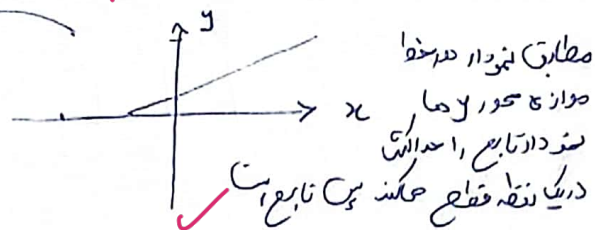


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$$x = \begin{cases} 3y-1 & y \geq 0 \rightarrow \frac{x+1}{3} = y \\ -y^2 & y > 1 \rightarrow \sqrt{-x} = y \end{cases}$$



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$$f(x) = 0 \rightarrow \{-\varepsilon, 3, \infty\} \rightarrow f(x-2) \xrightarrow{17,5} f(x-2) = \{-2, \infty, 7\} \quad D_{f(x)} = \mathbb{R} - \{4\}$$

$$D_{f(x-2)} = \mathbb{R} - \{4\}$$

$$D_{g(x)} = (-\varepsilon, -2] \cup [0, 3) \cup [7, +\infty)$$

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$$f(x) = \frac{2x^2 - 3x + 2}{x^3 - \varepsilon x} \quad D_{f(x)} = \mathbb{R} - \left\{ \frac{3}{2} \right\}$$

$$x^3 - \varepsilon x = 0$$

$$x(x^2 - \varepsilon) = (x-2)(x+2)x = 0$$

$$x = -2, 0, 2$$

$$D_{f(x)} = \mathbb{R} - \{0, \pm 2\}$$

$$f(x) = \frac{2x^2 - 3x + 2}{x^3 - \varepsilon x} \rightarrow \frac{2x^2 - 3x + 2}{x^3 - \varepsilon x} = \frac{2x^2 - 3x + 2}{x^3 - \varepsilon x} \xrightarrow{\Delta}$$

$$D_{f(x)} = (-2, 0) \cup (2, +\infty)$$

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$$f(x) = \sqrt{\frac{x-2}{x^2 - 3x - 4}} = \sqrt{\frac{(x-2)}{(x^2 - \varepsilon)(x^2 + 2)}} \rightarrow \sqrt{\frac{(x-2)}{(x-2)(x+2)(x^2 + 2)}}$$

$$D_y \rightarrow \frac{-2}{-2+2} \quad D_{f(x)} = (-2, +\infty) - \{2\}$$

$$y = \frac{2x^2 + 1}{\varepsilon - 2[-x]} \quad \varepsilon - 2[-x] = 0 \quad [-x] = 2 \rightarrow 2 \leq -x < 3$$

$$D_{f(x)} = \mathbb{R} - \{2, -2\}$$

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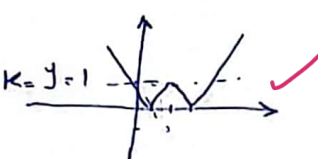
$$f(x) = \frac{\sqrt{x(x^2-1)}}{\sqrt{|x|+x}} \rightarrow |x|+x > 0 \quad \begin{cases} x > 0 \rightarrow x \rightarrow x > 0 \\ x < 0 \rightarrow 0 \end{cases}$$

$$x(x-1)(x+1) > 0 \rightarrow \frac{-1}{-1+1} \quad D_{f(x)} = [1, +\infty)$$

$$f(x) = \frac{\sqrt{|x-1|-x^2}}{|x|-1} \quad |x|-1 \neq 0 \quad |x| \neq 1 \quad x \neq \pm 1$$

$$D_{f(x)} = [-2, 1) - \{-1\}$$

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$\text{a) } y = \sqrt{(x-1)(x-2)} \quad \begin{array}{c ccc} & 1 & 2 & \\ \hline & + & 0 & + \end{array} \quad D_{f_{\text{un}}} = \mathbb{R} \checkmark$	(r)
$\text{b) } y = \sqrt{ x-1 (x-2)} \quad \begin{array}{c ccc} & 1 & 2 & \\ \hline & - & 0 & + \end{array} \quad D_{f_{\text{un}}} = [\neq, +\infty) \cup \{1\} \checkmark$	6
$y = \frac{1}{ x-1 -1 -k} \rightarrow x-1 -1 =k \begin{cases} \rightarrow x-1 =k+1 \xrightarrow{k=1} x-1 =2 \\ \rightarrow x-1 =-k+1 \xrightarrow{k=1} x-1 =0 \rightarrow x=1 \end{cases}$ $\rightarrow x-1 =2 \rightarrow x-1=\pm 2 \rightarrow x=3, -1$ 	(r) 7
$f(n) = \frac{\frac{x^r \cdot n + r}{n^r + n + r}}{\frac{x+1}{n-1}} \rightarrow \frac{\frac{(n+r)(n+1)}{(n-1)}}{\frac{(n-1)}{(n-1)}} \rightarrow D_{f_{\text{un}}} = \mathbb{R} \setminus \{-1, -r, 1\}$ $n^r \cdot n + r = 0 \quad (n-r)^r = 0 \rightarrow x=r$	(r) 8
$y = \log_{x+1} \cdot \log_x^{\frac{1}{r}} \quad \begin{matrix} x > -1 & x \neq 0 \\ x > 0 & x \neq 1 \end{matrix} \quad D_{f_{\text{un}}} = (0, +\infty) \setminus \{1\}$ 1) $x+1 > 0 \rightarrow x > -1, \quad x+1 \neq 1 \rightarrow x \neq 0$ 2) $x > 0, \quad x \neq 1$ 3) $\log_x^{\frac{1}{r}} > 0 \rightarrow 0 < x < 1$ $\Rightarrow D_f = (0, 1)$	(1,2) 9
$- \infty < x < r \quad 0 < x^r < r \omega \quad -1 \leq x^r - 1 < \sqrt{2} \quad D_{f_{\text{un}}} = [-1, \sqrt{2})$	0 10

۱. - د فترت $f(n)$ دامنه $f(n)$ یعنی تعاقبی که تابع f می‌تونه بگیره پس $1 - n^2$ یا $n^2 - 1$ $[-5, 4]$ قرار بگیرد:

$$-5 \leq n^2 - 1 \leq 4 \rightarrow -4 \leq n^2 \leq 4 \rightarrow n^2 \leq 4 \rightarrow -\frac{4}{\sqrt{3}} \leq n \leq \frac{4}{\sqrt{3}}$$

$$\rightarrow -\frac{2\sqrt{3}}{3} \leq n \leq \frac{2\sqrt{3}}{3} \rightarrow D_f(n^2 - 1) = \left[-\frac{2\sqrt{3}}{3}, \frac{2\sqrt{3}}{3} \right]$$