

الف) $\frac{x-1}{x} - \frac{x}{x-1} \geq 0 \Rightarrow \frac{x^2 - 2x + 1 - x^2}{x(x-1)} \geq 0 \Rightarrow \frac{-2x+1}{x(x-1)} \geq 0$

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

ب) $\frac{x-2x-2}{x(x+1)} = \frac{-x-2}{x(x+1)} \rightarrow 1) \text{ صورت } \Rightarrow x \neq 0, -1$
 $\frac{3x+4+x-1}{(x-1)(x+1)} = \frac{4x+3}{(x-1)(x+1)} \rightarrow 2) \text{ مخرج } \Rightarrow x \neq -1, 1$
 $\Rightarrow x \neq -\frac{3}{4}$

الف) $((\frac{1}{3})^x - 9)(3^x - 4^x) \geq 0 \Rightarrow \frac{-1}{+} \frac{2}{-} \Rightarrow D_f = \mathbb{R} - (-\frac{2}{3}, 2)$

ب) 1) $x-1 \geq 0 \Rightarrow x \geq 1$

2) $3 - \sqrt[4]{x-1} \geq 0 \Rightarrow 11 \geq x-1 \Rightarrow x \leq 12$

$D_f = \mathbb{R} - \{-\frac{2}{3}, \frac{2}{3}\}$

$\Rightarrow D_f = [1, 12]$

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

2) $x^2 - 1 \geq 0 \Rightarrow x \in (-\infty, -1] \cup [1, \infty) \rightarrow 1 \cap 2 \Rightarrow D_f = (-\infty, -1) \cup (2, \infty)$

به دلیل اینکه تابع max داراست و مقدارهای تعریف آن به شکل بازه است، عدد ابتدای و انتهایی بازه

if $x = -2 \Rightarrow 3 - 2a - 4 = 0 \Rightarrow a = -\frac{1}{2}$

if $x = b \Rightarrow 3 - \frac{1}{b} - b^2 = 0 \Rightarrow b = -2 \text{ و } b = +1$

دورینه تابع هستند پس:

$a+b=1$

آن وقت دیگه منتهی به شکل بازه نیست
 غیق ق ق

$f(x) - x \geq 0 \rightarrow ① \text{ if } x \geq 1 \Rightarrow 3x - 2 = x \Rightarrow x = 1$

$\rightarrow ② \text{ if } x < 1 \Rightarrow 2x + 3 = x \Rightarrow x = -3 \Rightarrow \frac{-3}{-} \frac{1}{+}$

$D_f = \mathbb{R} - (-\infty, -3) \cup (1, \infty)$

$$f\left(\sin \frac{\pi}{\sqrt{e}} + \cos \sqrt{e} \pi\right) = f\left(\frac{\sqrt{e}}{\sqrt{e}} + 1\right) = f\left(\frac{1+\sqrt{e}}{\sqrt{e}}\right) = \sqrt{e} \left(\frac{1+\sqrt{e}}{\sqrt{e}}\right)^{\sqrt{e}} - f\left(\frac{1+\sqrt{e}}{\sqrt{e}}\right) =$$

$$= \sqrt{e} \left(\frac{1+\sqrt{e}}{\sqrt{e}}\right)^{\sqrt{e}} - \sqrt{e} - \sqrt{e} = \frac{\sqrt{e}}{\sqrt{e}} + \sqrt{e} - \sqrt{e} - \sqrt{e} = -\frac{1}{\sqrt{e}} \quad \text{C}$$

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$$a = \frac{f(a)+1}{f(a)-1} \Rightarrow \frac{\frac{a+1}{a-1}+1}{\frac{a+1}{a-1}-1} = a \Rightarrow a = \frac{1a}{1} \Rightarrow a = a$$

$$a \in \mathbb{R} - \{1\} \quad \text{C}$$

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$$f(g(a)) = -\sqrt{e} \Rightarrow \text{if } g(a) = z \Rightarrow -\sqrt{e} = z^{\sqrt{e}} - f(z) \Rightarrow (z - \sqrt{e})^{\sqrt{e}} = 0 \Rightarrow z = \sqrt{e}$$

$$z = g(a) = \sqrt{e} = \sqrt{a^{\sqrt{e}} - 1} \Rightarrow \sqrt{e} = a^{\sqrt{e}} - 1 \Rightarrow a = \pm \sqrt[{\sqrt{e}}]{\sqrt{e} + 1} \quad \text{C}$$

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$$\left. \begin{aligned} f(f) &= 1 - \omega + \sqrt{e} = \sqrt{e} \\ f(-\sqrt{e}) &= \sqrt{e} + 1 + \sqrt{e} = 2\sqrt{e} \end{aligned} \right\} \Rightarrow f(f) \times f(-\sqrt{e}) = 1 \times \sqrt{e} \quad \text{C}$$

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$$f \cos^{\sqrt{e}} x + \omega \cos x = \sqrt{e} \omega \Rightarrow f \cos^{\sqrt{e}} x + \omega \cos x - \sqrt{e} \omega = 0$$

$$\cos^{\sqrt{e}} x + \omega \cos x - 1 \sqrt{e} = 0 \Rightarrow \cos x = -\frac{\sqrt{e}}{\sqrt{e}} \quad \text{C}$$

$$\cos x = \frac{1}{\sqrt{e}} \Rightarrow x = \frac{\pi}{\sqrt{e}} \quad \text{C}$$

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$$\text{if } x = \frac{\pi}{\sqrt{e}} \Rightarrow f(\sqrt{e} \omega) = \tan^{\sqrt{e}} \frac{\pi}{\sqrt{e}} \Rightarrow f(\sqrt{e} \omega) = \sqrt{e}$$