

$$\text{b) } f(x) = \sqrt{\frac{x-1}{x} - \frac{x}{x-1}} \quad \text{def. } \geq 0 \rightarrow \frac{x-1}{x} - \frac{x}{x-1} \geq 0 \quad \frac{1-2x}{x(x-1)} \geq 0 \rightarrow D = (-\infty, 0) \cup \left[\frac{1}{2}, 1\right)$$

$$b) f(x) = \frac{\frac{1}{x+1} - \frac{2}{x}}{\frac{x}{x-1} + \frac{1}{x+1}} \rightarrow D = \mathbb{R} \setminus \{-1, 0, 1\} \Rightarrow D_f = \mathbb{R} \setminus \{-1, 0, 1\}$$

الف) $f(x) = \sqrt{\left(\left(\frac{1}{x}\right)^x - 9\right)(32 - 4x)} - \left(\left(\frac{1}{x}\right)^{x-2} - 9\right)(32 - 4x) \geq 0 \rightarrow D_f = (-\infty, -1] \cup \left[\frac{8}{3}, +\infty\right)$

ب) $\sqrt{x-1} + \sqrt{9+1} = 3$
 $\sqrt{x-1} \leq 2 \rightarrow 0 \leq x-1 \leq 4 \rightarrow 1 \leq x \leq 5$
 $D_f = [1, 5]$

$$f(x) = \frac{\log_e \frac{(x^2 - x + 1)}{\sqrt{x^2 - 1} + 1}}{(x - 2)(x + 1)} \rightarrow \frac{-1}{+1-1} \rightarrow \frac{-1}{0} \rightarrow \text{D.F.} = (-\infty, -1) \cup (1, +\infty)$$

نہ ضرورت ہے کہ $x^2 - 1 > 0$ کی بجائے $x^2 - 1 < 0$ کی صورت میں بھی $\log$ کی تعریف ہو سکتی ہے۔

$f(x) = \sqrt{c+ax-x^2} \xrightarrow{w^0} [-r, b] \xrightarrow{d^0} \omega_0^0 \rightarrow$
 $a+b=? \quad \omega_0^0 \xrightarrow{w^0} \omega_0^0 \xrightarrow{d^0} \omega_0^0 = \frac{c}{a} \Rightarrow (-r)b = -\frac{r}{r}$
 $-xr+ax+r$
 $a+b \xrightarrow{r} \frac{r}{r} - \frac{1}{r} \xrightarrow{r} \omega_0^0 \xrightarrow{r} -\frac{b}{a} \Rightarrow a = -r + \frac{r}{r} \rightarrow a = \frac{r}{r} - \frac{1}{r}$

$$f(x) = \begin{cases} x-1 & x \geq 1 \\ x+1 & x < 1 \end{cases} \rightsquigarrow \text{find } g(x) = \sqrt{f(x)-x} =$$

$$f(x), x^2 - 4x$$

$$f\left(\sin \frac{\pi}{4} + \cos 2\pi\right) \rightarrow f\left(1 + \frac{\sqrt{2}}{2}\right) \xrightarrow{\text{محل}} f\left(1 + \frac{\sqrt{2}}{2}\right), 2\left(1 + \frac{\sqrt{2}}{2}\right)^2 - 4\left(1 + \frac{\sqrt{2}}{2}\right)$$

$$\left(\sin \frac{\pi}{4}, \frac{\sqrt{2}}{2} \quad \cos 2\pi = 1\right) \quad 2\left(1 + \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}\right) - 4 - 2\sqrt{2}$$

$$\sin \frac{\pi}{4} + \cos 2\pi = \frac{\sqrt{2}}{2} + 1 \quad 2 + \frac{\sqrt{2}}{2} + \sqrt{2} - 4 - 2\sqrt{2} = -2 + \frac{3\sqrt{2}}{2} = \frac{-4 + 3\sqrt{2}}{2}$$

$$f(x), \frac{x+1}{x-1} \rightarrow \text{دو تابع این تابع وارث} \rightarrow \text{فرض کنیم } f(f(x)) = x$$

$$a \in \mathbb{R} - \{1\} \quad a \neq 1$$

$$f(x), x^2 - 2x$$

$$g(x), \sqrt{x^2 - 1}, \quad f(g(a)) = 2$$

$$g(a)^2 - f(g(a)) = 2$$

$$(g(a) - 1)^2 = 0 \rightarrow g(a) = 1 \rightarrow \sqrt{a^2 - 1} = 1 \rightarrow a^2 - 1 = 1 \rightarrow a^2 = 2 \rightarrow a = \pm \sqrt{2}$$

$$f(x), x^2 - 8x + 9$$

$$f(f) \times f(-2) = \dots$$

$$f(f) = f(1+3) = 1 - 8 + 9 = 2$$

$$f(-2) = f(-9+3) = 81 + 18 + 9 = 108$$

$$f(f) \times f(-2) = 2 \times 108 = 216$$

$$f(\cos^2 x + 2 \cos x), \tan^2 x$$

$$f(3) = 3 \checkmark$$

$$\Delta = 1.0 - 1(1)(-1) = 2 \rightarrow \frac{-1 \pm \sqrt{1+2}}{2} = \frac{-1 \pm \sqrt{3}}{2}$$

$$\tan 45^\circ = 1 \rightarrow \frac{1}{\sqrt{3}} \rightarrow \frac{\sqrt{3}}{3}$$

$$\tan 120^\circ = -\sqrt{3}$$