

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

$$x+1 \neq 0 \rightarrow x \neq -1$$

$$x-1 \neq 0 \rightarrow x \neq 1$$

$$x+2 \neq 0 \rightarrow x \neq -2$$

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

$$\sqrt{\frac{x^2-2x+1-x^2}{x(x-1)}}$$

$$\sqrt{\frac{-2x+1}{x(x-1)}} = \frac{0 - \frac{1}{2} + 1}{\frac{1}{2} - \frac{1}{2} + \frac{1}{2}} = 1$$

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

$$\sqrt{x-1} + \sqrt{y+1} = 3$$

$$\sqrt{y+1} = 3 - \sqrt{x-1}$$

$$y+1 = 9 - 6\sqrt{x-1} + x-1$$

$$y = 8 - 6\sqrt{x-1} + x - 2 \rightarrow x \geq 1$$

$$\sqrt{y+1} \geq 0 \rightarrow 3 - \sqrt{x-1} \geq 0 \rightarrow \sqrt{x-1} \leq 3 \rightarrow x-1 \leq 9 \rightarrow x \leq 10$$

$$Df = [1, 10]$$

$$\sqrt{(x^2-9)(3x-2x^2)} \geq 0$$

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

$$F(x) = \frac{\log_{\varepsilon}(x^2-x-2)}{\sqrt{x^2-1}+1}$$

$$x^2-1 \geq 0 \rightarrow x \leq -1 \text{ یا } x \geq 1$$

$$\sqrt{x^2-1} \geq 0 \rightarrow \sqrt{x^2-1} + 1 \geq 1$$

$$x^2-x-2 > 0 \rightarrow$$

$$\frac{-1 \pm 2}{2} = \frac{-1 \pm 2}{2}$$

$$Df = (-\infty, -1] \cup [2, +\infty)$$

$$f(x) = \sqrt{3+ax-x^2} \rightarrow -x^2+ax+3 \geq 0 \rightarrow \frac{-a \pm \sqrt{a^2-12}}{2} \rightarrow Df = [-2, 5]$$

$$-(-2)^2 - 2a + 3 = 0 \rightarrow -2a - 1 = 0 \rightarrow a = -\frac{1}{2} \rightarrow -x^2 - \frac{x}{2} + 3 = (x+2)(-x+\frac{3}{2})$$

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

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

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

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

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

$$f(m) = r m^r - \varepsilon m = r m (m - r)$$

$$f\left(\frac{\sin \frac{\pi}{\sqrt{r}} + \cos \frac{\pi}{\sqrt{r}}}{\frac{\sqrt{r}}{r}}\right) \rightarrow f\left(\frac{r + \sqrt{r}}{r}\right) \rightarrow \frac{r \times \frac{r + \sqrt{r}}{r} \left(\frac{r + \sqrt{r}}{r} - r\right)}{(r + \sqrt{r}) \left(\frac{\sqrt{r} - r}{r}\right)} = \frac{r - \varepsilon}{r} = -\frac{1}{r}$$

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

$$f(f(a)) = a$$

$$a - 1 \neq 0 \rightarrow a \neq 1$$

$$\frac{a+1}{a-1} - 1 \neq 0 \rightarrow \frac{r}{a-1} \neq 0$$

$$Da = \{R - \{1\}\}$$

$$f(a) = a^r - \varepsilon a$$

$$g(a) = \sqrt{a^r - 1}$$

$$f(g(a)) = -\varepsilon \rightarrow g(a)^r - \varepsilon g(a) = -\varepsilon \rightarrow g(a)^r - \varepsilon g(a) + \varepsilon = 0$$

$$(g(a) - r)^r = 0 \rightarrow \widehat{g(a)} = r \quad \begin{matrix} \sqrt{a^r - 1} = r \\ a = \pm \sqrt[r]{a} \end{matrix}$$

$$f(x+y) = x^r - \varepsilon x + y$$

$$\xrightarrow{x=1} f(\varepsilon) = 1 - \varepsilon + \varepsilon = r$$

$$\xrightarrow{x=-r} f(-r) = r^r + r^r + \varepsilon = r^r$$

$$\left. \begin{matrix} f(\varepsilon) = r \\ f(-r) = r^r \end{matrix} \right\} \rightarrow f(\varepsilon) \times f(-r) = r^r \times r = r^r \varepsilon$$

$$f(\varepsilon \cos^r x + \omega \cos x) = f a n^r x, \quad f(\psi/\omega) = ?$$

$$\varepsilon \cos^r + \omega \cos x = \psi/\omega \rightarrow \varepsilon \cos^r x + \omega \cos x - \psi/\omega = 0 \xrightarrow{\cos(0)}$$

$$\cos^r x + \omega \cos x - r^2 = 0 \rightarrow (\cos x + r)(\cos x - r) = 0$$

$$\begin{matrix} \swarrow \cos x = \frac{1}{r} \\ \searrow \cos x = -\frac{1}{r} \end{matrix}$$

$$f(\psi/\omega) = f a n^r x = \frac{1}{\cos^r x} - 1 = \frac{1}{\frac{1}{\varepsilon}} - 1 = \varepsilon - 1 = r$$