

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

$$D = (-\infty, 0) \cup \left[\frac{1}{2}, \infty\right)$$

$$\Rightarrow x \neq -2, -1, 0, 1, \quad \frac{3}{x-1} + \frac{1}{x+2} \neq 0 \Rightarrow \frac{3x+4+x-1}{(x+2)(x-1)} \neq 0 \Rightarrow x \neq -\frac{5}{2}, -1$$

$$D = \mathbb{R} - \{-2, -\frac{5}{2}, -1, 0, 1\}$$

$$\left(\frac{1}{x}\right)^x - 9 = 0 \quad x = -2 \quad 3^2 = 9 \Rightarrow x = \frac{5}{2} \quad \frac{-2}{+1} - \frac{5/2}{+1} +$$

$$D = \mathbb{R} - \{-2, \frac{5}{2}\}$$

$$\Rightarrow \sqrt{y+1} = 3 - \sqrt[4]{x-1} \rightarrow 3 - \sqrt[4]{x-1} \geq 0 \Rightarrow x \leq 17$$

$$\sqrt[4]{x-1} \rightarrow x \geq 1 \quad D_f = [1, 17]$$

$$\lim_{x \rightarrow -2} \frac{x^2 - x - 2}{x^2 - x - 2} \rightarrow \frac{x^2 - x - 2}{x^2 - x - 2} \rightarrow (x+1)(x-2) \geq 0 \Rightarrow \frac{-1}{+1} - \frac{2}{+1} \rightarrow x > 2 \text{ یا } x < -1$$

$$\sqrt{x^2 - 1} + 1 \rightarrow 0 \Rightarrow \sqrt{x^2 - 1} \geq 0 \Rightarrow x^2 - 1 \geq 0 \Rightarrow (x+1)(x-1) \geq 0 \Rightarrow x > 1 \text{ یا } x < -1$$

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

$$-2, b \xrightarrow{\text{محدود}} 0 \quad 3 - 2(a) - (-1)^2 \leq 0 \rightarrow a \leq \frac{1}{2}$$

$$f(x) = \sqrt{3 - \frac{x}{2} - x^2} \rightarrow -x^2 - \frac{x}{2} + 3 = 0 \rightarrow x = \left(\frac{1}{2} \pm \sqrt{\frac{49}{4}}\right) \times \frac{1}{-2}$$

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

$$x = \frac{3}{2} \rightarrow b = \frac{3}{2}$$

$$f(x) - x = \begin{matrix} 3x-2-2 & x > 1 \\ 2x+3-2 & x < 1 \end{matrix} \rightarrow \begin{matrix} 2x-2 & x > 1 \\ x+3 & x < 1 \end{matrix} \Rightarrow \begin{matrix} 2x-2 \geq 0 \rightarrow x \geq 1 \\ x+3 \geq 0 \rightarrow x \geq -3 \end{matrix}$$

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

$$x = 2\pi/r + \cos \varphi = \frac{\sqrt{r}}{r} + 1 = \frac{\sqrt{r}+r}{r}$$

$$f(x) = r(x-r) = \left(\frac{\sqrt{r}+r}{r} \times r \right) \left(\frac{\sqrt{r}-r}{r} \right) = -\frac{1}{r}$$

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$$f \circ f(a) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{\frac{a+1+a-1}{a-1}}{\frac{a+1-a+1}{a-1}} \cdot a \neq 1 \quad a \in \mathbb{R} - \{1\}$$

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$$g(a) = t \quad f(t) = -2 \Rightarrow t - 2t = -2 \Rightarrow t = 2$$

$$g(a) = 2 \Rightarrow \sqrt{a^2 - 1} = 2 \Rightarrow a^2 - 1 = 2 \Rightarrow a = \pm \sqrt{3}$$

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$$x=1 \Rightarrow f(x) = 1$$

$$x=-1 \Rightarrow f(-1) = \sqrt{1}$$

$$f(x) \times f(-x) = 1 \forall x$$

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$$r \cos x + \sin x - \frac{1}{r} = 0 \rightarrow \cos x = \frac{-1 \pm \sqrt{1 - \left(\frac{r}{\lambda}\right)^2}}{r} \rightarrow -1 \leq \cos x \leq 1$$

$$\cos x = \frac{r}{\lambda} \Rightarrow x = \pi/r$$

$$f\left(\frac{r}{\lambda}\right) = 2 \sin \pi/r \Rightarrow r$$

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