

$$\frac{x-1}{x} - \frac{x}{x-1} \geq 0 \rightarrow \frac{1-2x}{x^2-x} \geq 0 \rightarrow \frac{1}{x} - \frac{1}{x-1} \geq 0 \rightarrow D_f: (-\infty, 0) \cup [\frac{1}{2}, +\infty)$$

$x=0$ یا $x=1$

$$\frac{2}{x-1} + \frac{1}{x+2} \neq 0 \rightarrow \frac{2x+7+x-1}{x^2+x-2} \rightarrow 3x+6 \neq 0 \rightarrow x \neq -\frac{6}{3}$$

$x \neq -1, 0, 1, -2$

$$D_f: \mathbb{R} - \{0, -1, 1, -2, -\frac{6}{3}\}$$

$$\sqrt{(\frac{1}{3})^x - 9} (32 - 4^x) \geq 0 \quad (\frac{1}{3})^x - 9 = 0 \rightarrow (\frac{1}{3})^x = 9 \rightarrow x = -2$$

$$32 - 4^x = 0 \rightarrow 32 = 4^x \rightarrow 2^5 = 2^{2x} \rightarrow x = \frac{5}{2}$$

$$D_f: (-\infty, -2] \cup [\frac{5}{2}, +\infty)$$

$$\sqrt{y+1} = 3 - \sqrt{x-1} \xrightarrow{2 \text{ توان}} y+1 = 9 + \sqrt{x-1} - 6\sqrt{x-1} \rightarrow \sqrt{x-1} - 6\sqrt{x-1} + 8 \geq -1$$

$x \geq 1$ و $y \geq -1$

$$(\sqrt{x-1} - 3)^2 \geq 0 \rightarrow D_f: [1, +\infty)$$

$$\left. \begin{aligned} x^2 - x - 2 > 0 &\rightarrow \frac{-1 \pm 3}{2} \\ x^2 - 1 > 0 &\rightarrow x^2 \geq 1 \rightarrow x \geq 1 \\ &\quad x \leq -1 \end{aligned} \right\} D_f: (-\infty, -1) \cup (2, +\infty)$$

$$x = -2 \rightarrow 2 - 2a - 2 \rightarrow a = -\frac{1}{2} \quad -2 \times b = \frac{c}{a} = -3 \rightarrow b = \frac{3}{2}$$

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

$$\left. \begin{aligned} \sqrt{f(x)} - x &\rightarrow f(x) \geq x^2 \xrightarrow{x \geq 1} 2x - 2 \geq 2 \rightarrow x \geq 1 \\ &\quad x < 1 \quad 2x + 3 \geq x \rightarrow x \geq -3 \end{aligned} \right\} D_f: [-3, +\infty)$$

$$f(\sin \frac{\sqrt{r}}{r} + \cos r\pi) = f(1 + \frac{\sqrt{r}}{r}) = r(1 + \frac{\sqrt{r}}{r}) - f(1 + \frac{\sqrt{r}}{r})$$

$$= r + \frac{r}{r} + \sqrt{r} - r - r\sqrt{r} = -\frac{1}{r}$$

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$$f(\alpha) = \frac{\alpha+1}{\alpha-1} \rightarrow f(\frac{\alpha+1}{\alpha-1}) = \frac{\alpha+1+\alpha-1}{\alpha+1-\alpha+1} = \frac{2\alpha}{2} = \alpha$$

$$f(f(\alpha)) = \alpha \rightarrow D_f: \mathbb{R} - \{1\}$$

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$$x^2 - f(x) = -r \rightarrow (x-r)^2 = 0 \rightarrow x = r$$

$$g(\alpha) = r \rightarrow \sqrt{\alpha^2 - 1} = r \rightarrow \alpha^2 = r^2 + 1 \rightarrow \alpha = \pm \sqrt{r^2 + 1}$$

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$$x = -4 \rightarrow f(-r) = r^2 + r^2 + r = \sqrt{r}$$

$$x = 1 \rightarrow f(r) = 1 - r + r = r$$

$$f(r) \times f(r) = r \times \sqrt{r} = 1 \times r$$

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$$f(\cos^2 x) + \alpha \cos x = r, \alpha \rightarrow f(\cos^2 x) + \alpha \cos x - r/\alpha = 0$$

$$\cos x = \frac{-\alpha \pm \sqrt{\alpha^2 - 4\alpha(r-\alpha)}}{2\alpha} \rightarrow \cos x = -\frac{1}{\alpha} \rightarrow -1 \leq \cos x \leq 1$$

$$f(r, \alpha) = \tan^2 45^\circ \rightarrow (\sqrt{r})^2 = r$$

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