

الف) $y = \sqrt{\frac{x^2 - 4x}{x^3 - x}} \Rightarrow \frac{x(x-4)}{x(x-1)(x+1)} \Rightarrow \frac{-1}{x} \cdot \frac{+}{x-1} \cdot \frac{+}{x+1} \Rightarrow x \in (-1, 0) \cup (0, 1) \cup [2, +\infty)$

ب) $y = \sqrt{\frac{x^4 - x^3}{x^3 - x}} \Rightarrow \frac{x^3(x+1)(x-1)}{x(x+1)(x-1)} \Rightarrow \frac{-1}{x} \cdot \frac{+}{x+1} \cdot \frac{+}{x-1} \Rightarrow x \in (-\infty, -1) \cup (-1, 0) \cup (0, 1) \cup [1, +\infty)$

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$y = \frac{x+1}{\sqrt{x+1}x} \Rightarrow \sqrt{x+1}x > 0 \Rightarrow x+1 > 0 \Rightarrow x > -1$

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$y = \frac{1}{\sqrt{x+1}x} \Rightarrow \sqrt{x+1}x > 0 \Rightarrow x > 0$

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$y = \sqrt{2 - [x]} \Rightarrow \sqrt{2 - [x]} \geq 0 \Rightarrow 2 - [x] \geq 0 \Rightarrow x \in (-\infty, 2)$

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$y = \sqrt{2 - [x]} \Rightarrow \sqrt{2 - [x]} > 0 \Rightarrow 2 - [x] > 0 \Rightarrow x \in (-\infty, 2)$

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الف) $y = \sqrt{[x - \frac{1}{n}] + [x + \frac{2}{n}]} \Rightarrow [x - \frac{1}{n}] \geq 0 \Rightarrow x - \frac{1}{n} \geq 0 \Rightarrow x \in [\frac{1}{n}, +\infty)$

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$[x - \frac{1}{n}] + [x + \frac{2}{n}] \geq 0 \Rightarrow x + \frac{2}{n} = x - \frac{1}{n} + 1 \Rightarrow [x + \frac{2}{n}] = [x - \frac{1}{n}] + 1$

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ب) $y = \sqrt{[x - \frac{1}{n}] + [x + \frac{2}{n}]} \Rightarrow \begin{cases} 0 \leq x - \frac{1}{n} < 1 \\ -1 \leq x - \frac{1}{n} < 0 \end{cases} \Rightarrow x - \frac{1}{n} \in \mathbb{Z} \Rightarrow x \in \{\frac{1}{n} + n\mathbb{Z}\}$

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$y = \frac{2}{\sin x - 1} \Rightarrow x \in \mathbb{R} - \{k\pi + \frac{\pi}{2}\}$

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$y = \frac{3}{2\sin^2 x - 1} \Rightarrow 2\sin^2 x \neq 1 \Rightarrow \sin x \neq \pm \frac{1}{\sqrt{2}} \Rightarrow x \in \mathbb{R} - \{k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4}\}$

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$$y = \sqrt{2 \sin x - 1} \geq 0 \Rightarrow 2 \sin x - 1 \geq 0 \Rightarrow \sin x \geq \frac{1}{2} \Rightarrow x \in \left[\frac{\pi}{6} + 2k\pi, \frac{5\pi}{6} + 2k\pi \right]$$



✓ 1, 6

$$y = \sqrt{\cos x - 1} \geq 0 \Rightarrow \cos x - 1 \geq 0 \Rightarrow \cos x \geq 1 \Rightarrow x \in \{2k\pi, k\pi\}$$

$$\cos y = |x| - 3 \Rightarrow -1 \leq |x| - 3 \leq 1$$

$$2 \leq |x| \leq 4 \Rightarrow x \in [-4, -2] \cup [2, 4]$$

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1, 7, 8

$$\Rightarrow x \in [-3, -2] \cup [-1, 0]$$

$$y = \arcsin(x^2 - 2x + 1) \Rightarrow x^2 - 2x + 1 \in [-1, 1]$$

$\Rightarrow x^2 - 2x + 1 \geq -1 \Rightarrow x^2 - 2x + 2 \geq 0 \Rightarrow (x-1)^2 + 1 \geq 0$
 $\Rightarrow x^2 - 2x + 1 \leq 1 \Rightarrow x^2 - 2x \leq 0 \Rightarrow x(x-2) \leq 0 \Rightarrow x \in [0, 2]$

$$الف) y = \sqrt{2 - \log_2(x-2)} \geq 0 \Rightarrow 2 - \log_2(x-2) \geq 0 \Rightarrow \log_2(x-2) \leq 2 \Rightarrow x-2 \leq 4 \Rightarrow x \leq 6$$

$x-2 > 0 \Rightarrow x > 2$
 $\Rightarrow x \in (2, 6]$

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$$ب) y = \log(x^2 - x) \Rightarrow x(x-1) > 0 \Rightarrow x < 0 \text{ or } x > 1$$

$$الف) \frac{x}{x^2+1} \Rightarrow x^2+1 > 0 \Rightarrow x \in \mathbb{R}$$

$$ب) \frac{x}{x^2-1} \Rightarrow x \in \mathbb{R} - \{0, \pm 1\}$$

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$$ج) \frac{x}{x^2-2} \Rightarrow x^2-2 > 0 \Rightarrow x \in \mathbb{R} - \{\pm \sqrt{2}\}$$

$$د) \frac{x}{x^2-3} \Rightarrow x \in \mathbb{R} - \{\log_2 3\}$$

$$y = (x+1)! \Rightarrow x+1 \in \mathbb{N} \Rightarrow x \in \mathbb{N} - 1 \Rightarrow D_y = \{x \mid x = \frac{n-1}{k}, k \in \mathbb{N}\}$$

$$y = \left(\frac{x-2}{x-5} \right)! \Rightarrow \frac{x-2}{x-5} \in \mathbb{N} \Rightarrow x \in \left(\frac{5n-2}{n-1}, \frac{5n+3}{n-1} \right) \cup (2, 5)$$

$$D_y = \{x \mid x = \frac{5k-2}{k-1}, k \in \mathbb{N}\}$$