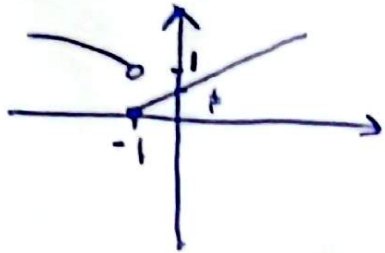
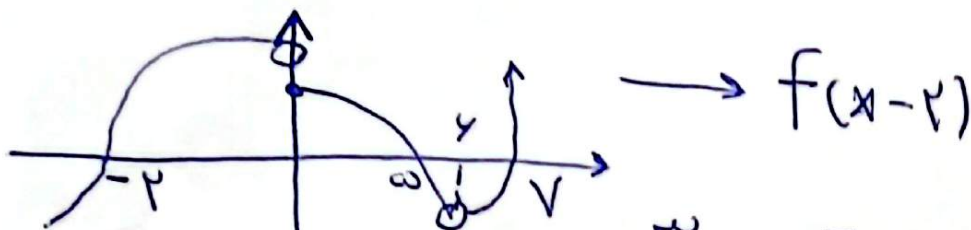


$$x = \begin{cases} 3y-1 & y \geq 0 \\ -y^2 & y < 0 \end{cases} \Rightarrow y = \begin{cases} \frac{x+1}{3} & x \geq -1 \\ \sqrt{-x} & x < -1 \end{cases}$$

-۱



یا توجه به شکل تابع است



-۲

x	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8
f(x-2)	-	-	0	+	+	+	+	0	-	0	-	0	+
f(x)	0	+	+	+	0	-	0	-	0	+	+	+	+
$\frac{x f(x-2)}{f(x)}$	0	+	0	-	0	+	-	0	-	0	-	0	+

$$D_f = [-2, -1] \cup [0, 1] \cup [2, 3] \cup [5, 6]$$

$$x^3 - 4x = 0 \rightarrow (x)(x^2 - 4) = 0$$

۳ - الف)

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

$$x^3 - 4x + 2 \rightarrow \Delta(0) \rightarrow \text{پیش‌نماد}$$

ب)

$$\rightarrow x^3 - 4x > 0 \rightarrow (x)(x-2)(x+2) > 0$$

$$\begin{array}{c} -2 \quad 0 \quad 2 \\ - \quad + \quad - \quad + \end{array}$$

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

الف) $\frac{x-2}{x^3-2x^2-1} \geq 0 \rightarrow \frac{x-2}{(x^2-1)(x+2)} \geq 0$

ب)

$$\rightarrow \frac{x-2}{(x-1)(x+1)(x+2)} \geq 0 \quad \begin{array}{c} -2 \quad 1 \quad 2 \\ - \quad + \quad - \quad + \end{array}$$

$$D_f = (-2, +\infty) - \{1\}$$

ب) $1-2[-x] = 0 \rightarrow 1 = [-x] \rightarrow 1 \leq -x$

$$\rightarrow -1 \leq x \leq -2$$

~~$$D_f = [-1, -2]$$~~

$$D_f = \mathbb{R} - (-2, -1]$$

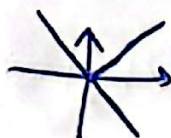
الف) $(x)(x+1)(x-1) \geq 0$

$$\begin{array}{c} -1 \quad 0 \quad 1 \\ - \quad + \quad - \quad + \end{array}$$

ب)

$$D = [-1, 0] \cup [1, +\infty) \cup \{0\}$$

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



$$\rightarrow x > 0 \rightarrow D = (0, +\infty) \cup \{0\}$$

$$D_f = \mathbb{N} \cup \{0\} = [0, +\infty)$$

$$\bullet) |x-y| - x^2 \geq 0$$

$$\rightarrow |x-y| \geq x^2$$

$$\rightarrow -x+y = x^2$$

$$\rightarrow x^2 + x - y = 0$$

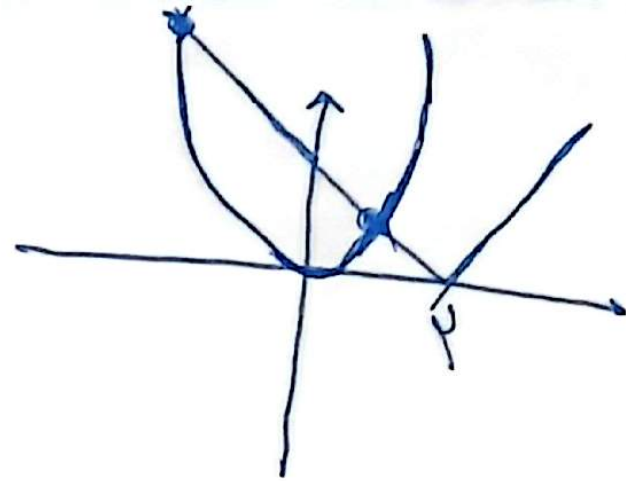
$$\rightarrow (x+y)(x-1) = 0 \begin{cases} \rightarrow x = -y \\ \rightarrow x = 1 \end{cases}$$

$$\rightarrow D = [-2, 1] \quad I$$

$$|x|-1 \neq 0 \rightarrow |x| \neq 1 \rightarrow x \neq \pm 1$$

$$D = \mathbb{R} - \{\pm 1\} \quad II$$

$$D_f = I \cap II \rightarrow [-2, 1) - \{-1\}$$



(c)

ا) $[x-2]=0 \rightarrow x-2 < 1 \rightarrow 1 < x < 3$

$\begin{array}{c} \star \quad \mu \\ \hline + \quad \phi \quad 0 \quad + \quad + \end{array} \rightarrow D_f = \mathbb{R}$

ب) $[x-\mu]=0 \rightarrow 0 < x-\mu < 1 \rightarrow \mu < x < \mu+1$

$|x-1| [x-\mu] \geq 0$
 $\begin{array}{c} 1 \quad \mu \quad \mu \\ \hline - \phi - \phi \quad 0 \quad + \quad + \end{array}$

$D_f = [\mu, \mu+1) \cup \{1\}$

$$|x - y - 1| = k \quad \begin{cases} \rightarrow |x - y| = k + 1 & \begin{cases} \rightarrow x = k + y \\ \rightarrow x = -k + y \end{cases} \\ \rightarrow |x - y| = -k + 1 & \begin{cases} \rightarrow x = -k + y \\ \rightarrow x = k + y \end{cases} \end{cases}$$

$$-k + y = k + 1 \\ \Rightarrow \boxed{k = 1}$$

با استعاره کردن تساوی های متفاوت ←

$$x^2 + 3x + 2 = 0 \rightarrow (x+2)(x+1) = 0 \begin{cases} \rightarrow x = -1 \\ \rightarrow x = -2 \end{cases}$$

(۸)

$$\frac{x+1}{x-1} = 0 \rightarrow x = -1$$

$$x \neq -19-99$$

$$x-1 = 0 \rightarrow x = 1$$

$$\Rightarrow n = 3$$

$$x^2 - 4x + 9 = 0 \rightarrow (x-3)^2 = 0 \Rightarrow x = 3$$

یک ریشه دارد

$$\left. \begin{aligned} x+1 > 0 &\rightarrow x > -1 \\ x+1 \neq 1 &\rightarrow x \neq 0 \end{aligned} \right\} \Rightarrow D = (-1, +\infty) - \{0\} \mathbb{I}$$

-9

$$\log \frac{1}{x} > 0 \rightarrow \log x < 0 \rightarrow \log \frac{x}{1} < 0$$

$$\log \frac{x}{1} < 0 \rightarrow x < 1 \mathbb{I} \rightarrow P_f = \mathbb{I} \cap \mathbb{I} \cap \mathbb{I} \cap \mathbb{I} = (0, 1)$$

$$\log \frac{1}{x} < 0 \rightarrow x > 0 \mathbb{I} \mathbb{I} \mathbb{I} \\ x \neq 1$$

$$-1 < x < 2 \rightarrow 9 \leq x^2 \leq 25 \rightarrow 25 \leq x^2 \leq 25$$

-10

$$\rightarrow 25 \leq x^2 - 1 \leq 25 \rightarrow D_{f(x^2-1)} = [25, 25]$$