

الف)  $\frac{x-1}{x} = \frac{x}{x-1} = \frac{(x-1)^2 - x^2}{x(x-1)}$

$= \sqrt{\frac{1-2x}{x^2-x}}$

$\rightarrow x \neq 0 \text{ و } \frac{1}{x}$

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

ب)  $x \neq 1 \text{ و } 0 \text{ و } -2 \text{ و } -1$

$\frac{x}{x-1} = \frac{-1}{x+2}$

$x^2 + 2 = -x + 1$

$x \neq -1$

$x \neq -\frac{1}{2}$

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

$f(x) = \sqrt{\left(\frac{1}{x} - 9\right)(x^2 - 25)}$   
 $0 = x = -2 \quad 0 = x = 2, \infty$   
 $-2 \quad \frac{1}{9} = 1, \infty$

$D_f = (-\infty, -2] \cup [\frac{1}{9}, +\infty)$

$\sqrt{y+1} = x - \sqrt{x-1}$

$x - \sqrt{x-1} \geq 0 \quad x \leq 1$

$x \geq 1 \rightarrow D_f = [1, \infty)$

$x^2 - x - 1 > 0$   
 $\Delta = 1 + 4 = 5 \quad x = \frac{1 \pm \sqrt{5}}{2}$   
 $\frac{1-\sqrt{5}}{2} \quad \frac{1+\sqrt{5}}{2}$   
 $x < \frac{1-\sqrt{5}}{2} \quad x > \frac{1+\sqrt{5}}{2}$

$x^2 - 1 \geq 0 \quad \textcircled{1} \cap \textcircled{2} \rightarrow D_f = (-\infty, \frac{1-\sqrt{5}}{2}) \cup (\frac{1+\sqrt{5}}{2}, +\infty)$   
 $x \geq 1 \quad \textcircled{3}$   
 $x \leq -1$

$x^2 + ax + b = 0 \rightarrow -x + 2a + b = 0 \quad -2a = 1 \quad a = -\frac{1}{2}$

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

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

①  $f(x) - x = x^2 - 2 - x = x^2 - x - 2 \geq 0 \quad x \geq 1$

②  $f(x) - x = x^2 + 3 - x = x^2 - x + 3 \geq 0 \quad x \geq -1 \quad x < 1$   
 $[-1, 1)$

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

$$f(u) = ru^r - ru$$

$$\sin \frac{\pi}{r} = \frac{\sqrt{r}}{r} \quad \cos 2\pi = 1$$

$$\frac{\sqrt{r}}{r} + 1 = \left( \frac{r + \sqrt{r}}{r} \right)$$

$$f(u) = r \left( \frac{r + \sqrt{r}}{r} \right)^r - r \left( \frac{r + \sqrt{r}}{r} \right) = \boxed{-\frac{1}{r}}$$

$$f(a) = \frac{a+1}{a-1} \rightarrow f(f(a)) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{ra}{r} = a$$

$$f(f(a)) = a \rightarrow \text{بجز برای یک}$$

$$u \neq 1$$

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

$$f(g(a)) = -r \quad f(u) = -\varepsilon \quad \begin{aligned} u^r - ru &= -\varepsilon \\ u^r - ru + r &= (u-r)^r \\ u &= r \end{aligned}$$

$$g(a) = r \rightarrow u^r - 1 = r$$

$$\hookrightarrow a^r = a \rightarrow a = \pm \sqrt[r]{a}$$

$$f(\varepsilon) \rightarrow u + r = \varepsilon \rightarrow u = 1 \rightarrow 1 - a + r = r$$

$$f(-r) \rightarrow u + r = -r \rightarrow u = -r \rightarrow r^r + r^0 + r = \quad \vee r$$

$$f(\varepsilon) \times f(-r) = r \times \vee r = \boxed{1 \varepsilon \varepsilon}$$

$$r \cos^r u + a \cos^r u = r, a$$

$$r \cos^r u + a \cos^r u - r, a = 0$$

$$\tan^r u = \frac{\frac{1}{r}}{\frac{\sqrt{r}}{r}} = \left( \frac{\sqrt{r}}{r} \right)^r = \boxed{\mu}$$

$$\cos^r u + a \cos^r u - 1 \varepsilon = 0$$

$$(u + v)(u - r) \rightarrow \begin{cases} \cos u = -\frac{v}{\varepsilon} \alpha \\ \cos u = \frac{r}{\varepsilon} = \frac{1}{r} v \end{cases}$$