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Subject: -----

الف) $\frac{x-1}{x} - \frac{x}{x-1} \geq 0 \rightsquigarrow \frac{(x-1-x)(x-1+x)}{(x)(x-1)} \geq 0$ (1)

$\frac{0}{+} \frac{1}{+} \frac{1}{+}$ $D_f = (-\infty, 0) \cup [\frac{1}{2}, 1)$

ب) $\left. \begin{array}{l} x+1 \neq 0 \\ x \neq 0 \\ x-1 \neq 0 \\ x+2 \neq 0 \end{array} \right\} \rightsquigarrow x \neq \left\{ -1, 0, 1, -2, -\frac{5}{2} \right\}$

$D_f = \mathbb{R} - \left\{ -1, 0, 1, -2, -\frac{5}{2} \right\}$

الف) $\left(\left(\frac{1}{3} \right)^x - 9 \right) (3x - 4^x) \geq 0$ (2)

$(-2) = \frac{1}{3}$ $(+2.5)$

$D_f = (-\infty, -2] \cup [2.5, +\infty)$

ب) $x-1 > 0 \rightsquigarrow x > 1$ $\sqrt[3]{x+1} = 3 - \sqrt[3]{x-1}$

$\sqrt[3]{x-1} \leq 3 \rightsquigarrow x \leq 28$ $D_f = [1, 28]$

$x^2 - x - 2 > 0 \rightsquigarrow (x-2)(x+1) > 0$ (3)

$\sqrt{x^2-1} \neq -1$ $x^2 - 1 > 0 \rightsquigarrow$

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

$$3 - 2a - \varepsilon = 0 \rightsquigarrow a = -\frac{1}{2} \quad \text{نقطه } b = -\frac{1}{2} \quad (4)$$

$$-2b = \frac{c}{A} \rightsquigarrow -2b = \frac{3}{-1} = -3 \quad \text{نقطه } b = \frac{3}{2}$$

$$a+b = -\frac{1}{2} + \frac{3}{2} = 1$$

$$f(x) - a \geq 0 \rightsquigarrow \begin{cases} x \geq 1 \rightarrow 3x - 2 - a = 2x - 2 \rightarrow 2x - 2 \geq 0 \rightarrow x \geq 1 \\ x < 1 \rightarrow 2x + 3 - a = x + 3 \rightarrow x + 3 \geq 0 \rightarrow x \geq -3 \end{cases} \quad (5)$$

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

$$x = \frac{\sqrt{x}}{2} + 1 = \frac{\sqrt{x} + 2}{2} \rightarrow f\left(\frac{\sqrt{x} + 2}{2}\right) = \frac{1}{2} \left(\frac{(\sqrt{x} + 2)^2}{4} \right) - \frac{1}{2} \left(\frac{\sqrt{x} + 2}{2} \right) \quad (6)$$

$$\frac{3 + 2 + \frac{1}{2}\sqrt{x}}{2} - \frac{1}{2}\sqrt{x} - \frac{1}{2} = \frac{3 + \frac{1}{2}\sqrt{x} - \frac{1}{2}\sqrt{x} - 1}{2} = \left(-\frac{1}{2} \right)$$

$$f(f(a)) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{\frac{2a}{a-1}}{\frac{2}{a-1}} = a \rightsquigarrow f(f(a)) = a \quad (7)$$

سوی برای هر چند به جز این خروج

$$\{a \in \mathbb{Z}, a \neq 1\}$$

$$f(\sqrt{a^2 - 1}) = -\varepsilon \rightsquigarrow x^2 - \varepsilon x = -\varepsilon \rightsquigarrow (x-2)^2 = 0 \rightsquigarrow x = 2 \quad (8)$$

$$\sqrt{a^2 - 1} = 2 \rightarrow a^2 - 1 = 4 \rightsquigarrow \boxed{a = \pm \sqrt{5}}$$

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$$f(r) \times f(r) = (1 - d + r)(r_0 + r_0 + r) = (r)(vr) = 1 \text{ } \textcircled{9}$$

$$F \cos \theta + d \cos = r_0 d \leadsto F \cos \theta + d \cos \theta - \frac{V}{r} = 0 \quad \textcircled{10}$$

$$\wedge \cos \theta + 1 \cos \theta - V = 0 \leadsto (F \cos - r)(r \cos \theta + r) = 0 \leadsto \cos \theta = \frac{1}{r} \quad \checkmark$$

$$\cos \theta = -\frac{V}{r} \quad \textcircled{x}$$

$$\tan \theta = \frac{1 \cos}{\cos r} - 1 \leadsto \tan \theta = \frac{1}{\frac{1}{r}} - 1 = \textcircled{r}$$