

الف) $y^3 = 2x^2 + 2x - 1$ $\xrightarrow{\text{تعریف ریاضی}} y_1^3 = y_2^3 \rightarrow y_1 = y_2$ تابع است

ب) $x = \frac{\pi}{4} \rightarrow \cos \frac{\pi}{4} = 0 \rightarrow \frac{\pi}{4} \cos y = 0 \rightarrow y = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \dots$ تابع نیست

ج) $(x+y)^2 = 4xy \rightarrow x^2 + 2xy + y^2 = 4xy \rightarrow x^2 - 2xy + y^2 = 0 \rightarrow (x-y)^2 = 0 \rightarrow x=y$ تابع است

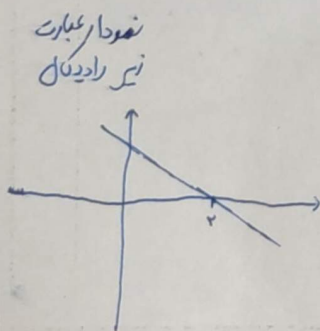
د) $x(y^2+2) - y(y^2+2) = 0 \rightarrow (x-y)(y^2+2) = 0 \rightarrow y^2+2 > 0 \rightarrow x-y=0 \rightarrow x=y$ تابع است

الف) $\rightarrow y \geq 0 \rightarrow y+x^2 = 2y \rightarrow y = x^2$
 $\rightarrow y < 0 \rightarrow -y+x^2 = 2y \rightarrow y = \frac{x^2}{3}$ تابع است

ب) $x=0 \rightarrow [y]=1 \rightarrow y \in [1,2) \rightarrow$ تابع نیست

الف) $f(x) = \begin{cases} x^2 - b & x \geq 3 \\ a + 2x & 0 \leq x \leq 3 \\ x^2 - b & x \leq -1 \end{cases}$ $\xrightarrow{x=3} 1a - b = a + 9 \rightarrow a + b = 12$

الف) a, b رابطه $\Rightarrow a - bx - x^2 = -(x-a)(x-b)$
 $\Rightarrow a + b = -b \rightarrow a = -2b$
 $\Rightarrow a + b = 1$

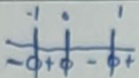


$\Rightarrow a=0 \xrightarrow{x=2} 2b+c \Rightarrow c=-2b$
 $\Rightarrow b < 0$

$$r+b=0 \rightarrow b=-r \rightarrow \begin{array}{l} \text{باید صورت زیر را بگیرد} \\ \text{به این صورت باشد} \end{array} \rightarrow \frac{\lambda}{n-r} \rightarrow \frac{r_{n+r}}{n-r} + \alpha = \frac{r_n + r + \alpha(n-r)}{n-r} \xrightarrow{\text{ضرب در } n} \frac{r_n + r + \alpha(n-r)}{n-r} \xrightarrow{\text{باید صاف باشد}} r + \alpha = 0$$

$$\alpha = -r \rightarrow \frac{r_{n+r}}{n-r} - r = \frac{\lambda}{n-r} \geq 0 \rightarrow n > r \rightarrow \boxed{b = -r}$$

۶

الف) $x^2 - x \geq 0 \rightarrow x(x-1) \geq 0$  $\rightarrow [-1, 0] \cup [1, +\infty)$

ب) $|x| > 1 \rightarrow x > 1, x < -1$

۷

الف) $|x| \neq [x] \rightarrow \mathbb{R} - \{0, 1, 2, 3, \dots\}$

ب) $x \geq 0, 9 - \sqrt{x} \geq 0 \rightarrow 9 \geq \sqrt{x} \rightarrow 81 \geq x \rightarrow 0 \leq x \leq 81$

۸

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

$\downarrow$
 $(r_n - \frac{1}{r}) + r$

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

۹

$$r_n - a > 0, 1 - f(r_n - a) \geq 0 \rightarrow f(r_n - a) \leq 1 \rightarrow r_n - a \leq 1 \rightarrow 0 < r_n - a \leq 1 \rightarrow \frac{a}{r} < x \leq \frac{a+1}{r}$$

$$(b, c] = \left(\frac{a}{r}, \frac{a+1}{r} \right] \rightarrow c - b = \omega \rightarrow \frac{a+1}{r} - \frac{a}{r} = \omega$$

۱۰