

14 آذرین



$$\sqrt{x-4} = t$$

$$x = t^2 + 4$$

$$f(x) = \sqrt{t^2 + 4 + 4t} = \sqrt{(t+2)^2} \rightarrow f(x) = t+2$$

$$g(x) = \sqrt{t^2 + 4 - 4t} = \sqrt{(t-2)^2} = |t-2|$$

$$t = \sqrt{x-4} \geq \sqrt{4} = 2$$

$$|t-2| = t-2 \quad g(x) = t-2$$

$$f(x) + g(x) = 2t \rightarrow 2\sqrt{x-4} \quad a=0 \quad b=2 \quad c=-4$$

$$\frac{a+b}{c} = \frac{2}{-4} = -\frac{1}{2}$$

1

$$x=2 \rightarrow f(2) = \frac{2+2}{2-2+2} = \frac{4}{2} = 2 \rightarrow g(2) = -\frac{1}{2} \quad (2, -\frac{1}{2})$$

$$x=1 \rightarrow 1-4+2=0 \rightarrow f(1) = \text{undefined}$$

$$f(1) = \text{undefined}$$

$$x=0 \rightarrow f(0) = \frac{0}{0-0+0} = \frac{0}{0}$$

$$g(0) = 2$$

$$\frac{g(0)}{f(0)} = \frac{2}{0} = \text{undefined}$$

$$\frac{g}{f} = \left\{ (2, -\frac{1}{2}), (0, 2) \right\}$$

2

$$f(x) = \left\{ \left(\frac{1}{2}, 2 \right), \left(\frac{1}{2}, -1 \right), \left(2, 2 \right), \left(2, -1 \right), \left(\frac{1}{2}, 2 \right) \right\}$$

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

$$2 \times 9 + 1 = 19$$

$$2(1) + 1 = 3$$

$$2(2) + 1 = 5$$

$$2(0) + 1 = 1$$

3

$$x=1$$

$$x=2$$

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

$$\frac{f(2)}{g(2)} = \frac{f}{-1} = -f$$

$$g(1) = 0$$

$$\left\{ (-2, 19), (1, 3), (2, 5), (-1, 1) \right\}$$

3

$$D_h = \{2, 3, -2\}$$

$$h = \{ (2, 0), (-2, 2), (3, 0) \}$$

$$h = 2f + g$$

$$h = 2 + 3 = 5 \rightarrow (2, 5)$$

$$h = 2 + 3 = 5 \rightarrow (2, 5)$$

$$h = 0 + 4 = 4 \rightarrow (-2, 4)$$

4

$$x \geq 0$$

$$\sqrt{x-4} \geq 0$$

$$\sqrt{x-4} \geq 0 \rightarrow x-4 \geq 0$$

$$x-4 \geq 0$$

$$x(1-x) \geq 0 \rightarrow x=0 \quad x=1$$

$$-1 \leq x \leq 1$$

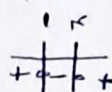
$$g(x) = [x] + [-x] \quad x \in \mathbb{Z} \Rightarrow 0$$

$$x \notin \mathbb{Z} \Rightarrow -1$$

$$g(x) + 1 = \begin{cases} 0 & x \notin \mathbb{Z} \\ 1 & x \in \mathbb{Z} \end{cases}$$

$$\frac{D_f}{g+1} = \{0, 1, 2\}$$

5

$\omega x = x^2 - \varepsilon \geq 0$ $x^2 - \omega x + \varepsilon \leq 0$ $(x-1)(x-\varepsilon) \leq 0$ $1 \leq x \leq \varepsilon$  $h_{(1)} = \frac{\sqrt{\varepsilon}}{\varepsilon}$	$D_g = \{1, 2, \varepsilon, 0\}$ $D_n = \{2, 1, \varepsilon\}$ $h \rightarrow x=1 \rightarrow \begin{cases} f_{(1)} = 0 \\ g_{(1)} = 2 \end{cases} \Rightarrow \frac{0}{2} = 0$ $h_{(2)} = 0$ $h = \{(1, 0), (2, \frac{\sqrt{\varepsilon}}{\varepsilon}), (\varepsilon, 0)\}$	6
$y = x^2 - 2x + 1$ (الف) $y = (x-1)^2 + 1$ $y-1 = (x-1)^2$ $x-1 = \sqrt{y-1}$ $R = \mathbb{R}$	$y = \frac{1}{x^2 - 2x}$ $xy - 2xy = 1 \xrightarrow{y=0} 0 = 1 \times \frac{1}{y} + 1 \geq 0$ $y(x^2 - 2x) = 1$ $\frac{x^2 - 2x}{y} = \frac{1}{y}$ $(x-1)^2 - 1 = \frac{1}{y} \rightarrow (x-1)^2 = \frac{1}{y} + 1$ $y = 0$ ریشه مفروض است پس در بر نیست! $y = -1$ $y = 0$ $\frac{y+1}{y} \geq 0$ $1, 0, \infty$	7
$y = x^2 - 2x + 10$ $a=1 \quad b=-2$ $x = \frac{-(-2)}{2(1)} = 1$ $1^2 - 2(1) + 10 = 9$ $R = (0, +\infty)$	$y = -x^2 + 4x + 3$ (ب) $a=-1 \quad b=4$ $x = \frac{-4}{2(-1)} = 2$ $y = -(-2)^2 + 4(-2) + 3 = -11$ $R = (-\infty, 11]$ $R = [0, \frac{11}{2}]$	8
$R = \mathbb{R}$ (الف) $R = \mathbb{R}$ (ب) $R = [0, +\infty)$ (ج) $R = [0, +\infty)$ (د)	$R = \mathbb{R}$ $R = \mathbb{R}$ $R = [0, +\infty)$ $R = [0, +\infty)$	9
$R = \mathbb{R} - \{2\}$ (الف) $R = \mathbb{R} - \{2\}$		10

$$f(q) = \sqrt{t^2 + \epsilon + \epsilon f} = \sqrt{(t+r)^2} \rightarrow f(q) = t+r$$

$$g(r) = \sqrt{tr + \epsilon - \epsilon t} = \sqrt{(t-r)\epsilon} = |t-r|$$

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

$$t = \sqrt{x-f} \geq \sqrt{f} = 1$$

$$|t-r| \approx t-r \quad g_{(a)} \approx t-r$$

$$\frac{a+b}{c} = \frac{\mu}{-\epsilon} + \left(-\frac{1}{f} \right)$$

$$x = r \rightarrow f(r) = \frac{r+r}{\epsilon - \lambda + r} = \frac{\epsilon}{-1} = (-\epsilon) \rightarrow \frac{g(r)}{f(r)} = -\frac{1}{r} \quad (r, -\frac{1}{r})$$

$$n=1 \rightarrow 1 - \epsilon_+ \mu \approx 0 \rightarrow f_{(1)} \approx \bigcup \alpha$$

$$u = 0 \quad f_{(0)} = \frac{1}{r}$$

$$I_0 = 1$$

$$\frac{g(a)}{f(a)} =$$

$$f(x) = 0.5$$

$$\frac{g}{f} = \left[\left(r, -\frac{1}{\epsilon} \right) (0, 4) \right]$$

$$f_{(x,y)} = \left(\frac{1}{F}, 2\right) \quad \left(\frac{1}{F}, -1\right), (2, 0), \left(\frac{1}{F}, 0\right)$$

$$f(x) = \{(-1, 2)(1, 2)(2, 2)(-2, 2)(-5, -1)(4\sqrt{2}, -1)\}$$

$$n = 1$$

$$n = 5$$

$$\frac{f'(1)}{g'(1)} = \frac{f}{-1} = -f$$

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

$$9_{(-1)}^{20}$$

$$\{(-2, 19), (1, 3), (5, 9), (-1, 1)\}$$

$$D_2 = \{r, r, -r\}$$

$$h = \{(1, \omega), (-1, \gamma), (1, \omega)\}$$

$$h = r f + g$$

$$h = \nu + \nu = \omega \rightarrow (\nu, \omega)$$

h. $r + r' = \omega \rightarrow (r, \omega)$

$$h = 0 \text{ \& } y = y \Rightarrow (-2, 4)$$

$$\begin{aligned} \gamma a &\geq 0 \\ a &\geq 0 \end{aligned}$$

$$\sqrt{101} - 10 \geq 0$$

$$\sqrt{r}x \geq x \rightarrow rx \geq x^2$$

$$\mu_{\mathcal{X}} - \mathcal{X} \geq 0$$

$$g_1(\mu - \alpha) \geq 0 \rightarrow g_1 = 0$$

$$\begin{array}{|c|c|c|} \hline - & + & - \\ \hline \end{array} \quad \bullet \quad x \leq m$$

$$g(x) = [x] + [-x] \quad x \in \mathbb{R} \Rightarrow 0$$

$$a \notin \mathbb{Z} = -1$$

$$g(x) + 1 = \begin{cases} 0 & x \notin \mathbb{Z} \\ 1 & x \in \mathbb{Z} \end{cases}$$

$$\frac{D_f}{991} = \{9, 1, 3\}$$

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

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

$R_f = \mathbb{R}$

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

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

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

الف - 1) $y = n^2 - 2n + 1 \rightarrow \min \begin{cases} n = \frac{2}{2} = 1 \\ y = 1 - 2 + 1 = 0 \end{cases} \rightarrow R_f = [0, +\infty)$

ب - 1) $y = -n^2 + 4n + 3 \rightarrow \max \begin{cases} n = \frac{-4}{-2} = 2 \\ y = -9 + 16 + 3 = 10 \end{cases} \rightarrow R_f = (-\infty, 10]$

ج - 1) $y = n^2 - 2n - 3 \rightarrow \min \begin{cases} n = \frac{2}{2} = 1 \\ y = 1 - 2 - 3 = -4 \end{cases} \rightarrow R_f = \sqrt{[-4, +\infty)} = [-2, +\infty)$

د - 1) $y = 4n - n^2 \rightarrow \max \begin{cases} n = \frac{-4}{-2} = 2 \\ y = 8 - 4 = 4 \end{cases} \rightarrow R_f = \sqrt{(-\infty, 4]} = (-\infty, 4]$