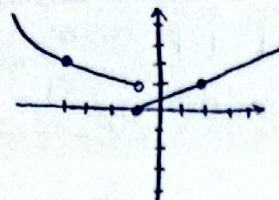


$$x = \begin{cases} 3y-1 & y \geq 0 \\ -y^2 & y > 1 \end{cases}$$



این رابطه یک تابع است به دلیل اینکه هیچ خط عمودی در دو نقطه ای تابع را قطع نمی کند.

۱- به شکل رسم شل

$$x = \begin{cases} 3y-1 & y \geq 0 \\ -y^2 & y > 1 \end{cases} \rightarrow x = 3y-1 \Rightarrow y = \frac{x+1}{3} \rightarrow y = \begin{cases} \frac{x+1}{3} & x \geq -1 \\ \sqrt{-x} & x < -1 \end{cases} \leftarrow \text{تابع است}$$

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

$$D_{f(x)} = \mathbb{R} - \{2\} \rightarrow D_{f(x-2)} = \mathbb{R} - \{4\}$$

$$D_{g(x)} = (-\infty, 2) \cup (0, 4) \cup (4, +\infty)$$

	-2	-1	0	1	2	3	4
x	-	-	-	0	+	+	+
f(x-2)	-	-	0	+	+	+	0
f(x)	-	+	+	+	+	-	+
g(x)	-	+	0	-	+	-	+

$$a) f(x) = \frac{2x^2 - 3x + 2}{x^2 - 4} \rightarrow x^2 - 4x = 0 \Rightarrow x(x-4) = 0 \rightarrow D_{f(x)} = \mathbb{R} - \{0, 4\}$$

$$b) \sqrt{f(x)} = \sqrt{\frac{2x^2 - 3x + 2}{x^2 - 4}} \rightarrow \Delta < 0 \Rightarrow x^2 - 4x > 0 \Rightarrow x(x-4) > 0 \Rightarrow D_{\sqrt{f(x)}} = (-\infty, 0) \cup (4, +\infty)$$

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

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

$$b) y = \frac{2x^2 + 1}{x - 2[-x]} \rightarrow x - 2[-x] = 0 \Rightarrow x = 2[-x] \Rightarrow x = -2x \Rightarrow x = 0 \rightarrow D = \mathbb{R} - [-2, -1]$$

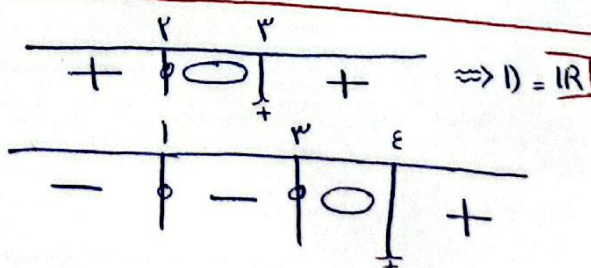
$$f(x) = \frac{\sqrt{x(x^2 - 1)}}{\sqrt{|x| + x}} \rightarrow \begin{cases} x(x^2 - 1) \geq 0 \Rightarrow [-1, 0] \cup [1, +\infty) \\ |x| + x > 0 \Rightarrow x < 0 \Rightarrow x + (-x) = 0 \times \\ x > 0 \Rightarrow x + x = 2x \Rightarrow x > 0 \Rightarrow x > 0 \end{cases} \rightarrow D_{f(x)} = [1, +\infty)$$

$$b) f(x) = \frac{\sqrt{|x-2| - x^2}}{|x+1| - 1} \rightarrow \begin{cases} |x-2| - x^2 \geq 0 \Rightarrow x = \pm 1 \\ |x-2| - x^2 \geq 0 \Rightarrow -x^2 - x + 2 \geq 0 \Rightarrow x^2 + x - 2 \leq 0 \Rightarrow (x+2)(x-1) \leq 0 \Rightarrow x \in [-2, 1] \end{cases}$$

$$a) y = \sqrt{(x-2)[x-3]} \rightarrow (x-2)[x-3] \geq 0 \rightarrow$$

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

$$\Rightarrow D = [3, +\infty) \cup \{1\}$$



$$||x-y|-1|-k=0 \Rightarrow ||x-y|-1|=k \Rightarrow |x-y|-1=k \Rightarrow |x-y|=k+1 \Rightarrow x-y=k+1 \Rightarrow x=1+k$$

$$k > 0 \Rightarrow |x-y|-1=-k \Rightarrow |x-y|=1-k \Rightarrow x-y=1-k \Rightarrow x=y-k$$

$$x-y=k-1 \Rightarrow x=k+1$$

$$x+k=k+1 \Rightarrow x=1$$

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

$$f(x) = \frac{x^2 + x^2 + x^2}{x^2 + x^2 + x^2} = \frac{x^2 + x^2 + x^2}{x^2 + x^2 + x^2} \Rightarrow \left\{ \begin{array}{l} x^2 + x^2 + x^2 = 0 \rightarrow (x+1)(x+1) = 0 \Rightarrow x \neq -1, -1 \\ x-1=0 \rightarrow x \neq 1 \\ \frac{x+1}{x-1} = 0 \rightarrow x \neq -1 \end{array} \right\} \rightarrow D = \mathbb{R} - \{-1, \pm 1\}$$

$$x^2 - y^2(x+y) = x^2 - 9x + 9 = 0 \Rightarrow x = \frac{9 \pm \sqrt{81-36}}{2} = \frac{9 \pm \sqrt{45}}{2}$$

$$y = \log x + 1 \log \frac{y}{x} \Rightarrow \left\{ \begin{array}{l} x > 0, x \neq 1 \\ x+1 > 0 \Rightarrow x > -1 \end{array} \right\} \cap \rightarrow D = (0, +\infty) - \{1\} = (0, 1) \cup (1, +\infty)$$

$$f(x) \quad D_{f(x)} = [-\infty, 3] \Rightarrow -\infty < x \leq 3 \Rightarrow 0 \leq x^2 \leq 9 \Rightarrow 0 \leq x^2 \leq 9$$

$$D_{f(x^2-1)} = \boxed{[-1, 9]} \Rightarrow -1 \leq x^2-1 \leq 9$$