

الف) $x^3 - 2x^2 = 2n - 1$

$$\begin{cases} y_1^3 = 2n^2 + 2n - 1 \\ y_2^3 = 2n^2 + 2n - 1 \end{cases}$$

$$\Rightarrow \{y_1^3 = y_2^3 \Rightarrow y_1 = y_2$$

تابع است

ب) $n \cos y = y \cos n \xrightarrow{n = \frac{\pi}{y}} \frac{\pi}{y} \cos y = \sin y$
 $y = \frac{\pi}{y}, \frac{5\pi}{y}, \dots$

تابع نیست

ج) $\frac{n+y}{2} = \sqrt{ny}$, $n, y > 0$.

$$n+y = 2\sqrt{ny} \rightarrow n+y-2\sqrt{ny} = 0 \rightarrow (\sqrt{n} - \sqrt{y})^2 = 0$$

$$\begin{cases} \sqrt{y_1} = \sqrt{n} \\ \sqrt{y_2} = \sqrt{n} \end{cases} \quad \sqrt{y_1} = \sqrt{y_2} \xrightarrow{\text{مربع}} |y_1| = |y_2| \xrightarrow{y>0} y_1 = y_2$$

د) $ny^2 + 2n - y^3 - 2y = 0$

$$n(y^2 + 2) = y^3 + 2y \rightarrow n = \frac{y(y^2 + 2)}{y^2 + 2} \Rightarrow n = y$$

ه) $\frac{|y| + n^2}{2} = 2y \Rightarrow 2y \geq 0 \quad y + n^2 = 4y \rightarrow y = n^2$

و) $[y] + [2y] = 1$

$$\xrightarrow{n=0} [y] = 1 \rightarrow 1 < y < 2$$

تابع نیست

$$f(n) = \begin{cases} rn^r - b & |n-1| \geq r \\ a + rn & 0 \leq n \leq c \end{cases} \rightarrow f(n) = \begin{cases} rn^r - b & n \geq c, n \leq -1 \\ a + rn & 0 \leq n \leq c \end{cases} \quad (2)$$

$$n = r \rightarrow \cancel{11-b=a+r} \rightarrow \boxed{a+b=1r}$$

$$f(n) = \sqrt{a - bn - n^r} \quad -n^r - bn + a \geq 0$$

$$D_f = [b, a] \quad \begin{array}{cc} b & a \\ -\phi & +\phi - \end{array}$$

$$S = a + b = -b \rightarrow -a = rb \\ P = abc = -a \rightarrow \boxed{b = -1}$$

$$\xrightarrow{b=-1} a = rb \rightarrow a = -r \rightarrow \boxed{a = r} \\ a + b = +r - 1 = (1)$$

$$y = \frac{r}{\sqrt{an^r + bn + c}}$$

$$D_y = (-\infty, r) \\ an^r + bn + c \geq 0$$

$$\begin{array}{c} r \\ +\phi - \\ \hline \end{array} \quad \begin{array}{c} \text{بزرگتر} \\ \downarrow \\ a=0 \end{array} \\ \text{منتر} \rightarrow b < 0$$

$$\rightarrow y = bn + c \xrightarrow{(r, 0)} 0 = rb + c \rightarrow c = -rb$$

$$ra + c - c/|b| \geq 0 \rightarrow r - rb - r(-b) = (b)$$

$$y = \sqrt{\frac{rn+r}{n+b} + a}$$

$$D_y = (r, +\infty)$$

$$\frac{rn+r}{n+b} + a \geq 0$$

$$\begin{array}{c} \text{بزرگتر} \\ \downarrow \\ r \\ -\phi + \end{array}$$

$$\rightarrow \frac{rn+r+an+ab}{n+b} \geq 0 \rightarrow \frac{(r+a)n + r+ab}{n+b} \geq 0$$

$$r+a=0 \rightarrow \boxed{a=-r}$$

$$n+b=r \rightarrow \boxed{b=-r}$$

ا) $y = \sqrt{n^2 - n}$ $n^2 - n \geq 0 \rightarrow n(n-1) \geq 0$ (V)

$D_f = [-1, 0] \cup [1, +\infty)$

$\begin{array}{cccc} & -1 & 0 & 1 \\ & - & + & - \\ & + & - & + \end{array}$

ب) $y = \frac{1}{\sqrt{n^2 - 1}}$ $|n| - 1 \geq 0 \rightarrow |n| \geq 1$ (V)

$D_f = (-\infty, -1) \cup (1, +\infty)$

ج) $y = \sqrt{\frac{1}{|n| - [n]}}$ $|n| - [n] = 0 \rightarrow |n| = [n] \xrightarrow[n \in \mathbb{Z}]{n \geq 0} n = n$ (1)

$D_f = \mathbb{R} - (\mathbb{Z}^+ \cup \{0\})$

د) $\sqrt{x} + \sqrt{y} = 9$

$x \geq 0$ (I)

$y = -\sqrt{x} + 9$

$-\sqrt{x} + 9 \geq 0 \rightarrow \sqrt{x} \leq 9 \rightarrow |x| \leq 81$ (II)

$(I) \cap (II) \Rightarrow D_f = [0, 81]$

$x \leq 81$

هـ) $y = \frac{1}{[r_n - \frac{1}{r}] + [r_n + r - \frac{1}{r}]}$ (9)

$[r_n - \frac{1}{r}] + [r_n + r - \frac{1}{r}] > 0 \rightarrow r[r_n - \frac{1}{r}] > -r \rightarrow [r_n - \frac{1}{r}] > -1$

$\rightarrow 0 \leq r_n - \frac{1}{r} \rightarrow n \geq \frac{1}{2}$ $D_f = [\frac{1}{2}, +\infty)$

و) $y = \sqrt{1 - \log(r_n - a)}$

$1 - \log(r_n - a) \geq 0 \rightarrow r_n - a \leq 1 \rightarrow n \leq \frac{1+a}{r}$
 $r_n - a > 0 \rightarrow n > \frac{a}{r}$ (1)

$D_f = (b, c]$

$b = \frac{a}{r}$ $c = \frac{1+a}{r}$

$c - b = \frac{1+a}{r} - \frac{a}{r} = \frac{1}{r}$ (2)