

$$x = \begin{cases} 3y-1, & x \geq 0 \\ -y^2, & x < 0 \end{cases} \rightarrow \begin{cases} 3y-1 = -y^2 \\ y^2+3y-1=0 \end{cases} \rightarrow \frac{-3 \pm \sqrt{9+4}}{2}$$

هیچ یک از این اعداد در y نمی توان کرد
پس برای هیچ y ای، x یکسانی نخواهیم داشت.
تابع است ✓
+ تابع قائم از روی هم شکل نیز خواهد بود

$$f(x-2)=0 \quad x = -2, 0, 2$$

	-4	-2	0	2	4	+
x	-	-	-	+	+	+
$f(x-2)$	-	-	+	+	+	+
$f(x)$	-	+	+	+	-	+
$x f(x-2)$	-	+	-	+	-	+
$f(x)$	-	+	+	+	-	+

$$\frac{x f(x-2)}{f(x)} \geq 0 \quad D_f = (-4, -2] \cup [0, 2) \cup [4, +\infty)$$

$$\left. \begin{aligned} x^2-4x \neq 0 \\ x(x-2)(x+2)=0 \end{aligned} \right\} x \neq 0, 2, -2 \quad D_f(x) = \mathbb{R} - \{-2, 0, 2\}$$

$$\text{ب) } \frac{4x^2-3x+2}{x(x-2)(x+2)} \geq 0 \rightarrow \frac{-2 \quad 0 \quad 2}{-\frac{1}{2} \quad \frac{1}{2} \quad \frac{1}{2}} \rightarrow D_{\sqrt{f(x)}} = (-2, 0) \cup (2, +\infty)$$

$$\text{الف) } \frac{x-2}{x^2-2x^2-1} \geq 0 \rightarrow \frac{-2 \quad 2}{-\frac{1}{2} \quad \frac{1}{2} \quad \frac{1}{2}} \rightarrow D = (-2, +\infty) - \{2\}$$

$$\frac{(x^2-4)(x^2+2)}{(x-2)(x+2)(x^2+2)} \geq 0$$

$$\text{ب) } \left. \begin{aligned} -2 < x \leq -2 \\ 2 \leq -x < 2 \end{aligned} \right\} x \neq [-2] \quad D = \mathbb{R} - (-2, 2]$$

$$\text{الف) } x(x-1)(x+1) \geq 0 \rightarrow \frac{-1 \quad 0 \quad 1}{-\frac{1}{2} \quad \frac{1}{2} \quad \frac{1}{2}} \rightarrow [-1, 0] \cup [1, +\infty) \text{ (I)}$$

$$|x| + x > 0 \rightarrow (0, +\infty) \text{ (II)}$$

$$I \cap II \rightarrow D_f = [1, +\infty)$$

$$\text{ب) } |x|-1 \neq 0 \rightarrow x \neq 1, -1 \text{ (I)}$$

$$|x-2|-x^2 \geq 0 \rightarrow \begin{cases} -x^2+x-2, & x \geq 2 \\ -x^2-x+2, & x < 2 \end{cases} \rightarrow \frac{-2 \quad 1}{-\frac{1}{2} \quad \frac{1}{2} \quad \frac{1}{2}} \rightarrow [-2, 1] \text{ (II)}$$

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

$$(x-2)[x-2] \geq 0 \rightarrow \frac{2}{+} \frac{2}{-} \frac{2}{+} \rightarrow D = \mathbb{R}$$

⑤ $[x]=2$
 $2 \leq x < 3$

$$b) |x-1|[x-2] \geq 0 \rightarrow \frac{1}{-} \frac{2}{-} \frac{2}{+} \rightarrow D = [2, +\infty) \cup \{1\}$$

① $[x]-2=0$
 $[x]=2$
 $2 \leq x < 3$

$$||x-2|-1| + (-k) = 0$$

$\frac{+}{+} \frac{-}{-}$

$-k \leq 0 \rightarrow \boxed{k \geq 0}$

$|x-2| \neq 1+k$ $\rightarrow$ $x \neq 2+k$ $\rightarrow$ $k=-1$ $\frac{2}{-}$ $k < 0$ (X)

$|x-2| \neq 1-k$ $\rightarrow$ $x \neq 1-k$ $\rightarrow$ $k=0$ $\frac{2}{-}$ $k \geq 0$ (X)

$|x-2| \neq 1-k$ $\rightarrow$ $x \neq 2-k$ $\rightarrow$ $k=0$ $\frac{2}{-}$ $k \geq 0$ (X)

$|x-2| \neq 1-k$ $\rightarrow$ $x \neq 1+k$ $\rightarrow$ $k=1$ $\frac{2}{-}$ $k \geq 0$ (✓)

$\boxed{k=1}$

$$\frac{(x+2)(x+1)}{(x+2)(x+1)} \neq 0$$

$\frac{x+1}{x-1} \neq 0 \rightarrow x \neq -2, -1, 1$

$\frac{x+1}{x-1} \neq 0 \rightarrow \boxed{n=2} \rightarrow x^2 - 6x + 9 = 0$

$(x-3)^2$

③ $\rightarrow$ که همیشه صاف

$$y = \log \log^{\frac{1}{x}} x+1$$

$\left. \begin{array}{l} x \neq 1 \\ x > 0 \\ x+1 \neq 1 \rightarrow x \neq 0 \\ x+1 > 0 \rightarrow x > -1 \end{array} \right\} \xrightarrow{n} D = (0, 1)$

$\log^{\frac{1}{x}} x > 0$

$\begin{array}{l} 0 < x < 1 \rightarrow \frac{1}{x} < x^0 \quad \frac{1}{x} < 1 \quad (✓) \\ x > 1 \rightarrow \frac{1}{x} > x^0 \quad \frac{1}{x} > 1 \quad (X) \end{array}$

$$D_{f(x)} = [-5, 3] \rightarrow -5 \leq x \leq 3 \rightarrow 9 \leq x^2 \leq 16 \rightarrow 3 \leq x \leq 4 \rightarrow \boxed{3 \leq x^2-1 \leq 15}$$

$\rightarrow D_{f(x^2-1)} = [3, 15]$