

الف) $x^2 + 2x - 1 = y^3$

①

$y = \sqrt[3]{x^2 + 2x - 1}$ تابع است

ب) $\frac{\cos x}{x} = \frac{\cos y}{y}$

$x = \frac{\pi}{2} \rightarrow \frac{\cos x}{x} = \frac{\cos y}{y} = 0 \rightarrow \cos y = 0 \begin{cases} y = \frac{\pi}{2} \\ y = \frac{3\pi}{2} \end{cases}$

تابع نیست

ج) $x + y = 2\sqrt{xy} \rightarrow x^2 + y^2 + 2xy = 4xy$

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

$x = y \Rightarrow xy > 0 \Rightarrow \sqrt{xy} \checkmark$

تابع است

د) $xy^2 - y^3 = 2y - 2x \rightarrow +y^2(y - x) = 2(y - x)$

$\Rightarrow +y^2 = 2 \Rightarrow y = \pm\sqrt{2}$ تابع نیست

الف) $x^2 = 2y - 1 \mid \begin{cases} y \geq 0 \rightarrow x^2 = y \checkmark \\ y \leq 0 \rightarrow x^2 = 2y \rightarrow \frac{x^2}{2} = y \checkmark \end{cases}$ (2)

تابع است $D = \{0\}$

ب) $[y] = 1 - [x]$

$x = 1 \rightarrow [y] = 0 \rightarrow y = [0, 1)$

تابع نیست

$|x - 1| \geq 2 \rightarrow \begin{cases} x - 1 \geq 2 \rightarrow x \geq 3 \\ (x \geq 1) \\ x - 1 \leq -2 \rightarrow x \leq -1 \\ (x \leq 1) \end{cases}$ (3)

$\Rightarrow x = 3 \rightarrow 2x^2 - b = a + 2x \Rightarrow$

$2(3)^2 - 2(3) = a + b \Rightarrow a + b = 12$

$-x^2 - bx + a \geq 0 \rightarrow x^2 + bx - a \leq 0$ (4)

$\{b, a\} = \{5, -1\} \rightarrow S = a + b = -b \Rightarrow a = -2b \Rightarrow a = -10$

$P = ab = -a \Rightarrow b = -1$

$\Rightarrow a + b = -12$

$ax^2 + bx + c \xrightarrow{\text{دایره جزیع}} a = 0$ (5)

$2b + c = 0 \Rightarrow c = -2b$

$\frac{1}{2}a + c - 2b = c + 2b = -2b + 2b = 0$

$$x+b=0 \xrightarrow{x=2} 2+b=0 \rightarrow b=-2$$

④

$$\rightarrow \sqrt{\frac{x^2+x}{x-2}} \rightarrow \frac{\frac{-5}{2} \quad 2}{+ \quad - \quad +}$$

$$D = (-\infty, \frac{-5}{2}] \cup (2, +\infty)$$

سقاری برای b وجود ندارد که دامنه فقط شامل $(2, +\infty)$ شود.

$$\text{الف) } \sqrt{x(x^2-1)} = \sqrt{x(x-1)(x+1)} \rightarrow \frac{-1 \quad 0 \quad 1}{- \quad + \quad - \quad +}$$

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

⑤

$$\text{ب) } |x|-1 > 0 \rightarrow |x| > 1 \begin{cases} x > 0 \rightarrow x > 1 \\ x < 0 \rightarrow x < -1 \end{cases}$$

$$D = \mathbb{R} - (-1, 1)$$

$$\text{الف) } |x| \neq [x]$$

⑥

$$\left. \begin{array}{l} x > 0 \rightarrow x \neq [x] \rightarrow x \notin \mathbb{Z} \\ x < 0 \rightarrow -x \neq [x] \rightarrow x \neq 0 \end{array} \right\} D = \mathbb{R} - \mathbb{W}$$

$$\mathbb{R} - \{0, 1, 2, 3, \dots\}$$

$$\text{ب) } \sqrt{x} + \sqrt{y} = 9 \rightarrow \sqrt{y} = 9 - \sqrt{x} \rightarrow 9 - \sqrt{x} \geq 0$$

$$\left. \begin{array}{l} \boxed{x > 0} \\ \Rightarrow 9 \geq \sqrt{x} \rightarrow \boxed{1 \geq x} \end{array} \right\} x = [0, 1]$$

$$\left[rx - \frac{1}{r}\right] + \left[rx + \frac{r}{r}\right] > 0$$

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$$\left[rx - \frac{1}{r}\right] + \left[rx - \frac{1}{r} + r\right] > 0$$

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

$$\left[rx - \frac{1}{r}\right] > -1 \rightarrow rx - \frac{1}{r} \geq 0 \rightarrow rx \geq \frac{1}{r}$$

$$x \geq \frac{1}{r} \rightarrow D = \left[\frac{1}{r}, +\infty\right)$$

$$\log(rx - a) \rightarrow rx - a > 0 \rightarrow rx > a$$

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$$\hookrightarrow x > \frac{a}{r} \text{ (1)}$$

$$1 - \log(rx - a) \geq 0 \rightarrow 1 \geq \log(rx - a)$$

$$rx - a \leq 10 \rightarrow rx \leq 10 + a \rightarrow x \leq \frac{10 + a}{r}$$

$$(b, c] = \left(\frac{a}{r}, \frac{a+10}{r}\right] \rightarrow c - b = \frac{a}{r} + d - \frac{a}{r}$$

$$\boxed{c - b = d}$$