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$$الف) y = \sqrt{\frac{x^3 - \varepsilon x + 3}{x^3 - 1}} \Rightarrow \begin{cases} \frac{x^3 - \varepsilon x + 3}{x^3 - 1} \geq 0 \rightarrow \frac{(x-3)(x-1)}{x^3 - 1} \geq 0 \\ x^3 - 1 \neq 0 \rightarrow x \neq 1 \rightarrow x \neq -1 \end{cases}$$

$$D_f = [3, +\infty)$$

$$ب) y = \sqrt[3]{\frac{x^3 - \varepsilon x + 3}{x^3 - 1}} \Rightarrow x^3 - 1 \neq 0 \rightarrow x^3 \neq 1 \rightarrow x \neq \pm 1$$

$$D_f = \mathbb{R} - \{\pm 1\}$$

$$الف) y = \log(x^3 - 3x) \Rightarrow x^3 - 3x > 0 \rightarrow x(x-3) > 0$$

$$D_f = (-\infty, 0) \cup (3, +\infty)$$

$$ب) y = \log|4 - x^3| \Rightarrow \begin{cases} |4 - x^3| > 0 \rightarrow 1 > x^3 \rightarrow -1 < x < 1 \\ |x| - 2 > 0 \rightarrow |x| > 2 \rightarrow x > 2, x < -2 \\ |x| - 1 \neq 1 \rightarrow |x| \neq 2 \rightarrow x \neq \pm 2 \end{cases}$$

$$D_f = (-\infty, -2) \cup (-1, 1) \cup (2, +\infty)$$

$$ج) y = \log \frac{x^3 - \sqrt{x} + 1}{x - 3} \Rightarrow \begin{cases} 10 - x > 0 \rightarrow 10 > x \\ 10 - x \neq 1 \rightarrow 9 \neq x \\ \frac{x^3 - \sqrt{x} + 1}{x - 3} > 0 \rightarrow \frac{(x-3)(x-1)}{x-3} > 0 \end{cases}$$

$$D_f = (1, 10) - \{9\}$$

$$د) y = \sqrt{x^3 - 11x + 12} + \log \frac{\sqrt{4 - x^3}}{x}$$

$$(x-3)(x-1) \neq 0 \rightarrow x \neq 1, x \neq 3$$

$$\frac{4 - x^3}{x} > 0 \rightarrow \frac{(2-x)(2+x)}{x} > 0$$

$$(-\infty, -2] \cup [2, +\infty) \cup (-1, 1) \cup (3, +\infty)$$

$$D_f = (-\infty, -2] \cup [2, +\infty)$$

$$y = \frac{x^3 - x}{x^3 + x} \Rightarrow \frac{x(x-1)}{x(x+1)}$$

$$\begin{array}{c|ccc} & -1 & 0 & 1 \\ \hline & + & - & + \end{array}$$

$$\begin{array}{c|ccc} & -1 & 0 & 1 \\ \hline x^3 - x & + & - & - \\ x^3 + x & + & - & + \end{array}$$

$$y = \sqrt{\frac{x - f(x)}{f(x)}} \Rightarrow \sqrt{\frac{x - 3}{3}} \rightarrow \frac{x - 3}{3} \geq 0 \rightarrow x - 3 \geq 0 \rightarrow x \geq 3$$

$$D_f = [3, +\infty)$$

$$الف) f(x) + 1 \Rightarrow$$

$$ب) f(x - 1) \Rightarrow$$

$$ج) -f(x) \Rightarrow$$

$$د) f(x + 1) \in \mathbb{R} \Rightarrow$$

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