

الف) $y'' - 2x = 2x - 1 \Rightarrow$ فرض کنیم $\begin{cases} y_1'' = 2x^2 + 2x - 1 \\ y_2'' = 2x^2 + 2x - 1 \end{cases} \rightarrow y_1'' = y_2'' \Rightarrow y_1 = y_2$ پایست ✓ (1)

ب) $x \cos y = y \cos x \xrightarrow{x=\frac{\pi}{2}} \frac{\pi}{2} \cos y = y \cos \frac{\pi}{2} \Rightarrow \cos y = 0 \rightarrow y = k\pi + \frac{\pi}{2}$ پایست ✓ (1)

ج) $\frac{x+y}{r} = \sqrt{xy} \rightarrow x+y = r\sqrt{xy} \rightarrow x+y - r\sqrt{xy} \rightarrow (\sqrt{x} - \sqrt{y})^2 \geq 0 \rightarrow \sqrt{x} = \sqrt{y}$ پایست ✓ (2)

د) $xy^2 + 2x - y^2 - 2y = 0 \rightarrow xy^2 - y^2 + 2x - 2y = 0$
 $y^2(x-y) + 2(x-y)$

$(x-y)(y^2+2) = 0 \rightarrow x=y$ پایست ✓

و) $|y| + x^2 = 2y \rightarrow$ پایست ✓

$x^2 = 2y - |y| \xrightarrow{y \geq 0} 2y - y = x^2$

$2y - |y| \geq 0$

$|y| \leq 2y$

$-2y \leq y \leq 2y \rightarrow$

$\begin{cases} x^2 \geq 0 \\ x^2 \geq 0 \end{cases} \Rightarrow y \geq 0$

ب) $[y] + [x] = 1$

$[y] = 1 - [x]$

$\xrightarrow{x=1} [y] = 0$

$1 \leq y < 2 \rightarrow$ پایست ✓

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

$x=3 \rightarrow 2(3)^2 - b = 11 - b \Rightarrow 11 - b = 4 + a$

$a + 2(3) = 4 + a \Rightarrow 11 = a + b$ پایست ✓

$f(x) = \sqrt{a - bx - x^2} \rightarrow -(x^2 + bx - a)$

$-a = ab$

$b = -1$

$a + b = -1 + 2 = 1$ پایست ✓

$\begin{matrix} b & a \\ + & - & + \end{matrix}$

$-(x-b)(x-a)$

$-(x^2 - (bx+a)x + ab)$

$-b - a = +b$
 $+1 - a = -b \Rightarrow a = 2$

$y = \frac{x}{\sqrt{ax^2 + bx + c}} \rightarrow a = 0$

$bx + c > 0 \rightarrow x > -\frac{c}{b}$

$-\frac{c}{b} = 2$

$c = -2b$

$2a + c = 2|b|$

$2b - 2b = 0 = (b)$ ✓

ب) $\rightarrow$ چون تابع زوج است - اعراضی

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$$y = \sqrt{\frac{r^2x + r}{x + b}} + a \quad \frac{r^2x + r}{x + b} + a \xrightarrow{a=r} \frac{r^2x + r}{x + b} + a$$

$$\frac{r^2x + r + ax + ab}{x + b} \rightarrow \frac{a(r+a) + r + ab}{x + b} \rightarrow \frac{a(r+a) + r + ab}{x + b} \rightarrow a + r = 0 \rightarrow a = -r$$

و چون $a = -r$ $\Rightarrow$ $h = -r$ ✓

تو $h = -r$ $\Rightarrow$ $h = -r$ ✓

$$21) y = \sqrt{x(n-1)(n+1)} \Rightarrow D_f = [-1, \infty) \cup [1, \infty) \quad \checkmark$$

$-1 \leq x \leq 1$

$$22) y = \frac{1}{\sqrt{|x|-1}} \Rightarrow |x|-1 > 0 \rightarrow |x| > 1 \rightarrow x > 1, x < -1 \rightarrow (-\infty, -1) \cup (1, \infty) \quad \checkmark$$

$$y = \sqrt[3]{\frac{1}{|x| - [x]}} \rightarrow |x| - [x] \neq 0 \rightarrow |x| \neq [x] \quad D_f = \mathbb{R} - \mathbb{Z} \quad \checkmark$$

فقط در $x = 0$ $\Rightarrow$ $0 = 0$

$$\sqrt{x} + \sqrt{y} = 9 \rightarrow 9 - \sqrt{x} = \sqrt{y} \Rightarrow 9 - \sqrt{x} \geq 0 \rightarrow \sqrt{x} \leq 9 \rightarrow -1 \leq x \leq 81 \quad D_f = [-1, 81] \quad \checkmark$$

$$y = \frac{1}{\sqrt{\left[xn - \frac{1}{r}\right] + \left[xn + \frac{r}{r}\right]}} \quad D_f = \left[\frac{1}{2}, \infty\right) \quad \checkmark$$

$\frac{1}{r} \leq xn \leq \frac{1}{2} + \frac{r}{r}$

$\left[xn - \frac{1}{r}\right] + \left[xn + \frac{r}{r}\right] + r > 0 \rightarrow x \left[xn - \frac{1}{r}\right] > -r \rightarrow \left[xn - \frac{1}{r}\right] > -1 \rightarrow xn - \frac{1}{r} > -1$

وقت!

$$y = \sqrt{1 - \log(r^2x - a)} \rightarrow r^2x - a > 0$$

$r^2x > a$
 $x > \frac{a}{r^2}$

$1 - \log(r^2x - a) \geq 0$
 $\log(r^2x - a) \leq 1$
 $r^2x - a \leq 1$
 $r^2x \leq 1 + a$
 $\frac{a}{r^2} < x \leq \frac{1+a}{r^2} \rightarrow \frac{1+a}{r^2} = C$
 $\frac{a}{r^2} = b$
 $C - b = \frac{1+a}{r^2} - \frac{a}{r^2} = \frac{1}{r^2} = \textcircled{2} \quad \checkmark$