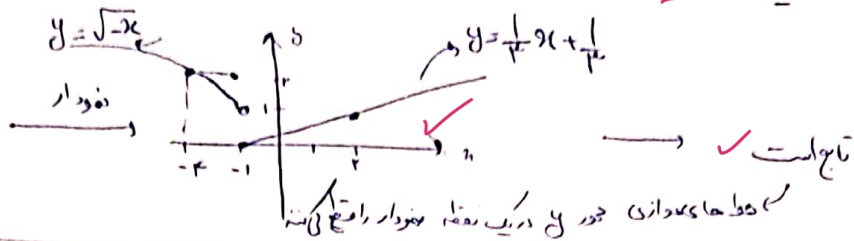


۱)

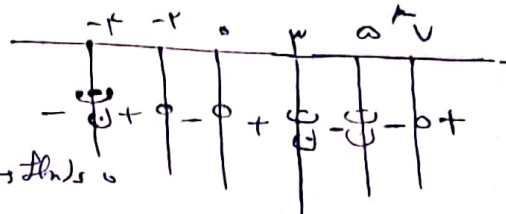
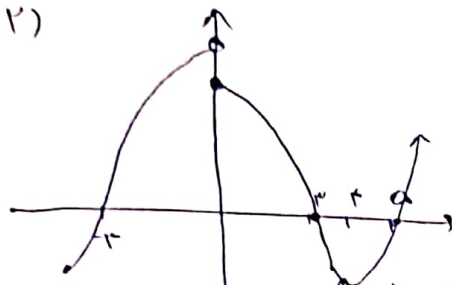
$$g(x) = \begin{cases} x^3 - 1 & x \geq 0 \\ -x^2 & x < 0 \end{cases}$$



(۲)

۲)

$$g(x) = \sqrt{\frac{x f(x-2)}{f(x)}} \rightarrow \frac{x (f(x-2))}{f(x)} \geq 0$$



دانه =
 $(-2, -2] \cup [0, 2]$
 $\cup [2, +\infty)$

(۲)

فقط دانه باشد که $x=4$ در دانه $f(x)$ و $x=4$ در دانه $f(x-2)$ است که در دانه $f(x)$ آمده نیست.

$$۳) f(x) = \frac{2x^2 - 3x + 2}{x^3 - 4x}$$

(۲)

الف) $2x^2 - 3x + 2 \neq 0 \rightarrow x(2x - 3) \neq 0 \rightarrow x \neq 0, 2, -2 \rightarrow D_f = \mathbb{R} - \{0, 2, -2\}$

ب) $\sqrt{\frac{2x^2 - 3x + 2}{x^3 - 4x}} \geq 0 \rightarrow \frac{2x^2 - 3x + 2}{x^3 - 4x} \geq 0$

Number line for $\frac{2x^2 - 3x + 2}{x^3 - 4x} \geq 0$:
 -2, 0, 2
 - + - +
 $D_f = (-2, 0) \cup (2, +\infty)$

۴)

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

Number line for $\frac{x-2}{x^4 - 2x^2 - 1} \geq 0$:
 -2, 2
 - + - +
 $D = (-2, 2) \cup (2, +\infty)$

(۲)

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

۳) $-x \geq 2 \rightarrow [-x] = 2$
 $-3 < x \leq -2 \rightarrow D = \mathbb{R} - (-3, -2]$

8)

a) $f(x) = \frac{\sqrt{x(x^2-1)}}{\sqrt{|x|+x}}$ $\rightarrow \begin{cases} x(x^2-1) \geq 0 \rightarrow \frac{-1}{-1} \leq \frac{0}{-1} \leq \frac{1}{-1} \rightarrow D = [-1, 0] \cup [1, +\infty) \\ |x|+x > 0 \rightarrow |x| > -x \rightarrow D = (0, +\infty) \end{cases}$ (r)

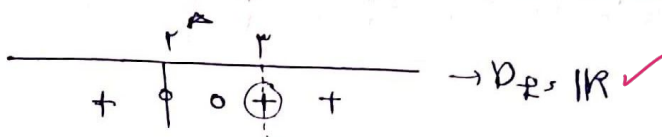
$\rightarrow D_f = [1, +\infty)$ ✓

b) $f(x) = \frac{\sqrt{|x-1|-x^2}}{|x|-1}$ $\rightarrow \begin{cases} |x-1|-x^2 \geq 0 \rightarrow \begin{cases} x > 1: -x^2+x-1 \geq 0 \rightarrow \Delta < 0 \rightarrow \text{no solution} \\ x < 1: -x^2-x+1 \geq 0 \rightarrow 0 \geq x^2+x-1 \rightarrow \frac{-1}{-1} \leq \frac{0}{-1} \leq \frac{1}{-1} \rightarrow D = [-1, 1] \end{cases} \\ |x| \neq 1 \rightarrow x \neq \pm 1 \end{cases}$

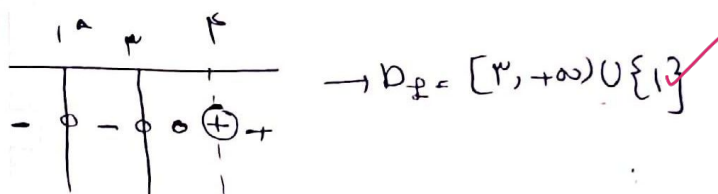
$\rightarrow D_f = [-1, 1] - \{-1\}$ ✓

9)

a) $y = \sqrt{(x-2)(x-7)}$
 $(x-2)(x-7) \geq 0$

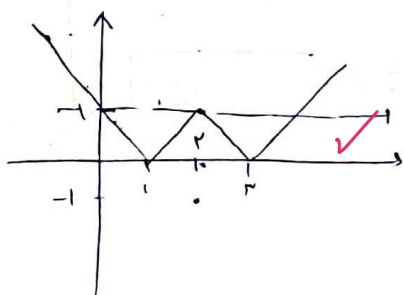


b) $y = \sqrt{|x-1|(x-3)}$
 $|x-1|(x-3) \geq 0$



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

$||x-1|-1|-k \neq 0 \rightarrow ||x-1|-1| \neq k$
 قطع عند $|x-1|-1 = k$ و $|x-1|-1 = -k$



(r)

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

$\begin{cases} x^2+x+1 \neq 0 \rightarrow (x+1)(x+1) \neq 0 \rightarrow x \neq -1 \\ x+1 \neq 0 \rightarrow x \neq -1 \\ x-1 \neq 0 \rightarrow x \neq 1 \end{cases}$

$x \neq -1$
 $x \neq 1$

$x^2 - 1x^2x + 1x^2 = 0 \rightarrow x^2 - 9x + 9 = 0 \rightarrow (x-3)^2 = 0 \rightarrow x = 3$
 قطع عند $x=3$ ✓

(r)

9)

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

$$\left\{ \begin{array}{l} x > 0, x \neq 1 \\ \log_n \frac{1}{x} > 0 \rightarrow \frac{1}{x} < 1 \rightarrow x < 1 \\ x+1 > 0 \rightarrow x > -1 \\ x+1 \neq 1 \rightarrow x \neq 0 \end{array} \right. \rightarrow D_f = (0, 1) \checkmark$$

(r)

10)

$$D_{f(x)} = [-\omega, \pi]$$

$$f(x) = \log(x^2 - 1)$$

$$\begin{aligned} x^2 - 1 > -\omega &\rightarrow x^2 > -\pi \\ \frac{x}{\pi} > x^2 &\rightarrow \frac{x\sqrt{\pi}}{\pi} > x > -\frac{x\sqrt{\pi}}{\pi} \end{aligned}$$

(r)

$$D_{f(x)} = \left[-\frac{x\sqrt{\pi}}{\pi}, \frac{x\sqrt{\pi}}{\pi} \right] \checkmark$$