

الف) $\frac{x-1}{x} - \frac{x}{x-1} > 0 \rightarrow \frac{x^2-2x+1}{x(x-1)} > 0 \rightarrow \frac{(x-1)^2}{x(x-1)} > 0 \rightarrow \frac{x-1}{x} > 0 \rightarrow D_f = (-\infty, 0) \cup (1, +\infty)$

ب) $\frac{\frac{1}{x+1} - \frac{x}{x-1}}{\frac{x}{x-1} + \frac{1}{x+2}} = 0 \rightarrow \frac{x}{x-1} + \frac{1}{x+2} \neq 0 \rightarrow \frac{x(x+2) + (x-1)}{(x-1)(x+2)} \neq 0 \rightarrow \frac{x^2+3x-1}{(x-1)(x+2)} \neq 0$
 $D = \mathbb{R} - \{-2, -1, \frac{1}{3}\}$

الف) $x^2 > x^2 \rightarrow x > 1 \rightarrow x < -1$
 $x^2 > x^2 \rightarrow x^2 < x^2 \rightarrow x < \omega \rightarrow x \leq \frac{\omega}{x} \rightarrow (-\infty, -1] \cup [\frac{\omega}{x}, +\infty)$
 $x > -1 / x > \frac{\omega}{x} \rightarrow x > \frac{\omega}{x}$

ب) $\sqrt{x-1} + \sqrt{3+1} = 2$
 $\downarrow \quad \downarrow$
 $x-1 \geq 0 \quad 3+1 \geq 0$
 $x \geq 1 \quad 3 \geq -1$
 $\rightarrow \sqrt{y+1} = 3 - \sqrt{x-1} \rightarrow \sqrt{x-1} \leq 3 \rightarrow x-1 \leq 9 \rightarrow x \leq 10$
 $D = x \in [1, +\infty) \cap y \in [-1, +\infty)$
 $D \neq [1, 10]$

$x^2 - x - 2 > 0 \rightarrow \frac{(x+1)(x-2)}{-1} > 0 \rightarrow \frac{-1}{+0-0+} \rightarrow (-\infty, -1) \cup (2, +\infty)$

$\sqrt{x^2-1} + 1 \neq 0 \rightarrow \sqrt{x^2-1} \neq -1 \checkmark$
 $\rightarrow D_f = (-\infty, -1) \cup (2, +\infty)$

$-x^2 + ax + 3 > 0$
 $\frac{c}{a} = -3 \rightarrow x \cdot b = -3 \rightarrow b = \frac{3}{x}$
 $\frac{-b}{a} = a \rightarrow -x + \frac{3}{x} \rightarrow a = -\frac{1}{x}$
 $a + b \rightarrow \frac{3}{x} - \frac{1}{x} = 1$

$f(x) - x > 0 \rightarrow f(x) > x \rightarrow \frac{x}{x-1} > x \rightarrow x(x-1) > 0 \rightarrow x > 1$
 $\left. \begin{array}{l} |x| < 1 \rightarrow x(x-1) < 0 \rightarrow x < -1 \end{array} \right\} D = [-3, +\infty)$

$f(x) = x(x-1)$
 $f(\frac{\sqrt{x}}{x} + 1) \rightarrow f(\frac{x+\sqrt{x}}{x})$
 $\left. \begin{array}{l} x \cdot \frac{x+\sqrt{x}}{x} \cdot \left(\frac{x+\sqrt{x}}{x} - 1 \right) \rightarrow \frac{x-\sqrt{x}}{x} = -\frac{1}{x} \end{array} \right\}$

$f(x) = \frac{x+1}{x-1}$
 $f(a) = \frac{a+1}{a-1} \quad f(f(a)) = \frac{f(a)+1}{f(a)-1} \rightarrow \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} \rightarrow \frac{a+1+a-1}{a+1-a+1} \rightarrow \frac{2a}{a+1} = a \rightarrow \mathbb{R} - \{1\}$
 بقدر است ۱

$f(g(a)) = -4$

$f \rightarrow x^2 - 4x + 4 = 0 \rightarrow (x-2)^2 = 0 \rightarrow x = 2 \rightarrow g(a) = 2 \rightarrow \sqrt{a^2-1} = 2 \rightarrow a^2-1 = 4 \rightarrow a = \pm \sqrt{5}$

$$x = -y \rightarrow f(-y) = y^4 + y^2 + y \rightarrow y^4$$

$$x = 1 \rightarrow f(1) = 1 - \omega + y \rightarrow y$$

$$V \times X \times Y = 1 \times \epsilon \times \epsilon$$

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$$\epsilon C \cos' t \omega \cos = \frac{V}{r} \quad \cos = t \quad \epsilon t^2 + \omega t - \frac{V}{r} = 0 \rightarrow \lambda t^2 + \mu t - V = 0 \quad t = \frac{-\mu \pm \sqrt{\mu^2 + 4\lambda V}}{2\lambda} \rightarrow \frac{1}{r} \pm \frac{V}{\epsilon} \quad \bar{O} \bar{O} \bar{E}$$

$$\cos = \frac{1}{r} \rightarrow \tan r = \frac{1 - \frac{1}{\epsilon}}{\frac{1}{\epsilon}}$$

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ب-۲) $\sqrt{x-1} + \sqrt{y+1} = 3$, $\underbrace{\sqrt{y+1}}_{\text{مجموعه نامتناهی}} = \underbrace{3 - \sqrt{x-1}}_{\text{مجموعه نامتناهی!}} \rightarrow 3 - \sqrt{x-1} \geq 0 \rightarrow \sqrt{x-1} \leq 3 \rightarrow x \leq 10$

$\downarrow$
 $x-1 \geq 0 \rightarrow x \geq 1$ I

I, II $\rightarrow 1 \leq x \leq 10 \rightarrow D_f = [1, 10]$