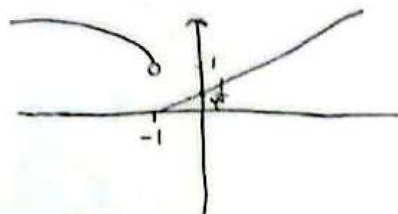


$$x = \begin{cases} y-1 & y \geq 0 \\ -y^2 & y > 1 \end{cases} \quad \begin{cases} y-1 = x & y = \frac{1}{x} & y \geq 0 \Rightarrow x \geq -1 \\ y > 1 & y = \sqrt{-x} & y > 1 \Rightarrow x < -1 \end{cases}$$

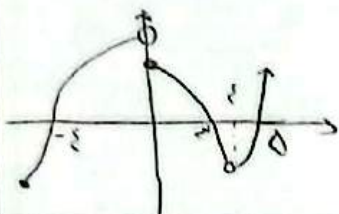


تابع معکوس $\Rightarrow$ ✓

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

$$D_f = (-4, -2] \cup [0, 3) \cup [7, +\infty) \checkmark$$

$$\left. \begin{array}{l} x \leftarrow \text{ضرب} \\ \Delta \text{ و } 0 \leftarrow f(0) \\ \Delta \text{ و } 0 \leftarrow f(x-2) \end{array} \right\} \text{رابطه}$$



$$\begin{array}{ccccccc} -4 & -2 & 0 & 3 & 5 & 7 \\ -\frac{1}{2} & + & \frac{1}{2} & - & \frac{1}{2} & - & \frac{1}{2} & + \end{array} \checkmark$$

فقط خطوط باشد که $x=4$ در دامنه است و $x=4$ در دامنه است $\Rightarrow$ نیست که در بازه است آفده نیست

$$f(x) = \frac{x^2 - 5x + 2}{x^2 - 4x} = \frac{x^2 - 5x + 2}{x(x-4)}$$

$$D_f = \mathbb{R} - \left\{ \frac{5 \pm \sqrt{17}}{2} \right\}$$

$$\Delta = 9 - 17 < 0 \Rightarrow \text{همواره مثبت} \quad \Delta_f = (-2, 0) \cup (2, +\infty) \checkmark$$

$$\text{الف) } y = \sqrt{\frac{x-2}{x^4 - 2x^2 - 8}} = \sqrt{\frac{x-2}{(x^2-4)(x^2+2)}} \quad D_f = (-2, +\infty) - \{2\} \checkmark$$

$$\text{ب) } y = \frac{x^2+1}{x-2} \Rightarrow D_f = \mathbb{R} - \left\{ \frac{1 \pm \sqrt{5}}{2} \right\} \quad \begin{array}{l} x-2 \neq 0 \\ x^2+1 \neq 0 \end{array}$$

$$\text{الف) } f(x) = \frac{\sqrt{x(x^2-1)}}{\sqrt{|x|+x}}$$

$$x(x^2-1) \geq 0 \quad |x|+x > 0 \quad \Rightarrow D_f = [1, +\infty) \checkmark$$

$$\Rightarrow f(x) = \frac{\sqrt{|x-1|-x^2}}{|x|-1}$$

$$|x-1|-x^2 \geq 0 \quad |x|-1 \neq 0 \quad \Rightarrow D_f = [-1, 1) - \{-1\} \checkmark$$

$$|x|-1 \neq 0 \quad |x| \neq 1 \quad x \neq \pm 1 \quad \Rightarrow D_f = [-1, 1) - \{-1\} \checkmark$$

$$1) y = \sqrt{(x-2)[x-2]}$$

براکت کی عبارت یا خود عبارت
هم علامت است $\Rightarrow D_f = \mathbb{R}$ ✓

$$2) y = \sqrt{(x-1)[x-3]} \quad \frac{1}{(x-1)[x-3]} \rightarrow [3, \infty)$$

← همواره منفی

$$\Rightarrow D_f = [3, \infty) \cup \{1\}$$
 ✓

$$y = \frac{1}{||x-2|-1| - k}$$

$$D_f = \mathbb{R} - \left\{ \frac{1}{k} \right\}$$

$$||x-2|-1| - k = 0 \quad |x-2|-1 = k \quad |x-2| = k+1 \rightarrow k = -1$$

$$||x-2|-1| = k \rightarrow -|x-2|+1 = k \quad -k+1 = |x-2| \rightarrow k = 1$$

if $k=1$ $x = 0$ and $x = 2$ $\Rightarrow k = +1$ ✓
if $k=-1$ ✗

$$f(x) = \frac{x^2 + 2x + 2}{x^2 + 3x + 2} \cdot \frac{x+1}{x-1}$$

$$(x+2)(x+1) \neq 0 \quad x+1 \neq 0 \quad x-1 \neq 0$$

$$\Rightarrow x \neq -1 \text{ and } x \neq 1$$

$$x^2 - 2(x+2)x + 2(x+2) =$$

$$x^2 - 4x + 4 = (x-2)^2$$

دارای یک ریشه مضاعف ✓

$$y = \log_{x+1} \log_{x+1} \frac{1}{x}$$

$$\log_{x+1} \frac{1}{x} > 0 \rightarrow \frac{1}{x} > 1 \quad x$$

$$x+1 > 0 \quad x+1 \neq 1$$

$$x > -1 \quad x \neq 0$$
 ✓

$$\frac{1}{x} < 1 \Rightarrow x < 1$$

$$\Rightarrow x = (-1, 1) \setminus \{0\}$$

$$D_f(x) = [-0.5, 3]$$

$$-0.5 \leq x \leq 3$$

⇓

$$-0.5 \leq x^2 - 1 \leq 3$$

$$-1 \leq x^2 \leq 4$$

$$-\frac{2}{\sqrt{e}} \leq x^2 \leq \frac{2}{\sqrt{e}} \Rightarrow x^2 \leq \frac{2}{\sqrt{e}} \rightarrow$$

$$-\frac{1}{\sqrt{e}} \leq x \leq \frac{1}{\sqrt{e}}$$

$$D_f(x^2-1) = \left[-\frac{2}{\sqrt{e}}, \frac{2}{\sqrt{e}} \right]$$
 ✓

$$1) \quad n+1 > 0 \rightarrow n > -1, \quad n+1 \neq 1 \rightarrow n \neq 0$$

$$2) \quad n > 0, \quad n \neq 1$$

$$\xrightarrow{n} D_f = (0, 1)$$

$$3) \quad \lg \frac{1}{n} > 0 \rightarrow 0 < n < 1$$