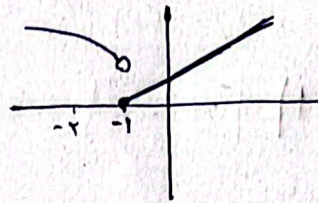


$$y = \begin{cases} \frac{x+1}{x} & x \geq -1 \\ \sqrt{-x} & x < -1 \end{cases}$$



۱- تابع است

$$\begin{array}{cccccccc} -4 & -2 & 0 & 2 & 4 & 6 & 8 & 10 \\ -\frac{1}{4} & +\frac{1}{2} & -\frac{1}{4} & +\frac{1}{2} & -\frac{1}{4} & +\frac{1}{2} & -\frac{1}{4} & +\frac{1}{2} \end{array}$$

$$D_f = (-4, -2] \cup [0, 2) \cup (4, 6) \cup (6, 8] \cup [10, +\infty)$$

۲- الف) $x^3 - 4x \neq 0 \Rightarrow x(x^2 - 4) \neq 0 \Rightarrow D_f = \mathbb{R} - \{0, \pm 2\}$

ب) $\frac{2x^2 - 3x + 2}{x^3 - 4x} \geq 0$ $\frac{-2 \quad 0 \quad 2}{-\frac{1}{2} \quad +\frac{1}{2} \quad +\frac{1}{2}}$ $D_f = (-2, 0) \cup (2, +\infty)$

۳- الف) $\frac{x-2}{x^2-2x+1} \geq 0 \Rightarrow \frac{x-2}{(x^2-4)(x^2+2)} \geq 0$ $\frac{-2 \quad 2}{-\frac{1}{2} \quad +\frac{1}{2} \quad +\frac{1}{2}}$ $D_f = (-2, 2) \cup (2, +\infty)$

ب) $4 - 2[-x] \neq 0 \Rightarrow 4 \neq 2[-x] \Rightarrow [-x] \neq 2 \Rightarrow -x \neq [2, 3] \Rightarrow x \neq (-3, -2] \Rightarrow D_f = \mathbb{R} - (-3, -2]$

۴- الف) $x(x^2-1) \geq 0$ $\frac{-1 \quad 0 \quad 1}{-\frac{1}{2} \quad +\frac{1}{2} \quad -\frac{1}{2}}$ (۱)
 $|x| + x > 0 \Rightarrow |x| > -x \Rightarrow x > 0$ (۱۱) $\xrightarrow{(۱) \cap (۱۱)} D_f = [1, +\infty)$

ب) $|x-2| - x^2 \geq 0$

صفر از منتهی $x \rightarrow$
 $\begin{cases} -x^2 + x - 2 \geq 0 & x \geq 2 \\ -x^2 - x + 2 \geq 0 & x < 2 \end{cases}$ $\frac{-2 \quad 0}{-1 \quad +1} \Rightarrow -2 \leq x \leq 0$ (۱)

(۱۱) $|x| - 1 \neq 0 \Rightarrow |x| \neq 1 \Rightarrow x \neq \pm 1$

$\xrightarrow{(۱) \cap (۱۱)} D_f = [-2, -1) \cup (-1, 0]$

$$(الف) (x-2) [x-2] \geq 0 \quad \checkmark \Rightarrow D_f = R$$

x و $[x]$ هم علامتند

$$ب) \underbrace{|x-1|}_{\text{عدد +}} [x-3] \geq 0 \quad \frac{-3}{-1} \quad D_f = [3 + \infty)$$

$$|x-2| - 1 \neq k \Rightarrow ||x-2| - 1| \neq k$$

$$|x-2| - 1 \neq \pm k \Rightarrow |x-2| - 1 \neq \pm 1$$

$$\Rightarrow |x-2| \neq 0 \Rightarrow x-2 \neq \pm 2$$

$$\Rightarrow x \neq \begin{matrix} 0 \\ \swarrow \searrow \\ 2 \end{matrix} \Rightarrow \boxed{k=1}$$

$$\left. \begin{aligned} x^2 + 3x + 2 &\neq 0 \Rightarrow x \neq -1, 2 \\ x+1 &\neq 0 \Rightarrow x \neq -1 \\ x-1 &\neq 0 \Rightarrow x \neq 1 \end{aligned} \right\} n=3$$

$$x^2 - 4x + 9 = 0 \Rightarrow \Delta = 0 \Rightarrow \boxed{\text{یک ریشه حقیقی}}$$

$$\left. \begin{aligned} x+1 &> 0 \Rightarrow x > -1 \\ x+1 &\neq 1 \Rightarrow x \neq 0 \\ x &> 0 \\ x &\neq 1 \end{aligned} \right\} D_f = R^+ - \{1\}$$

$$\begin{aligned} -5 &\leq 3x^2 - 1 \leq 3 \\ 3x^2 &\geq -4 \quad \checkmark \\ 3x^2 &\leq 4 \Rightarrow x^2 \leq \frac{4}{3} \Rightarrow -\frac{2}{\sqrt{3}} \leq x \leq \frac{2}{\sqrt{3}} \\ \Rightarrow D_{f(x)} &= \left[-\frac{2}{\sqrt{3}}, \frac{2}{\sqrt{3}} \right] \end{aligned}$$