

$$(1) \quad y^3 = 2x^2 + 2x - 1 \quad \{x_1 = x_2 \Rightarrow 2x_1^2 + 2x_1 - 1 = 2x_2^2 + 2x_2 - 1\} \\ \Rightarrow y_1 = y_2 : \text{تابع است}$$

$$(ب) \quad x \cos y = y \cos x \Rightarrow x = \frac{\pi}{2} \Rightarrow \frac{\pi}{2} \cos y = 0 \Rightarrow y = k\pi + \frac{\pi}{2} \quad \text{تابع نیست}$$

$$(ج) \quad \frac{x+y}{y} = \sqrt{xy} \Rightarrow x+y = 2\sqrt{xy} \Rightarrow x^2 + 2xy + y^2 = 4xy \Rightarrow (x^2 - 2xy + y^2) = (x-y)^2 = 0 \\ \Rightarrow x=y \quad \text{تابع هانی} \\ x, y > 0$$

$$(د) \quad xy^2 + 2x - y^3 - 2y \Rightarrow x(y^2 + 2) - y(y^2 + 2) = (x-y)(y^2 + 2) = 0 \Rightarrow x=y \quad \text{تابع است}$$

فاصله

(2)

$$f(x) = \begin{cases} 2x^2 - b; & |x-1| \geq 2 \\ 2x+a; & -3 \leq x \leq -1 \end{cases} \Rightarrow x = -1 \Rightarrow f(-1) = 2 - b = a - 2 \Rightarrow a + b = 4$$

(3)

$$f(x) = \sqrt{(x^2 + bx - a)} \Rightarrow \text{عدد } 0 \text{ در } x=a \Rightarrow a^2 + ab - a = 0$$

$$\Rightarrow a + b - 1 = 0 \Rightarrow a + b = 1$$

$a \neq 0$

(4)

$$y = \frac{2}{\sqrt{ax^2 + bx + c}} \rightarrow ax^2 + bx + c > 0 \equiv x < 2 \Rightarrow$$

$$bx + c \xrightarrow{x=2} 2b + c = 0 \quad c = -2b \quad a = 0 \quad \text{معادله ی ترانه درجه در باشد}$$

از آن جایی که برای جوابی در ضریب مثبت است

$$2a + c - 3|b| \Rightarrow 0 + (-2b) - 3(-b) = b$$

$$(ان) \quad f(x) = \sqrt{\frac{1}{|x| - [x]}} \Rightarrow |x| \neq [x] \Rightarrow x \notin \mathbb{W} \rightarrow x \in \mathbb{R} - \mathbb{W}$$

$$(ب) \quad \sqrt{x} + \sqrt{y} = 9 \Rightarrow \sqrt{x} = x \geq 0 \\ \sqrt{y} = 9 - \sqrt{x} \geq 0 \Rightarrow 9 \geq \sqrt{x} \Rightarrow x \leq 81 \quad \left. \begin{matrix} x \geq 0 \\ x \leq 81 \end{matrix} \right\} x \in [0, 81]$$

$$f(x) = \sqrt{\log \frac{x}{x-1}} \rightarrow \left. \begin{array}{l} x^2 - 1 > 0 \rightarrow x > \frac{1}{x} \\ x > 0, x \neq 1 \end{array} \right\} x \in \left(\frac{1}{x}, 1 \right) \cup (1, +\infty) \quad (4)$$

$$\left. \begin{array}{l} x > 1 \rightarrow \log \frac{x}{x-1} > 0 \rightarrow x^2 - 1 > 1 \rightarrow x > \frac{1}{x} \\ x < 1 \rightarrow \log \frac{x}{x-1} > 0 \rightarrow x^2 - 1 < 1 \rightarrow x < \frac{1}{x} \end{array} \right\} \left(\frac{1}{x}, \frac{1}{x} \right]$$

$$f(x) = \log \frac{1}{x + \sqrt{|x|} - |x|} \Rightarrow -|x| + \sqrt{|x|} + \frac{1}{2} > 0 \Rightarrow -(\sqrt{|x|} - \frac{1}{2})(\sqrt{|x|} + \frac{1}{2}) > 0$$

$$\Rightarrow \sqrt{|x|} < \frac{1}{2} \Rightarrow |x| < \frac{1}{4} \Rightarrow x \in (-\frac{1}{4}, \frac{1}{4})$$

(5)

$$y = \sqrt{\frac{x^2 + 2}{x + b}} + a = \sqrt{\frac{(x+a)x + ab + 2}{x + b}} \Rightarrow$$

برای اینکه دانه منفی $(x, +\infty)$ شکل بگیرد

تابع باید

در 2 تقریب نشه باشد

بای و دانه $(x, +\infty)$ باید صحت گرفته باشد
 باشد پس $a = -2 \Leftarrow a + 2 = 0$ است
 $b = -2 \Leftarrow x + b = 0 \Leftarrow$ دانه دارد

$$y = \sqrt{\frac{-x^2 + 2}{x + b}} \rightarrow (-b, +\infty) = (x, +\infty)$$

(6)

$$f(x) = \begin{cases} \sqrt{x-1} : [x] > 1 \rightarrow x > 1 \rightarrow y = \sqrt{x-1} - x + 1 = \sqrt{x} : x > 0 \Rightarrow x > 1 \\ \sqrt{x+3} : [x] \leq 1 \rightarrow x < 1 \rightarrow y = \sqrt{x+3} - x + 1 = \sqrt{x+3} \rightarrow x > -\frac{3}{4} \end{cases}$$

$$x \in \left[-\frac{3}{4}, +\infty \right)$$

$$-\frac{3}{4} \leq x < 1$$

$$y = \frac{x(1x^2 + 1x^2 + 4x + 1)}{(4x^2 + 4x + 1)^2} = \frac{(x+1)^2}{(x+1)^2} = \frac{x}{x+1} \Rightarrow x \in \mathbb{R} - \left\{ -\frac{1}{4} \right\} \quad (9)$$

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

$$\rightarrow 1 - \log(x-a) > 0 \rightarrow 1 > \log(x-a) \rightarrow x \leq a + \frac{a}{x} \left\} x \in \left(\frac{a}{x}, a + \frac{a}{x} \right] \quad (10)$$

$$c - b = a + \frac{a}{x} - \frac{a}{x} = a$$