

$f\left(\frac{\sqrt{x}}{y} + 1\right) = \sqrt{x(x-y)} = \sqrt{x\left(\frac{\sqrt{x}+y}{y}\right)} \left(\frac{\sqrt{x}-y}{y}\right)$ $= \frac{x-y}{y} \quad \checkmark \quad \text{D}$	6
$f\left(\frac{a+1}{a-1}\right) = a \rightarrow \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = a \rightarrow \frac{\frac{a+1}{a-1}}{\frac{y}{a+1}} = a$ $D_f = \mathbb{R} - \{1\} \quad \checkmark \quad \text{D}$	7
$f(g(a)) = x \rightarrow g(a) = y$ $x^y - 1 = x - 1$ $x^y - 1 = x + 1$ $(x-1)^y = 2$ $x = y$ $\sqrt{a^y - 1} = y$ $a^y - 1 = y^2$ $a^y = y^2 + 1 \rightarrow a = y \pm \sqrt{y}$	8
$f(x) \xrightarrow{x=1} 1 - 2 + 5 = 4$ $f(-3) \xrightarrow{x=-5} 10 + 10 + 5 = 25$ $f(x) \neq f(y) \quad \checkmark \quad \text{D}$	9
$\cos^2 x = x \rightarrow \cos^2 x + \delta x = \frac{1}{y}$ $2 \cos x (-\sin x) \delta x = -\frac{1}{y^2} \delta y$ $-2 \cos x \sin x \delta x = -\frac{1}{y^2} \delta y$ $2 \cos x \sin x \delta x = \frac{1}{y^2} \delta y$ $x = \frac{-y}{f} \rightarrow \frac{1}{f} \xrightarrow{x=\frac{1}{y}} \sin x = \frac{1}{y}$ $f\left(\frac{1}{y}\right) = \tan^{-1} \frac{1}{y}$ $= \left(\frac{1}{y}\right)^y = \frac{1}{y}$	10

تمام ریشه‌های مقعرها نباید در دامنه باشند! $x+1 \neq 0 \rightarrow x \neq -1$ $x \neq 0$ $x-1 \neq 0 \rightarrow x \neq 1$ **ب - ۱)**

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

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

$$f(n) - n = \begin{cases} x_n - 2 - n & n \geq 1 \\ x_n + 3 - n & n < 1 \end{cases} = \begin{cases} x_n - 2 & n \geq 1 \\ x_n + 3 & n < 1 \end{cases} \quad \Delta$$

$$f(n) - n \geq 0 \rightarrow \begin{cases} x_n - 2 \geq 0 \rightarrow n \geq 1 \quad \checkmark \\ x_n + 3 \geq 0 \xrightarrow{n < 1} -3 \leq n < 1 \quad \checkmark \end{cases}$$

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

با توجه به شکل نیز مشخص است!

