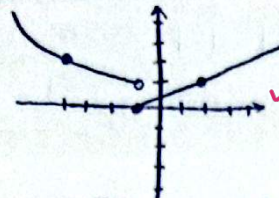


$$x = \begin{cases} 3y-1 & y \geq 0 \\ -y^2 & y > 1 \end{cases}$$



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

۱۷/۵

۱- به کار رسم شکل

(۲)

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

$$x = 3y-1 \Rightarrow y = \frac{x+1}{3}$$

$$x = -y^2 \Rightarrow -x = y^2 \Rightarrow y = \sqrt{-x}$$

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

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

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

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

	-۲	-۱	۰	۱	۲	۳	۴
x	-	-	-	+	+	+	+
f(x-2)	-	-	+	+	+	+	+
f(x)	-	+	+	+	-	+	+
g(x)	-	+	+	+	-	+	+

(۲)

$$a) f(x) = \frac{2x^2 - 3x + 2}{x^2 - 4x} \Rightarrow 2x^2 - 3x + 2 = 0 \Rightarrow x(2x - 3) = 0 \Rightarrow D_{f(x)} = \mathbb{R} - \{0, 1.5\}$$

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

(۲)

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

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

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

(۲)

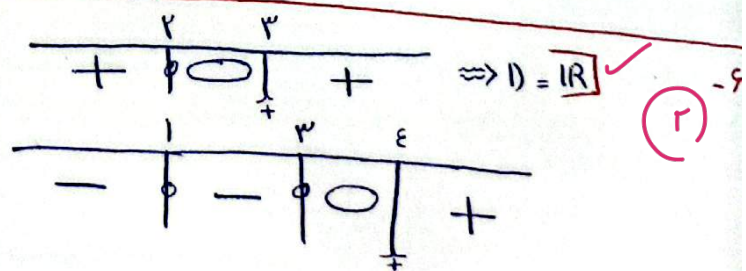
$$f(x) = \frac{\sqrt{x(x^2 - 1)}}{\sqrt{|x| + x}} \Rightarrow \begin{cases} x(x^2 - 1) \geq 0 \Rightarrow \frac{-1}{x} + \frac{0}{x} - \frac{1}{x} \geq 0 \Rightarrow [-1, 0] \cup [1, +\infty) \\ |x| + x > 0 \Rightarrow \begin{cases} x < 0 \Rightarrow x + (-x) = 0 \times \\ x > 0 \Rightarrow x + x = 2x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

(۲)

$$b) f(x) = \frac{\sqrt{|x-2| - x^2}}{|x+1| - 1} \Rightarrow \begin{cases} |x-2| - x^2 \geq 0 \Rightarrow \begin{cases} x < 2 \Rightarrow -x^2 - x + 2 \geq 0 \Rightarrow x^2 + x - 2 \leq 0 \Rightarrow (x+2)(x-1) \leq 0 \Rightarrow [-2, 1] \\ x \geq 2 \Rightarrow -x^2 + x - 2 \geq 0 \Rightarrow x^2 - x + 2 \leq 0 \Rightarrow \Delta < 0 \end{cases} \\ |x+1| - 1 \neq 0 \Rightarrow x \neq -2 \end{cases} \Rightarrow D_{f(x)} = [-2, 1] - \{-2\} \cup \{1\}$$

$$a) y = \sqrt{(x-2)[x-3]} \Rightarrow (x-2)[x-3] \geq 0 \Rightarrow D = \mathbb{R}$$

$$b) y = \sqrt{|x-1|[x-3]} \Rightarrow |x-1|[x-3] \geq 0 \Rightarrow D = [3, +\infty) \cup \{1\}$$



(۲)

$$||x-1|-1|-k=0 \Rightarrow ||x-1|-1|=k \Rightarrow |x-1|=k+1 \Rightarrow x=1+k \quad (2) \quad -V$$

$$k > 0 \Rightarrow |x-1|-1=-k \Rightarrow |x-1|=1-k \Rightarrow x-1=1-k \Rightarrow x=2-k$$

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

مثلاً $\Rightarrow x+k=k+1 \Rightarrow x=1$
 مثلاً $\Rightarrow x-k=k+1 \Rightarrow x=2k \Rightarrow \boxed{k=1}$ ✓

صفحه آخر...

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

(2) -A

$$x^2-x^2(x^2) + x^2(x^2) = x^2 - 9x + 9 = 0 \Rightarrow \frac{1}{(x-3)^2}$$

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

(1, 5) -B

$$f(x) \quad D_{f(x)} = [-5, 3] \Rightarrow -5 \leq x \leq 3 \Rightarrow 0 \leq x^2 \leq 15 \Rightarrow 0 \leq x^2 \leq 15$$

$$D_{f(x^2-1)} = [-1, 14] \Rightarrow -1 \leq x^2-1 \leq 14$$

0 -C

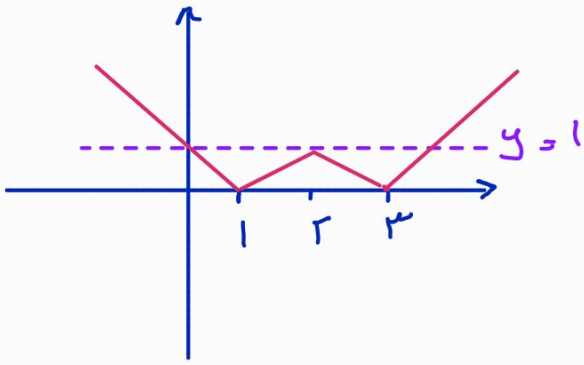
- 1) $x+1 > 0 \rightarrow x > -1$, $x+1 \neq 1 \rightarrow x \neq 0$ -9
- 2) $x > 0$, $x \neq 1$ $\Rightarrow D_f = (0, 1)$
- 3) $\log \frac{1}{x} > 0 \rightarrow 0 < x < 1$

1- دقت کنیم دامنه f یعنی مقادیری که تابع f می‌تونه بگیره پس $1-x^2$ باید در بازه $[-5, 3]$ قرار بگیرد:

$$-5 \leq 1-x^2 \leq 3 \rightarrow -4 \leq x^2 \leq 4 \rightarrow x^2 \leq 4 \rightarrow -\frac{4}{\sqrt{3}} \leq x \leq \frac{4}{\sqrt{3}}$$

$$\rightarrow -\frac{2\sqrt{3}}{3} \leq x \leq \frac{2\sqrt{3}}{3} \rightarrow D_{f(1-x^2)} = \left[-\frac{2\sqrt{3}}{3}, \frac{2\sqrt{3}}{3}\right]$$

$$||x-2|-1| = k \rightarrow \text{۳ ریشه دارد}$$



شکل تابع را با خط قطع مردهیم :

چون ۳ نقطه برخورد دارند پس $k = 1$ بوره!