

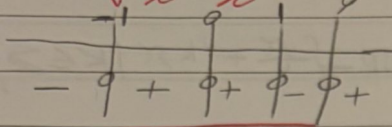
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کوفیاء میر عسکری

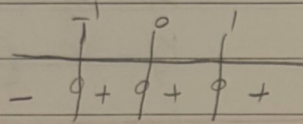
دامنه توابع

$$\text{الف) } y = \sqrt{\frac{x^2 - 4x}{x^3 - x}} = \frac{x^2 - 4x \geq 0}{x^3 - x} \quad \frac{x(x-4)}{x(x-1)(x+1)}$$



$$D_f = (-1, 0) \cup (0, 1) \cup [4, +\infty)$$

$$\text{ب) } y = \sqrt{\frac{x^3 - x^2}{x^3 - x}} = \frac{x^3 - x^2 \geq 0}{x^3 - x} \quad \frac{x^2(x-1)}{x(x-1)(x+1)} = x^2(x+1)$$



$$D_f = [-1, 0) \cup (0, 1) \cup (1, +\infty)$$

$$\text{الف) } y = \frac{x+1}{\sqrt{x+|x|}} = \frac{x+|x| > 0}{\sqrt{x+|x|}}$$

$$x \geq 0 \Rightarrow |x| = x$$

$$x < 0 \Rightarrow |x| = -x$$

$$x+x > 0 \quad x > 0 \Rightarrow x > 0$$

$$x-x = 0$$

$$D_f = (0, +\infty)$$

$$\text{ب) } y = \frac{1}{\sqrt{x|x|}} = \frac{x|x| > 0}{\sqrt{x|x|}}$$

$$x > 0 \Rightarrow x|x| = x^2 > 0$$

$$D_f = (0, +\infty)$$

$$x < 0 \Rightarrow x|x| = x(-x) = -x^2 < 0$$

$$\text{الف) } y = \sqrt{2 - [x]} = \frac{2 - [x] \geq 0}{[x] \leq 2}$$

$$x < 3 \quad D_f = (-\infty, 3)$$

$$\text{ب) } y = \frac{1}{\sqrt{2 - [x]}} = \frac{2 - [x] > 0}{[x] < 2}$$

$$x < 2 \quad D_f = (-\infty, 2)$$

$$\text{الف) } \sqrt{\left[x - \frac{1}{3}\right] + \left[x + \frac{2}{3}\right]} = \left[x - \frac{1}{3}\right] + \left[x + \frac{2}{3}\right] \geq 0 \quad x + \frac{2}{3} = x - \frac{1}{3} + 1$$

$$\left[x + \frac{2}{3}\right] = \left[x - \frac{1}{3}\right] + 1 \quad \left[x - \frac{1}{3}\right] + \left(\left[x - \frac{1}{3}\right] + 1\right) \geq 0 \quad 2\left[x - \frac{1}{3}\right] + 1 \geq 0 \quad \left[x - \frac{1}{3}\right] \geq 0$$

$$\text{ب) } y = \sqrt{\left[x - \frac{1}{3}\right] + \left[x + \frac{1}{3}\right]} = \frac{x - \frac{1}{3} \geq 0 \quad x \geq \frac{1}{3}}{D_f = \left[\frac{1}{3}, +\infty\right)}$$

$$\left[x - \frac{1}{3}\right] + \left[-x + \frac{1}{3}\right] \geq 0 \quad \left[-\left(x - \frac{1}{3}\right)\right] = \begin{cases} -\left[x - \frac{1}{3}\right] & x - \frac{1}{3} \in \mathbb{Z} \\ -\left[x - \frac{1}{3}\right] - 1 & x - \frac{1}{3} \notin \mathbb{Z} \end{cases}$$

$$\text{Parsian} \quad x - \frac{1}{3} = n \quad x = n + \frac{1}{3} \quad n \in \mathbb{Z} \quad D_f = \left\{n + \frac{1}{3} \mid n \in \mathbb{Z}\right\}$$

$$\left\{-\frac{1}{3}, -\frac{2}{3}, \frac{1}{3}, \frac{4}{3}, \dots\right\}$$

$$الف) y = \frac{y}{\sin x - 1} =$$

$$\sin x - 1 \neq 0 \quad \sin x \neq 1$$

$$x \neq \frac{\pi}{2} + 2k\pi$$

$$D_f = \mathbb{R} - \left\{ \frac{\pi}{2} + 2k\pi \mid k \in \mathbb{Z} \right\}$$

$$ب) y = \frac{y}{y \sin^2 x - 1} =$$

$$y \sin^2 x - 1 \neq 0$$

$$y \sin^2 x \neq 1 \Rightarrow \sin^2 x \neq \frac{1}{y}$$

$$\sin x \neq \pm \frac{\sqrt{y}}{y}$$

$$x = \frac{\pi}{2} + k\pi$$

$$D_f = \mathbb{R} - \left\{ \frac{\pi}{2} + k\pi \mid k \in \mathbb{Z} \right\}$$

$$الف) y = \sqrt{y \sin x - 1} =$$

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

$$\sin x \geq \frac{1}{y}$$

$$D_f = \left[\frac{\pi}{2} + 2k\pi, \frac{3\pi}{2} + 2k\pi \right], k \in \mathbb{Z}$$

$$ب) y = \sqrt{\cos x - 1} =$$

$$\cos x - 1 \geq 0 \Rightarrow \cos x \geq 1 \quad \cos x = 1$$

$$x = 2k\pi, k \in \mathbb{Z}$$

$$D_f = \{2k\pi \mid k \in \mathbb{Z}\}$$

$$الف) \cos y = |x| - 3 =$$

$$-1 \leq |x| - 3 \leq 1$$

$$2 \leq |x| \leq 4$$

$$D_f = [-4, -2] \cup [2, 4]$$

$$ب) y = \arcsin(x^2 + 3x + 1) =$$

$$D_f = [-3, -2] \cup [-1, 0]$$

$$x^2 + 3x + 1 \geq 0$$

$$(x+2)(x+1) \geq 0$$

$$x \leq -2 \text{ or } x \geq -1$$

$$-1 \leq x^2 + 3x + 1 \leq 1$$

$$x^2 + 3x \leq 0$$

$$-3 \leq x \leq 0$$

$$الف) y = \sqrt{2 - \log_3(x-2)}$$

$$2 - \log_3(x-2) \geq 0$$

$$\log_3(x-2) \leq 2$$

$$x-2 \leq 3^2 = 9$$

$$x-2 > 0 \Rightarrow x > 2$$

$$2 < x \leq 11$$

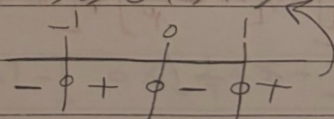
$$D_f = (2, 11]$$

$$ب) y = \log(x^3 - x)$$

$$D_f = (-1, 0) \cup (1, +\infty)$$

$$x^3 - x > 0 \Rightarrow x(x-1)(x+1) > 0$$

$$x < -1, x = 0, x = 1$$



$$الف) y = \frac{r}{r^x + 1} =$$

$$r^x > 0 \quad r^x + 1 > 0 \quad D_f = \mathbb{R}$$

$$ب) y = \frac{r}{r^x - 1} =$$

$$r^x - 1 \neq 0 \quad r^x \neq 1 \quad x \neq 0 \quad D_f = \mathbb{R} - \{0\}$$

$$ج) y = \frac{r}{r^x - r} =$$

$$r^x - r \neq 0 \quad r^x \neq r \quad x \neq \log_r r = 1 \quad D_f = \mathbb{R} - \left\{\frac{1}{r}\right\}$$

$$د) y = \frac{r}{r^x - r^3} =$$

$$r^x - r^3 \neq 0 \quad r^x \neq r^3$$

$$x \neq \log_r r^3 \quad D_f = \mathbb{R} - \{\log_r r^3\}$$

$$الف) y = (r^x + 1)! = \quad r^x + 1 = n$$

$$n = 0, 1, 2, 3, 4, \dots \quad x = \frac{n-1}{r} \quad D_f = \left\{ \frac{n-1}{r} \mid n = 0, 1, 2, 3, 4, \dots \right\}$$

$$ب) y = \left(\frac{r^x - r}{r^x - a} \right)! =$$

$$n = 0, 1, 2, \dots$$

$$\frac{r^x - r}{r^x - a} = n \quad r^x - r = n(r^x - a)$$

$$r^x - r = nr^x - an$$

$$x(r - rn) = r - an \rightarrow x = \frac{an - r}{rn - r}$$

$$D_f = \left\{ \frac{an - r}{rn - r} \mid n = 0, 1, 2, \dots \right\}$$

$$\text{Parsian} \left\{ \frac{r}{r}, -r, 1, \frac{1}{r}, - \right\}$$