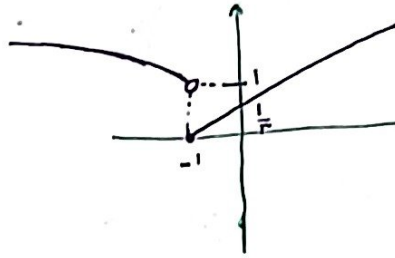


(۱)

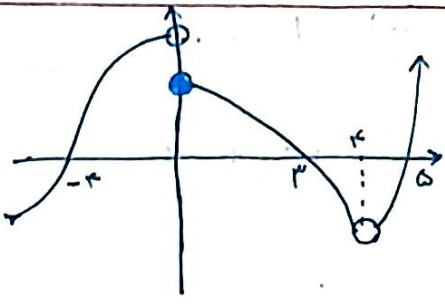
$$x = \begin{cases} 2y-1 & y \geq 0 \\ -y^2 & y < 0 \end{cases}$$



$$\begin{aligned} y \geq 0 &\rightarrow x = 2y-1 \rightarrow y = \frac{x}{2} + \frac{1}{2} \\ &\rightarrow y \geq 0 \rightarrow \frac{x}{2} + \frac{1}{2} \geq 0 \rightarrow x \geq -1 \\ y < 0 &\rightarrow x = -y^2 \rightarrow \sqrt{-x} = |y| \\ &\rightarrow \sqrt{-x} = y \rightarrow y < 0 \rightarrow x < -1 \end{aligned}$$

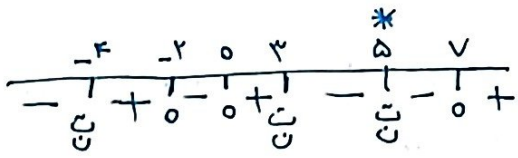
پس با توجه به نمودار تابع است.

(۲)



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

$$\frac{x \cdot f(x-2)}{f(x)} \geq 0 \rightarrow \begin{aligned} &\text{1. } f(x-2) \rightarrow x = 7, 5, -2 \\ &\text{2. } f(x) \rightarrow x = 5, 3, -4 \\ &\text{3. } x \rightarrow x = 0 \end{aligned}$$



$$\rightarrow D = (-4, -2] \cup [0, 2) \cup [7, +\infty)$$

(۳)

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

$$\begin{aligned} x^2 - 4x \neq 0 &\rightarrow x(x-4)(x+2) \neq 0 \\ &\rightarrow x \neq 0, 4, -2 \end{aligned}$$

$$\begin{aligned} \frac{2x^2 - 3x + 2}{x^2 - 4x} \geq 0 &\rightarrow \frac{2x^2 - 3x + 2}{x(x-4)(x+2)} \geq 0 \\ &\rightarrow \frac{-2}{-} + \frac{0}{+} - \frac{2}{-} + \end{aligned}$$

(ب)

$$\text{الف) } y = \sqrt{\frac{x-2}{x^2-2x^2-1}} \rightarrow \frac{x-2}{(x^2-4)(x^2+2)} \geq 0 \rightarrow \frac{-2}{-} + \frac{2}{+}$$

(۴)

$$D = (-2, +\infty) - \{2\}$$

$$\text{ب) } y = \frac{2x^2 + 1}{x^2 - 2[-x]} \rightarrow x^2 - 2[-x] \neq 0 \rightarrow x^2 + 2x \neq 0 \rightarrow x(x+2) \neq 0 \rightarrow x \neq 0, -2$$

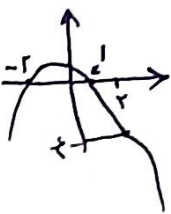
$$-2 \leq -x < 2 \rightarrow -2 \geq x > -2 \rightarrow x \neq (-2, -2)$$

$$\rightarrow D = \mathbb{R} - (-2, -2)$$

الف) $f(x) = \frac{\sqrt{x(x^2-1)}}{\sqrt{|x|+x}}$ $\rightsquigarrow$ $x(x^2-1) \geq 0 \rightarrow \frac{-1}{-1} + \frac{0}{1} - \frac{1}{1} \xrightarrow{(1)} (-1, 0) \cup (1, +\infty)$
 $|x|+x \geq 0 \rightarrow \frac{0}{0} + \frac{1}{x} \xrightarrow{(2)} (0, +\infty)$

$\rightarrow (1) \cap (2) = (1, +\infty)$

ب) $\frac{\sqrt{|x-2|-x^2}}{|x|-1}$ $\rightsquigarrow$ $|x-2|-x^2 \geq 0 \rightarrow -x^2-x+2 \geq 0 \rightarrow x^2+x-2 \leq 0$
 $|x|-1 \neq 0 \xrightarrow{(1)} x \neq \pm 1$
 $(2) \rightarrow -2 \leq x \leq 1$
 $(1) \cap (2) \rightarrow D = [-2, 1) \cup (-1, 1]$



الف) $y = \sqrt{(x-2)[x-3]}$ $\odot [0] \geq 0 \leftarrow$ همیشه هم علامت دارد $\odot [0]$ $\odot [0]$
 $D = \mathbb{R}$

ب) $y = \sqrt{|x-1|[x-3]}$ $x \geq 3 \leftarrow x-3 \geq 0$ $\leftarrow [x-3] \geq 0 \leftarrow |x-1| \geq 0$
 $\rightarrow 3 \leq x, x=1 \rightarrow D = [3, +\infty) \cup \{1\}$
 داخل قدر مطلق منفی نشود

الف) $\frac{1}{||x-2|-1|-k}$ $\rightsquigarrow ||x-2|-1|-k = 0 \rightarrow ||x-2|-1| = k$
 $\rightarrow |x-2|-1 = k \rightarrow |x-2| = k+1$
 $\rightarrow |x-2|-1 = -k \rightarrow |x-2| = -k+1$
 $\rightarrow |x-2| \geq 0 \rightarrow x=2$
 $\rightarrow |x-2| = 2 \rightarrow x=4, 0$
 $k \geq 0$
 $k+1=0 \rightarrow k=-1$
 $k-1=0 \rightarrow k=1$
 $k=\pm 1$

الف) $f(x) = \frac{x^2+x+1}{x+1}$ $\rightarrow$ $x^2+x+1 \neq 0 \rightarrow x \neq -1, -2$
 $x+1 \neq 0 \rightarrow x \neq -1$
 $x-1 \neq 0 \rightarrow x \neq 1$
 $\rightarrow x=3 \rightarrow x^2-4x+9=0 \rightarrow (x-3)^2=0 \rightarrow x=3$

$y = \log_{x+1} \log_x \frac{1}{x}$
 $x > 0, x \neq 1$
 $\log_{x+1} \frac{1}{x} > 0 \rightarrow \frac{1}{x} > 1 \rightarrow x < 1$
 $x < 1, \frac{1}{x} < 1$
 $x+1 > 0 \rightarrow x > -1, x \neq 0$
 $\rightarrow -1 < x < 1$

$D_{f(x)} = [-5, 3]$ $D_{f(x+1)}$
 $\rightarrow -5 \leq x^2-1 \leq 3 \rightarrow -4 \leq x^2 \leq 4 \rightarrow -2 \leq x \leq 2$