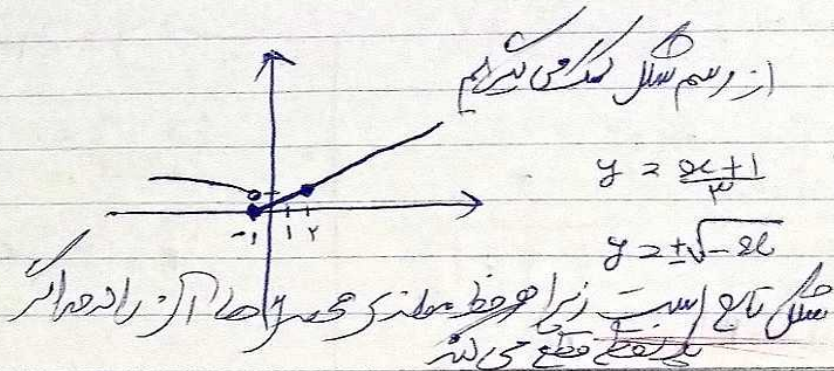
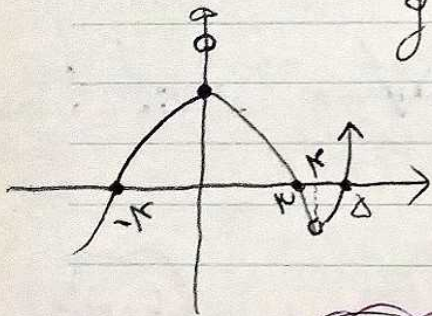


$$x \begin{cases} 3y - 1 & y \geq 0 \\ -y^2 & y > 1 \end{cases}$$



1



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

می بینیم که $f(x) \geq 0$ و $f(x-2) \geq 0$

$$f(x) = f(3) = f(-4) = 0$$

$$f(x-2) = f(1) = f(3) = f(-1) = 0$$

$$\begin{matrix} -4 & -2 & 0 & 2 & 4 \\ -\frac{1}{4} & -\frac{1}{2} & 0 & \frac{1}{2} & \frac{1}{4} \end{matrix}$$

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

2

$$f(x) = \frac{2x^2 - 3x + 2}{x^3 - 5x}$$

$$x^3 - 5x \rightarrow x(x^2 - 5) \rightarrow x(x-2)(x+2) \rightarrow x \neq \{0, 2, -2\}$$

$$D_{f(x)} = \mathbb{R} - \{0, 2, -2\}$$

$$D_{\sqrt{f(x)}} = \mathbb{R} - ((-\infty, -2] \cup [0, 2])$$

$$\frac{2x^2 - 3x + 2}{x^3 - 5x} \rightarrow \Delta < 0 \text{ و } \Delta > 0$$

$$\frac{-3 \pm \sqrt{17}}{4}$$

3

$$y = \sqrt{\frac{x-2}{x^6 - 2x^2 - 1}}$$

$$(x^2 - 1)(x^2 + 2)$$

$$\begin{matrix} -2 & 2^* \\ -\frac{1}{2} & +\frac{1}{2} \end{matrix} \rightarrow \mathbb{R} - ((-\infty, -2] \cup [2, +\infty))$$

$$y = \frac{2x^2 + 1}{x - 2[-x]}$$

$$x \neq 0 \rightarrow x - 2[-x] \neq 0$$

$$x \neq 2[-x] \rightarrow \mathbb{R} - [-2, 2]$$

$$x \neq [-x] \rightarrow \mathbb{R} - \{0\}$$

$$(x+2, 3) \neq -x \rightarrow x \neq 3, -2 \neq x$$

4

$$y = \sqrt{\frac{x(x^2 - 1)}{|x| + x}}$$

$$|x| + x > 0 \rightarrow \mathbb{R}^+$$

$$\begin{matrix} -1 & 0 \\ -\frac{1}{2} & +\frac{1}{2} \end{matrix} \rightarrow \mathbb{R} - \{0\}$$

Elegance

$$\mathbb{R} - \{0\}$$

$$y = \sqrt{\frac{|x-2| - x^2}{|x| - 1}}$$

$$|x| \neq 1 \rightarrow x \neq \pm 1 \rightarrow \mathbb{R} - \{1, -1\}$$

$$|x-2| - x^2 > 0$$

$$\frac{-2 \pm \sqrt{4 - 4x^2}}{2} \rightarrow \Delta < 0 \text{ و } \Delta > 0$$

5

6

$$a) y = \sqrt{(x-2)(x+3)}$$

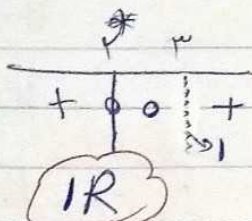
$$x-2 = 0 \rightarrow x=2$$

$$\{x+3\} \geq 0$$

$$\{x-2\} \geq 0$$

$$\{x\} \geq 2$$

$$x \in [2, +\infty)$$



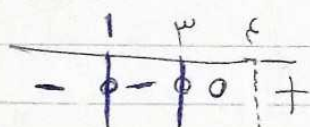
$$b) y = \sqrt{|x-1|(x-3)}$$

$$\{x-1\} \geq 0$$

$$\{x-3\} \geq 0$$

$$\{x\} \geq 3$$

$$x \in [3, +\infty)$$

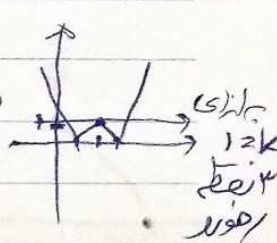
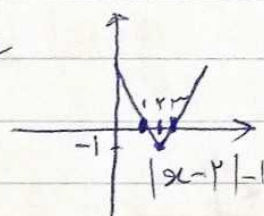


$$\{1\} \cup [3, +\infty)$$

7

$$y = \frac{1}{||x-2|-1|-k}$$

Pol: $\rightarrow$ شمس



$$\rightarrow k \geq 0 \quad ||x-2|-1| \geq k$$

$$|x-2|-1 \geq \pm k$$

$$|x-2| \geq k+1$$

$$|x-2| \geq k+1$$

$$\rightarrow k \geq 1 \rightarrow k \geq 1 \rightarrow k \geq 1$$

8

$$f(x) = \frac{x^2 + x + 1}{x^2 + x - 1} \rightarrow (x+1)(x+1) \rightarrow x+1 \rightarrow x \neq -1$$

$$x^2 + x + 1 = 0 \rightarrow x^2 - 4x + 9 = 0$$

9

$$y = \log_{\frac{1}{x}} \frac{1}{x}$$

$$\begin{aligned} x+1 &> 0 \\ x &> -1 \\ x+1 &\neq 1 \\ x &\neq 0 \end{aligned}$$

$$\begin{aligned} x &> 0 \\ x &\neq 1 \\ \log_{\frac{1}{x}} \frac{1}{x} &> 0 \end{aligned}$$

$$D_f = (0, 1)$$

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

$$D_f = [-2, 3]$$

$$D_f(x^2-1) = \left[-\frac{\sqrt{x}}{x}, \frac{\sqrt{x}}{x}\right]$$

$$D_f(x^2-1) = \emptyset$$

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

Elegance

$$\begin{aligned} x^2 &\leq \sqrt{x} \\ x &\leq \sqrt[4]{x} \\ -\frac{\sqrt{x}}{x} &\leq x \leq \frac{\sqrt{x}}{x} \end{aligned}$$