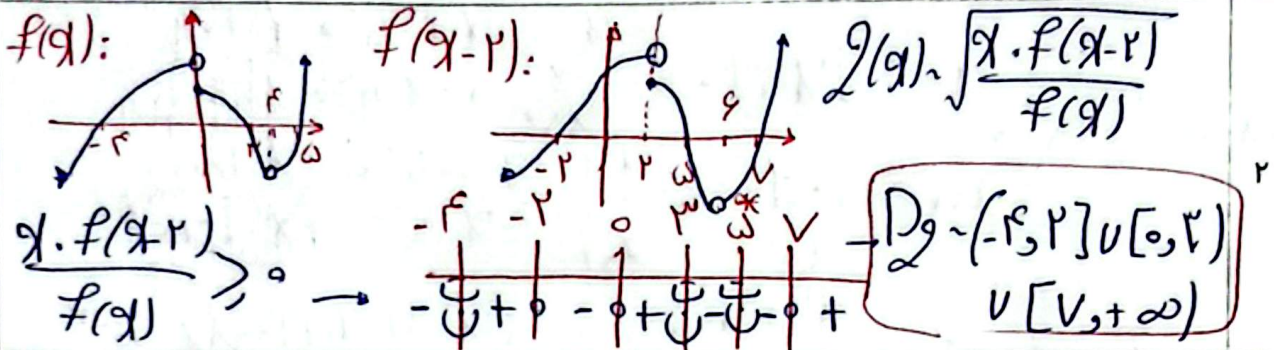


$$\begin{aligned}
 & \begin{cases} x^2 - 1 \geq 0 \\ -x^2 \geq 1 \end{cases} \rightarrow \begin{cases} x^2 - 1 \geq 0 \\ -x^2 \geq 1 \end{cases} \rightarrow \begin{cases} x^2 - 1 \geq 0 \\ -x^2 \geq 1 \end{cases} \rightarrow \begin{cases} x^2 - 1 \geq 0 \\ -x^2 \geq 1 \end{cases} \\
 & 0 \rightarrow x^2 - 1 \rightarrow -1 \rightarrow x^2 \geq 1 \rightarrow x \leq -1 \text{ or } x \geq 1 \\
 & 1 \rightarrow -x^2 \rightarrow -1 \rightarrow x^2 \leq 1 \rightarrow -1 \leq x \leq 1
 \end{aligned}$$

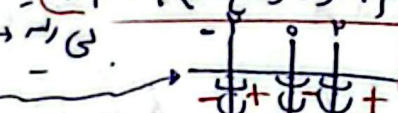
بابع است



$f(x) = \frac{2x^2 - 2x + 2}{x^3 - 1}$ $\rightarrow D_f \rightarrow x^3 - 1 \neq 0 \rightarrow x^3 - 1 = 0$

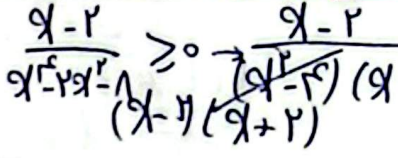
$x \neq 0, 2, -2 \rightarrow x(x-2)(x+2) = x(x^2 - 4)$

$f'(x) = \frac{2x^2 - 2x + 2}{x^3 - 1}$ $\rightarrow D_f = \mathbb{R} - \{0, 2, -2\}$

$\frac{2x^2 - 2x + 2}{x(x-2)(x+2)} \geq 0 \rightarrow$ 

$D_f = (-2, 0) \cup (2, \infty)$

$g(x) = \sqrt{\frac{x-2}{x^5 - 2x^2 - 1}}$ $\rightarrow \frac{x-2}{x^5 - 2x^2 - 1} \geq 0$

$\frac{x-2}{(x-1)(x+2)} \geq 0$ $\rightarrow$ 

$D_g = (-2, 1) \cup [2, \infty)$

$g(x) = \frac{2x^2 + 1}{x^2 - 2}$ $\rightarrow x^2 - 2 \neq 0 \rightarrow x^2 - 2 = 0$

$x^2 - 2 = 0 \rightarrow x = \pm \sqrt{2}$

$D_g = \mathbb{R} - \{\pm \sqrt{2}\}$

$f(x) = \sqrt{x(x^2 - 1)}$ $\rightarrow x(x+1)(x-1) \geq 0$

$|x| + x > 0 \rightarrow x > 0$

$D_f = [1, \infty)$

$f(x) = \sqrt{|x-2| - x^2}$ $\rightarrow |x-2| - x^2 \geq 0$

$|x-2| - x^2 \geq 0 \rightarrow x^2 - |x-2| \leq 0$

$|x-2| - x^2 \geq 0 \rightarrow x^2 - |x-2| \leq 0$

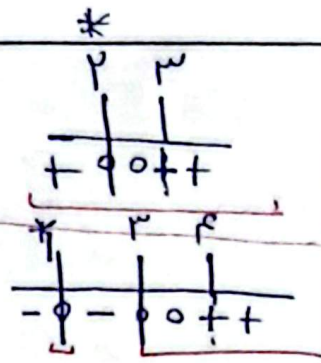
$D_f = [-2, 1) \cup [2, \infty)$

الف) $\sqrt{(x-1)(x-2)} \rightarrow (x-1)(x-2) \geq 0$
 $x-1 \geq 0 \rightarrow x \in [1, 2]$

$D_f: \mathbb{R}$

ب) $\sqrt{|x-1|(x-2)} \rightarrow |x-1|(x-2) \geq 0$
 $x=1 \rightarrow x \in [1, 2]$

$D_f: [1, 2] \cup \{1\}$



2. $\frac{1}{||x-1|-1|-k}$ $k+1, 1-k \rightarrow 2k-1 \rightarrow k=1 \rightarrow \cup \cup \mathbb{R}$
 $k-1, 1+k \rightarrow 2k-1 \rightarrow k=1 \rightarrow \cup \cup \mathbb{R}$

$||x-1|-1|-k$
 $x \geq 1 \rightarrow |x-1|-1-k \rightarrow x-1-1-k \rightarrow x-2-k \rightarrow x \geq 2+k$
 $x < 1 \rightarrow 1-x-1-k \rightarrow -x-k \rightarrow x \leq -1-k$
 $x \geq 1 \rightarrow |x-1|-1-k \rightarrow x-1-1-k \rightarrow x-2-k \rightarrow x \geq 2+k$
 $x < 1 \rightarrow 1-x-1-k \rightarrow -x-k \rightarrow x \leq -1-k$

$f(x) = \frac{x^2+3x+2}{x^2+3x+2} \rightarrow x^2+3x+2 \neq 0 \rightarrow (x+1)(x+2) \rightarrow x \neq -1, -2$
 $\frac{x+1}{x-1} \rightarrow \frac{x+1}{x-1} \neq 0 \rightarrow x \neq -1 \rightarrow D_f: \mathbb{R} - \{-1, -2\}$
 $x \neq 1 \rightarrow x-1 \neq 0$

$x^2-6x+9 = 0 \rightarrow (x-3)^2 = 0 \rightarrow x=3$

3. $\log_{x+1} \frac{1}{x^2} \rightarrow x > 0, x \neq 1$
 $\log_{x+1} \frac{1}{x^2} > 0 \rightarrow x+1 > 0, x+1 \neq 1 \rightarrow x > -1$
 $x \neq 0$
 $0 < x < 1$

$D_f: (0, 1)$

$D_{f(x)} [-\omega, \omega], D_{f(x^2-1)}? \rightarrow D_{f(x)} [-\frac{\sqrt{r}}{r}, \frac{\sqrt{r}}{r}]$

$\rightarrow r x^2 - 1 \in [-\omega, \omega] \rightarrow -\omega \leq r x^2 - 1 \leq \omega$
 $-\frac{\omega}{r} \leq x^2 \leq \frac{\omega}{r} \rightarrow -\frac{\sqrt{\omega}}{\sqrt{r}} \leq x \leq \frac{\sqrt{\omega}}{\sqrt{r}}$