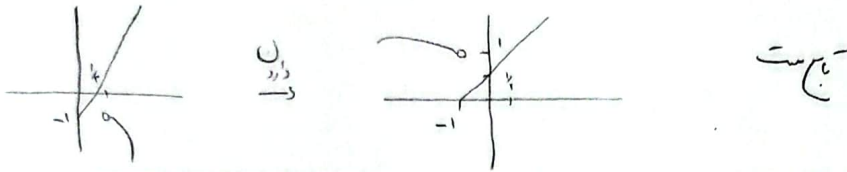
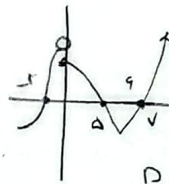
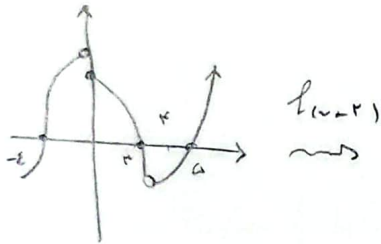
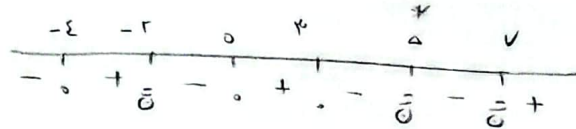


$$x = \begin{cases} x^2 - 1 & y > 0 \\ -x^2 & y < 0 \end{cases} \quad y = \begin{cases} x^2 - 1 & x > 0 \\ -x^2 & x < 0 \end{cases}$$

1



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



$$D_f = [-x, r] \cup [0, r] \cup (x, +\infty)$$

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

2

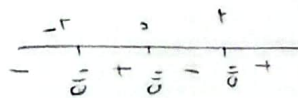
$$f(x) = \frac{x^2 - x^2 + r}{x^2 - x}$$

$$\sqrt{\frac{x^2 - x^2 + r}{x^2 - x}} \rightarrow \Delta < 0 \Rightarrow \frac{r}{x} > 0$$

$$x^2 - x \neq 0$$

$$x(x - r) \neq 0$$

$$D_f: \mathbb{R} - \{0, -r, r\}$$

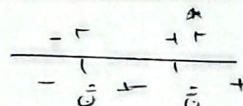


$$D_f = (-r, 0) \cup (r, +\infty)$$

3

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

$$\frac{x - r}{x^2 - x} \geq 0$$



$$\hookrightarrow x^2 \geq 0 \rightarrow \frac{x - r}{x} \geq 0 \Rightarrow x \geq r \text{ or } x \leq -r$$

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

4

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

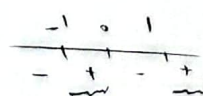
$$x - r[-x] \neq 0$$

$$D_f = \mathbb{R} - [-r, r]$$

$$x \neq r[-x] \Rightarrow [-x] \neq r \Rightarrow r \leq -x < r \Rightarrow -r \leq x < -r$$

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

$$\Rightarrow x(x^2 - 1) \geq 0$$



$$D_f = [1, +\infty)$$

$$|x| + x > 0 \Rightarrow (x, +\infty)$$

5

$$f(x) = \sqrt{\frac{|x - r| - x^2}{|x| - 1}}$$

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

$$D_f = [-r, 1) - \{1\}$$

$$|x - r| - x^2 \geq 0 \Rightarrow x^2 - 2rx + r^2 - x^2 \geq 0 \Rightarrow -2rx + r^2 \geq 0 \Rightarrow r^2 \geq 2rx \Rightarrow r \geq 2x \Rightarrow x \leq \frac{r}{2}$$

$$|x - r| - x^2 \geq 0 \Rightarrow x^2 - 2rx + r^2 - x^2 \geq 0 \Rightarrow -2rx + r^2 \geq 0 \Rightarrow r^2 \geq 2rx \Rightarrow r \geq 2x \Rightarrow x \leq \frac{r}{2}$$

$$y = \sqrt{(n-r)(-n-r)} \quad n \geq r$$

$$[n] = r \rightarrow r \leq n < r$$

$$\frac{r}{1} \cdot \frac{r}{1} = \frac{r}{1} + \frac{r}{1}$$

$$D_f = (-\infty, +\infty) \subseteq \mathbb{R}$$

$$y = \sqrt{|n-1|[-n-r]}$$

$$[n-r] =$$

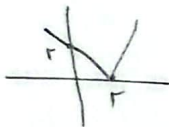
$$[n] = -r \rightarrow r \leq n < r$$

$$\frac{1}{-1} \cdot \frac{r}{-1} = \frac{r}{1} + \frac{r}{1}$$

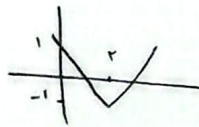
$$D_f = [r, +\infty) \cup (-1, 1]$$

6

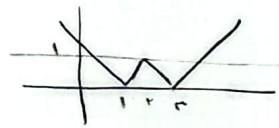
$$\frac{1}{|n-r|-1} \Rightarrow |n-r|-1 \neq k$$



$$|n-r|-1$$



$$|n-r|-1$$



$$|n-r|-1$$

$$y=1$$
  

$$k=1$$

7

$$f_{1,1} = \frac{n^2 + r_n + r}{n^2 + r_n + r} \rightarrow n^2 + r_n + r \neq 0 \rightarrow n \neq -1, -r$$

$$\frac{n+1}{n-1}$$

$$\frac{n+1}{n-1} \neq 0 \rightarrow n \neq -1$$

$$D_f = \mathbb{R} - \{-r, -1, 1\}$$

$$n, r$$

8

$$n^2 - 1n + r_n \rightarrow n^2 - 9n + 9 = 0 \rightarrow (n-3)^2 = 0 \Rightarrow n=3$$

$$\text{with } \underline{n=3}$$

$$y = \log_{n+1} \frac{1}{n}$$

$$n > 0$$

$$n \neq 1$$

$$n+1 > 0 \rightarrow n > -1$$

$$n+1 \neq 1 \rightarrow n \neq 0$$

$$D_f = (0, 1)$$

9

$$\frac{1}{n} < 1 \quad \frac{1}{r} < 1 \quad \text{if } n > 1, r > 1$$

$$\frac{1}{n} > 1 \rightarrow n < 1 \quad \frac{1}{r} > 1 \rightarrow r < 1$$

$$D_{f,1} = [-4, 3]$$

$$P_k(r^2-1) \rightarrow -4 \leq r^2-1 \leq 3 \quad \begin{cases} r^2 \leq 4 \rightarrow r \leq \frac{2}{\sqrt{r}} \rightarrow -\frac{2\sqrt{r}}{r} \leq n \leq \frac{2\sqrt{r}}{r} \\ r^2 \geq -3 \rightarrow \text{always true} \end{cases}$$

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

10