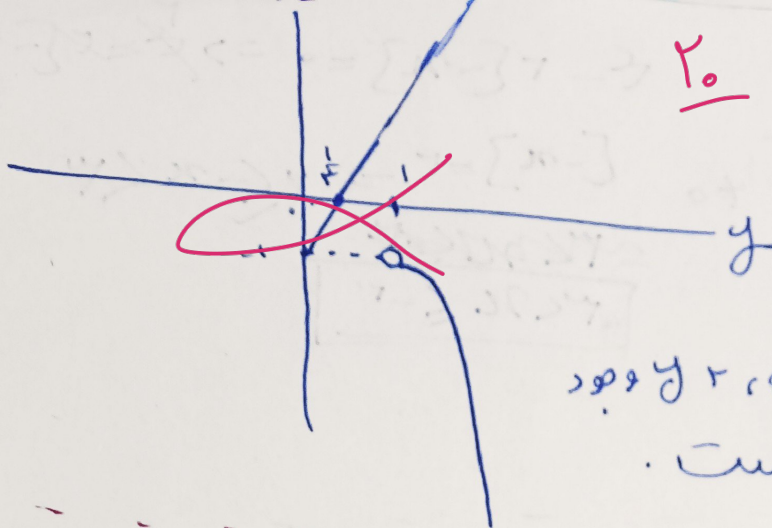


①



۲۰

هنا عقالی
تابع را بصورت $y = f(x)$ و $y = f^{-1}(x)$ بنویسید
و رسم می کنید:

متوجه می شویم برای هیچ x و y وجود ندارد که عبارت تابع است.

②

$x = e \Rightarrow f(x-2) = -2, 0, 1 \Rightarrow f(x) = -2, 0, 1$
 $\downarrow \quad \downarrow \quad \downarrow$
 $\{-2\} \quad \{0\} \quad \{1\}$

$D = (-2, -1] \cup [0, 1) \cup [1, +\infty)$

③

$f(x) = \frac{2x^2 - 3x + 1}{x^3 - 5x} = \frac{(x-1)(2x-1)}{x(x-5)}$
 $x^3 - 5x = x(x-5)(x+5)$

الف) $D = \{0, 5, -5\}$

ب) $\frac{2x^2 - 3x + 1}{x(x-5)(x+5)} \geq 0$
 $D = (-5, 0) \cup (1, +\infty)$

④

الف) $\frac{x-1}{x^4 - 2x^2 - 1} \geq 0$
 $x^4 - 2x^2 - 1 = (x^2 - 1)(x^2 + 1) = (x-1)(x+1)(x^2 + 1)$
 $\Rightarrow x = \pm 1$

$D = (-1, +\infty) - \{1\}$

$\textcircled{3} \text{ ب) } \frac{r(n^2+1)}{r[-n] \neq 0} \quad r[-n] = 0 \Rightarrow r = r[-n]$
 $r[-n] = r \rightarrow r \leq -n < r$
 $D_f = R - (-r, r]$
 $\boxed{-r < n \leq -r}$

$D_f = R - (-r, r] \checkmark$

$\textcircled{4} \text{ ا) } \sqrt{n(n-1)(n+1)} \rightarrow \infty$
 $\Rightarrow D_f = [1, \infty) \checkmark$
 $\frac{-1 \quad 0 \quad 1}{+ \quad + \quad +}$
 $[1, 0] \cup [0, +\infty)$
 $\oplus \rightarrow r, n \Rightarrow (0, +\infty)$
 $0 \rightarrow 0$
 $- \rightarrow 0$

$\text{ب) } \sqrt{|n-1|-n^2}$
 $|n| - 1$
 $D_f = R - [1, \infty)$
 $|n| \neq 1, n \neq \pm 1 \checkmark$
 $D_f = [-r, +\infty) - \{1\}$
 $\frac{-r \quad 1}{+ \quad - \quad +}$
 $\star \rightarrow [-r, 1) \cup [1, \infty)$
 $[-r, 1) - \{1\}$
 $-n^2 + |n-1| > 0$
 $-n^2 - n + r > 0$
 $-n^2 + n - r > 0$
 $n^2 - n - r < 0$
 $(n+r)(n-1) < 0$
 $n^2 - n + r < 0$
 $\frac{-r \quad 1}{+ \quad - \quad +}$
 $\star \rightarrow [-r, 1) \cup [1, \infty)$

$\textcircled{4} \text{ ا) } \frac{r}{r} + \frac{r}{r} + \frac{r}{r}$
 $D_f = R \checkmark$
 $\text{ب) } \frac{r}{r} - \frac{r}{r} + \frac{r}{r}$
 $D_f = R - (1, r]$
 $[r, +\infty) \cup \{1\}$

$$\textcircled{V} \quad |n-r|-1=K \rightarrow \begin{cases} n-r=K+1 \rightarrow n=K+r \\ n-r=-K-1 \rightarrow n=-K+1 \end{cases}$$

$$|n-r|-1=-K \rightarrow \rightarrow \{n-r\}=$$

$$\textcircled{V} \quad |n-r|-1=K \rightarrow \begin{cases} n-r=K+1 \rightarrow n=K+r \rightarrow n=r \\ n-r=K-1 \rightarrow n=-K+1 \rightarrow n=0 \end{cases} \quad (r)$$

$$\begin{cases} |n-r|-1=-K \rightarrow \begin{cases} n-r=-K+1 \rightarrow n=-K+r \rightarrow n=r \\ n-r=K-1 \rightarrow n=K+1 \rightarrow n=r \end{cases} \end{cases}$$

$$\rightarrow |n-r|=K+1 \rightarrow K+1 > 0 \rightarrow K > -1$$

$$|n-r|=-K+1 \rightarrow -K+1 > 0 \quad K < 1$$

$$-1 \leq K \leq 1$$

$$\rightarrow |n-r|-1=K \quad K > 0 \Rightarrow \boxed{K=1} \checkmark$$

$$f(n) = \frac{n^r + r n^{r-1}}{n^r + r n^{r-1}} \quad \begin{cases} n+r > 0 \quad (n+r) \neq 0 \Rightarrow n \neq -1, -r \\ n \neq -1 \\ n \neq 1 \Rightarrow n=r \end{cases} \quad (r)$$

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

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

$$n^r - r n^{r-1} = 0 \quad (n-r)^r = 0$$

$$\boxed{n=r} \checkmark$$

$$\log \frac{1}{n} \rightarrow n \neq 1, n > 0$$

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

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

$$\lim_{n \rightarrow \infty} \frac{1}{n} > 0 \rightarrow \frac{1}{n} > 0 \quad \text{if } n > 1 \quad \lim_{n \rightarrow \infty} \frac{1}{n} > 0 \rightarrow \frac{1}{n} > 0$$

$$\Rightarrow D_f = (0, 1) \checkmark \quad \text{if } 0 < n < 1 \quad \lim_{n \rightarrow \infty} \frac{1}{n} < 0 \quad \frac{1}{n} < 1 \quad \checkmark$$

(10)

$$f(x) = \sqrt{-(x+5)(x-3)} \xrightarrow{x \rightarrow \pm 1} \sqrt{-(5x^2+5)(x^2-5)}$$

مقادیر

(2)

$$x^2 = 5 \rightarrow x = \pm \sqrt{5}$$

$$\Rightarrow D_f = \left[-\sqrt{5}, \sqrt{5} \right] \setminus \{ -1, 1 \}$$

(1)

برای سوال 1 یک اوش مرسوسه:

$$x \begin{cases} y-1 \\ -y^2 \end{cases} \quad y \geq 0 \rightarrow y-1 = x \rightarrow y = \frac{x+1}{2}$$

$$y \geq 0 \rightarrow x \geq -1$$

$$-y^2 = x \rightarrow y = \pm \sqrt{-x}$$

$$y \geq 1 \rightarrow x \leq -1$$

توجه است ✓

(2)

