

الف) $y^3 - 2x^2 = 2x - 1 \rightarrow \begin{cases} y_1^3 = 2x^2 + 2x - 1 \\ y_2^3 = 2x^2 + 2x - 1 \end{cases} \rightarrow y_1^3 = y_2^3 \rightarrow y_1 = y_2$ تابع است	۱
ب) $x \cos y = y \cos x \xrightarrow{x=\pi} \pi \cos y = y \cos \pi \rightarrow \pi \cos y = -y$ تابع نیست	
ج) $\frac{x+y}{2} = \sqrt{xy} \quad x, y > 0 \rightarrow x+y = 2\sqrt{xy} \rightarrow (\sqrt{x} - \sqrt{y})^2 = 0 \rightarrow \sqrt{x} = \sqrt{y} \rightarrow x = y$ تابع است	
د) $xy^2 + 2x - y^3 - 2y = 0 \xrightarrow{x=1} -y^3 + y^2 - 2y + 2 = 0 \rightarrow -(y-1)(y^2+2) = 0 \xrightarrow{x=y} \text{تابع است}$	
الف) $ y + x^2 = 2y \rightarrow y \geq 0 \rightarrow x^2 = y \rightarrow x^2 \geq 0 \checkmark$ $\rightarrow y < 0 \rightarrow x^2 = 2y \rightarrow y = \frac{x^2}{2} \rightarrow \frac{x^2}{2} \geq 0 \times$ تابع است	۲
ب) $[y] + [x] = 1 \xrightarrow{x=0} [y] = 1 \rightarrow y = 1, 2, 3, \dots$ تابع نیست $\hookrightarrow 1 \leq y < 2$	
$f(x) = \begin{cases} 2x^2 - b & x-1 \geq 2 \rightarrow 2x^2 - b \quad x \geq 3, x \leq -1 \\ a + 2x & 0 \leq x \leq 3 \end{cases}$ $\Rightarrow x=3 \rightarrow 2 \times 9 - b = a + 6 \rightarrow a + b = 12$	۳
$f(x) = \sqrt{a - bx - x^2} \quad [b, a] \quad a + b = -b \rightarrow a = -2b$ $ab = -a \rightarrow b = -1 \rightarrow a = -2(-1) = 2 \Rightarrow a + b = 2 - 1 = 1$	۴
$y = \frac{2^x}{\sqrt{ax^2 + bx + c}} \rightarrow a = 0 \rightarrow \sqrt{bx + c} \xrightarrow{x=1} 2b + c = 0 \rightarrow c = -2b$ $\begin{array}{c} 2 \\ + \\ 1 \\ - \end{array} \rightarrow -b < 0 \quad 2a + c - 2 b = 2(0) - 2b - 2(-b) = 0$	۵

$$y = \sqrt{\frac{x^2+1}{x+b}} + a \rightarrow (1, +\infty) \rightarrow \text{در عدد ۲ تعریف نمی شود} \rightarrow \text{بدون مخرج صفر} \rightarrow \frac{1}{b} = 0 \rightarrow b = -1$$

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الف) $y = \sqrt{x^3 - x} \rightarrow x^3 - x \geq 0 \rightarrow x(x^2 - 1) \geq 0 \rightarrow x(x-1)(x+1) \geq 0$

$$\begin{array}{c} -1 & 0 & 1 \\ + & - & + \\ -1 & +1 & -1 \end{array} \rightarrow P = [-1, 0] \cup [1, +\infty)$$

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ب) $y = \frac{1}{\sqrt{|x|-1}} \rightarrow |x|-1 > 0 \rightarrow |x| > 1 \rightarrow x > 1 \text{ و } x < -1$

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

الف) $y = \sqrt{\frac{1}{|x| - [x]}} \rightarrow |x| - [x] \neq 0 \rightarrow |x| \neq [x]$

$$P = (-\infty, 0) \cup (0, +\infty), x \notin \mathbb{Z}$$

ب) $\sqrt{x} + \sqrt{y} = 9 \rightarrow x, y \geq 0 \rightarrow x \leq 81$

$$P = [0, 81]$$

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نمی شود

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$$y = \frac{1}{\sqrt{[2x - \frac{1}{p}] + [2x + \frac{3}{p}]}} \rightarrow [2x - \frac{1}{p}] + [2x + \frac{3}{p}] \geq 0 \rightarrow 2[2x - \frac{1}{p}] + 1 - 1 > 0$$

$$2[2x - \frac{1}{p}] > 0 \rightarrow [2x - \frac{1}{p}] > 0 \rightarrow 2x - \frac{1}{p} \geq 0 \rightarrow 2x \geq \frac{1}{p} \rightarrow x \geq \frac{1}{2p}$$

$$P = [\frac{1}{2p}, +\infty)$$

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$$y = \sqrt{1 - \log(x-a)} \rightarrow x-a > 0 \rightarrow x > \frac{a}{p} \quad (b, c]$$

$$1 - \log(x-a) \geq 0 \rightarrow 1 \geq \log(x-a) \rightarrow 10 \geq x-a \rightarrow \frac{10+a}{p} \geq x$$

$$c = \frac{10+a}{p}, b = \frac{a}{p} \rightarrow c-b = \frac{10+a}{p} - \frac{a}{p} = \frac{10}{p} = \omega$$

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