

$$الف) f(x) = \sqrt{\frac{x-1}{x} - \frac{x}{x-1}} \rightarrow \frac{x-1}{x} - \frac{x}{x-1} \geq 0 \quad (1)$$

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

$$D_x = (-\infty, 0) \cup \left[\frac{1}{2}, 1\right) \quad (2)$$

$$ب) f(x) = \frac{1}{x+1} - \frac{1}{x} \rightarrow \frac{x}{x-1} + \frac{1}{x+1} = \frac{x^2+x+1-x-1}{x^2-x-2}$$

$$= \frac{x^2+x}{x^2-x-2} \neq 0 \quad (1, 2)$$

$$D_x = \mathbb{R} - \left\{ -2, -\frac{5}{2}, 1 \right\}$$

هر عبارتی که در مخرج است نباید صفر شود!

$$x \neq -\frac{5}{2}$$

$$x \neq 1, -2$$

برای اخرج صحیح! یعنی کت

$$الف) f(x) = \sqrt{\left(\left(\frac{1}{x}\right)^x - 9\right)(12 - 4^x)} \Rightarrow \left(\frac{1}{x^x} - 3^2\right)(12 - 2^{2x}) \geq 0 \quad (3)$$

$$\frac{-2 \quad 1.5}{+ - - +} \rightarrow D_x = (-\infty, -2] \cup [1.5, +\infty) \quad (1, 2)$$

$$ب) \sqrt{x-1} + \sqrt{y+1} = 3 \rightarrow x-1 \geq 0 \rightarrow x \geq 1$$

$$D_x = [1, +\infty) \quad \rightarrow \sqrt{y+1} = 3 - \sqrt{x-1} \rightarrow \sqrt{y+1} \leq 3 \rightarrow y+1 \leq 9 \rightarrow y \leq 8$$

$$D_y = [1, 8]$$

Arman

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$$f(x) = \frac{\log_f(x^2 - x - 2)}{\sqrt{x^2 - 1} + 1} \rightarrow x^2 - x - 2 > 0 \rightarrow (x-2)(x+1) > 0 \quad (2)$$

$$\sqrt{x^2 - 1} \neq -1 \rightarrow x \in \mathbb{R} \rightarrow D_x = (-\infty, -1) \cup (1, +\infty)$$

$$f(x) = \sqrt{x^2 + ax - 2} \xrightarrow{x=-2} 3 - 2a - 2 = 0 \rightarrow -2a = 1 \quad (3)$$

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

$$x=b \rightarrow 3 - \frac{b}{2} - b^2 = 0 \rightarrow 2b^2 + b - 6 = 0$$

$$\Delta = 1 + 48 = 49 \rightarrow b^2 + b - 3 = 0 \rightarrow (b+3)(b-1) = 0$$

$$a+b = -0.5 + 1.5 = 1 \quad b = -1, 1.5 \leftarrow (b+3)(b-1) = 0$$

$$g(x) = \sqrt{f(x) - x} \rightarrow f(x) - x \geq 0$$

$$f(x) = x^2 - 2 = x \rightarrow x^2 - x - 2 = 0 \rightarrow x_1 = -1, x_2 = 2$$

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

$$x+2 \geq 0 \rightarrow x \geq -2, x < 1 \rightarrow -2 \leq x < 1$$

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

$$f(x) = x^2 - 2 \rightarrow f\left(\sin \frac{\pi}{6} + \cos 2\pi\right)$$

$$= f\left(\frac{\sqrt{3}}{2} + 1\right) = \frac{9}{4} + 2 + 2\sqrt{3} - 2\sqrt{3} - 2 = 1.5 - 2 = -0.5$$

دقت! $-0.5 = -\frac{1}{2}$

Arman

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

(V)

$$\Rightarrow a = \frac{1+a}{a-1} \times \frac{a-1}{1} = a \rightarrow D_a = \mathbb{R} - \{1\}$$

که این را می توانیم به هر صورتی بنویسیم

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

(1)

$$\rightarrow a^2-1 - f\sqrt{a^2-1} = -f \xrightarrow{\sqrt{a^2-1}=t} t^2 - ft + f = 0$$

$$t = 1$$

$$\sqrt{a^2-1} = 1$$

$$a^2-1 = 1 \rightarrow a = \pm\sqrt{2}$$

$$f^2(n+3) = (n-3)(n-1) \rightarrow f^2(4) = f^2(1+3)$$

(9)

$$= (1-3)(1-1)$$

$$f^2(-3) = f^2(-4+3) = (-4-3)(-4-1) = 2$$

$$= \sqrt{2}$$

$$f^2(4) \times f^2(-3) = 1 \times \sqrt{2} = \sqrt{2}$$

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$$r \cos^2 u + s \cos u = r_1 s \xrightarrow{ac} (\cos u + r)(\cos u - r) \quad (1)$$

$$f(r, s) = \tan^2 \gamma = \sqrt{r} = \boxed{r} \quad \cos u = -\frac{r}{s}, \frac{1}{r}$$

x

$u = \frac{\pi}{r}$

تقریب‌های مغرب‌ها نباید در دامنه باشند!

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

$$Df = \mathbb{R} - \left\{ -1, 0, 1, -\frac{\omega}{2} \right\}$$

ب-۲) $\sqrt{x-1} + \sqrt{y+1} = 3$, $\sqrt{y+1} = \frac{3-\sqrt{x-1}}{1} \rightarrow \sqrt{y+1} \geq 0 \rightarrow \sqrt{x-1} \leq 3 \rightarrow x \leq 10$

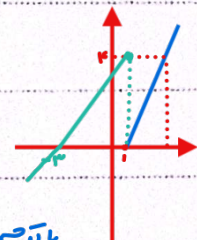
$\downarrow$
 $x-1 \geq 0 \rightarrow x \geq 1 \quad I$

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

$$f(n) - n = \begin{cases} r_n - r - n & n \geq 1 \\ r_n + r - n & n < 1 \end{cases} = \begin{cases} r_n - r & n \geq 1 \\ n + r & n < 1 \end{cases} \quad -5$$

$$f(n) - n \geq 0 \rightarrow \begin{cases} r_n - r \geq 0 \rightarrow n \geq 1 \quad \checkmark \\ n + r \geq 0 \rightarrow -r \leq n < 1 \quad \checkmark \end{cases} \rightarrow Df = [-r, +\infty)$$

باندجه به پس نیز منفی است!



$$f(n) = r_n^2 - 2n = r_n^2 - 2n + 2 - 2 = r(n^2 - 2n + 1) - 2 = r(n-1)^2 - 2 \quad -4$$

$$\sin \frac{\pi}{r} + \cos r = \sqrt{\frac{r}{r}} + 1 \rightarrow f\left(\sqrt{\frac{r}{r}} + 1\right) = r\left(\sqrt{\frac{r}{r}} + 1 - 1\right)^2 - 2 = r\left(\frac{r}{r}\right) - 2 = -\frac{1}{r}$$