{-1} = -\varepsilon \Rightarrow \frac{g(\varepsilon)}{f(\varepsilon)} = \boxed{-\frac{1}{\varepsilon}}$$

$$\Rightarrow \frac{g}{f} = \{(0,1)(\cancel{2},-\frac{1}{\varepsilon})\}$$

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$$f(x) = \{(\underline{1}, \underline{2})(\underline{3}, \underline{-1})(\underline{\varepsilon}, \underline{2})(\underline{-1}, \underline{\varepsilon})\} \quad g(x) = \{(-\underline{2}, \underline{3})(\underline{1}, \underline{-1})(\underline{2}, \underline{2})(\underline{-1}, \underline{0})\}$$

ا)  $f(x) = \{(\frac{1}{\varepsilon}, 2)(\frac{\varepsilon}{\varepsilon}, -1)(\cancel{2}, 2)(-\frac{1}{\varepsilon}, \varepsilon)\}$

ب)  $f(x^2) = \{(\underline{4}, 2)(\underline{\sqrt{3}}, -1)(\underline{\varepsilon}, 2)(\underline{-1}, \underline{\varepsilon})\} \Rightarrow \{(-\underline{1}, \underline{2})(\underline{-\sqrt{3}}, -1)(\underline{\sqrt{3}}, -1)(-\underline{2}, \underline{2})\}$

ج)  $2g^2(x) + 1 = \{(-\underline{2}, \underline{19})(\underline{1}, \underline{3})(\underline{2}, \underline{9})(\underline{-1}, \underline{1})\}$

د)  $\frac{2f}{g} = \{(\underline{-1}, \underline{\frac{19}{\varepsilon}})(\underline{1}, \underline{\frac{\varepsilon}{-1}})(\underline{3}, \underline{\frac{9}{\varepsilon}})\} \Rightarrow \{(\underline{1}, \underline{-4})(\underline{3}, \underline{-1})\}$

حسنہ سعید

$$f(x) = \{(x, 1)(x, 1)(x, 9)(-x, 0)\} \quad g = \{(x, 1)(x, 3)(-x, 4)(-1, x)(x, x)\} \quad -5$$

$$h = f + g \quad h(x) = f(x) + g(x) = x + x = 2x$$

$$h(x) = f(x) + g(x) = x + x = 2x \quad h(-x) = f(-x) + g(-x) = f(0) + 4 = 4$$

$$h = \{(x, 2)(x, 2)(-x, 4)\} \quad \text{D}$$

$$f(x) = \frac{\sqrt{3x-x^2}}{x-2}, \quad g(x) = [x] + [-x] \quad \left(\frac{f}{g+1}\right)(x) \quad -5$$

$$f(x) = \frac{\sqrt{3x-x^2}}{x-2} \Rightarrow \sqrt{3x-x^2} \geq 0 \Rightarrow 3x-x^2 \geq 0 \Rightarrow \sqrt{3x} \geq x \Rightarrow 3x \geq x^2 \Rightarrow$$

$$x^2 - 3x \leq 0 \Rightarrow x(x-3) \leq 0 \quad \begin{array}{c} 0 \quad 3 \\ + \quad - \quad + \end{array} \quad [0, 3] \quad , \quad x-2 \neq 0 \Rightarrow x \neq 2$$

اولی \$x\$ در صیغ باشد و اولی \$x\$ در صیغ نباشد -1 \$\Leftarrow\$ \$g+1\$ برای تمام صیغ می شود

$$D\left(\frac{f}{g+1}\right) = \{0, 1, 3\} \quad \text{D}$$

$$f(x) = \sqrt{5x-x^2-4} \quad g(x) = \{(1, 3)(x, 2)(x, 4)(5, 1)\} \quad h(x) = \frac{f(x)}{g(x)} \quad -4$$

$$f(x) = \sqrt{5x-x^2-4} \Rightarrow 5x-x^2-4 \geq 0 \Rightarrow -(x^2-5x+4) \geq 0 \Rightarrow -(x-4)(x-1) \geq 0$$

$$\begin{array}{c} 1 \quad 4 \\ + \quad - \quad + \end{array} \quad [1, 4] \quad f(1) = 0 \quad f(2) = \sqrt{2} \quad f(4) = 0$$

$$h(x) = \{(1, 0)(2, \frac{\sqrt{2}}{\sqrt{2}})(4, 0)\} \quad R_f = \{0, \frac{\sqrt{2}}{2}\} \quad \text{D}$$

$$y = x^3 - 3x^2 + 3x \quad R_f = R \quad -4$$

برای باید باشد. روش اولی برت آید!

$$b) \quad y = \frac{1}{x^2-2x}$$

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

$$(x-1)^2 = \frac{1}{y} + 1 \Rightarrow x-1 = \sqrt{\frac{y+1}{y}} \Rightarrow x = \sqrt{\frac{y+1}{y}} + 1 \Rightarrow \frac{y+1}{y} \geq 0 \Rightarrow \frac{1}{y} \geq -1$$

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

الف)  $y = x^2 - 5x + 10$   
min

ext  $\begin{cases} \frac{-b}{2a} = \frac{5}{2} = 2.5 \\ \frac{\Delta}{4a} = 4 \end{cases}$

$[4, +\infty)$

ب)  $y = -x^2 + 4x + 3$   
max

ext  $\begin{cases} \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ \frac{\Delta}{4a} = 12 \end{cases}$

$(-\infty, 12]$

ج)  $y = \sqrt{x^2 - 5x - 3}$   
min

ext  $\begin{cases} \frac{-b}{2a} = \frac{5}{2} = 2.5 \\ \frac{\Delta}{4a} = -V \end{cases}$

$\sqrt{[-V, +\infty)} \Rightarrow [0, +\infty)$

د

د)  $y = \sqrt{4x - x^2}$   
max

ext  $\begin{cases} \frac{-b}{2a} = \frac{-4}{-2} = 2 \\ \frac{\Delta}{4a} = 4 \end{cases}$

$\sqrt{(-\infty, 4]} \Rightarrow [0, 2]$

الف)  $y = x^2 - 5x + 10$   $R_f = R$

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ب)  $y = -x^2 + 4x + 3$   $R_f = R$

ج)  $y = \sqrt{x^2 - 5x - 3}$   $R_f = \sqrt{R} \Rightarrow R_f = [0, +\infty)$

د

د)  $y = (x^2 - 5x + 10)^2$   $R_f \geq 0 \Rightarrow [0, +\infty)$

الف)  $y = \frac{3x+1}{x-2}$

$R_f = R - \{2\}$

د

ب)  $y = \frac{2x+1}{x+1}$

$R_f = R - \{1\}$

حدا سیراف B

(الف)  $y = n^3 - 3n^2 + 2n - 1 + 1 = y = (n-1)^3 + 1$  (✓)

$$y-1 = (n-1)^3 \rightarrow \sqrt[3]{y-1} = n-1 \rightarrow n = \sqrt[3]{y-1} + 1$$

$R_f = \mathbb{R}$

(ب)  $y = \frac{1}{n^2 - 2n} \rightarrow n^2 y - 2ny = 1 \rightarrow n^2 y - 2ny - 1 = 0$

$y \neq 0 \rightarrow n = \frac{2y \pm \sqrt{4y^2 + 4y}}{2y} \rightarrow 4y(y+1) \geq 0 \rightarrow \frac{-1}{+} \frac{0}{+}$

$y = 0 \rightarrow 0 = 1 \times$  صفتی وجود ندارد!  $\rightarrow R_f = (-\infty, -1] \cup (0, +\infty)$