

الف)  $\frac{x-1}{x} - \frac{x}{x-1} > 0 \rightarrow \frac{(x-1)^2 - x^2}{x(x-1)} \rightarrow \frac{x^2 + 1 - 2x - x^2}{x(x-1)} \rightarrow \frac{1-2x}{x(x-1)}$

Sign chart:  $\frac{1}{x} \rightarrow + \mid - \mid +$  and  $\frac{1}{x-1} \rightarrow + \mid - \mid +$

Number line:  $\frac{1}{x} \rightarrow + \mid - \mid +$  and  $\frac{1}{x-1} \rightarrow + \mid - \mid +$

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

ب)  $x \neq 1, x \neq 0, x \neq -1, x \neq -2, x \neq \frac{-\omega}{2}$   $D = \mathbb{R} - \{-2, -\frac{\omega}{2}, -1, 0, 1\}$

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

$x \neq 1, -2$

الف)  $(\frac{1}{x})^x - 1 \rightarrow \frac{x}{x} \mid + \mid -$

$x^x - x^x \rightarrow \frac{x}{x} \mid + \mid -$

Sign chart:  $\frac{x}{x} \rightarrow + \mid - \mid +$  and  $\frac{x}{x} \rightarrow + \mid - \mid +$

$D = (-\infty, -2] \cup [2/\omega, +\infty)$

ب)  $x \geq 1$   $D = [1, +\infty)$

$\sqrt{y+1} = x - \sqrt{x-1} \rightarrow \text{باید مساوی باشد}$

$\rightarrow \sqrt{x-1} \leq x \rightarrow x-1 \leq x^2 \rightarrow x \leq x^2$

$D \in [1, +\infty)$

$\sqrt{x^2-1} \rightarrow x^2-1 \geq 0 \quad x^2 \geq 1 \quad x \geq 1, x \leq -1$

$x^2 - x - 2 > 0 \quad x \leq -1, x > 2$

$D = (-\infty, -1) \cup (2, +\infty)$

$D = [-2, b]$

$f(x) \rightarrow \max_{x \in D}$

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

$b = 1/\omega$

$a = -\frac{1}{x}, b = 1/\omega \rightarrow 1$

$g(x) = \sqrt{f(x)} - x$

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

$x < 1 \rightarrow x^2 + 3 - x \rightarrow x^2 + 3 \geq 0 \rightarrow [-\sqrt{3}, 1)$

$D = [-\sqrt{3}, +\infty)$

$\sin \frac{\pi}{2} = \frac{\sqrt{x}}{x}$

$x \rightarrow \cos \frac{\pi}{2} = 1$

$\frac{\sqrt{x}}{x} + 1 \quad x(\frac{\sqrt{x}}{x} + 1)^2 - 4(\frac{\sqrt{x}}{x} + 1)$

$x(\frac{x}{x} + 1 + \sqrt{x}) - 4\sqrt{x} - 4 = \frac{x}{x} + x - 4 = \frac{-1}{x}$

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

$D = \{1\}$

$$x^r - \epsilon x = -\epsilon \rightarrow x^r - \epsilon x + \epsilon = 0$$

$$(x - \epsilon)^r = 0 \quad y(u) = r$$

$$\sqrt{\alpha^r - 1} = r$$

$$\alpha^r - 1 = r$$

$$\alpha^r = \omega \quad \alpha = \pm \sqrt{\omega}$$

$$(x + r) = -r$$

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

$$x + r = r$$

$$x = 1$$

$$f(r) = 1 - \omega + r = r$$

$$r \times r = 1 \epsilon f$$

$$r \cos^r x + \omega \cos x = r/\omega$$

$$r t^r + \omega t - r/\omega = 0$$

$$(r t + r/\omega)(r t - 1) = 0$$

$$t = -1/\sqrt{\omega}$$

↓

?

$$t = \frac{1}{r} \rightarrow \cos x = \frac{1}{r}$$

$$x = r \pm \frac{\pi}{r}$$



$$\tan \frac{\pi}{r} = \sqrt{r}$$

$$\tan \frac{-\pi}{r} = -\sqrt{r}$$

$$\tan^r x = r$$

ج-۲)  $\sqrt{x-1} + \sqrt{y+1} = 3$  ,  $\underbrace{\sqrt{y+1}}_{\text{همواره نامنفی}} = \underbrace{3 - \sqrt{x-1}}_{\text{همواره نامنفی!}} \rightarrow 3 - \sqrt{x-1} \geq 0 \rightarrow \sqrt{x-1} \leq 3 \rightarrow x \leq 10$

$\downarrow$   
 $x-1 \geq 0 \rightarrow x \geq 1$  I

I, II  $\rightarrow 1 \leq x \leq 10 \rightarrow D_f = [1, 10]$