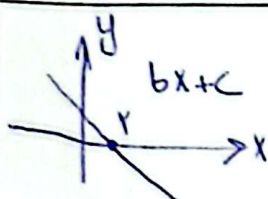


الف) تابع است $\rightarrow y_1^2 = 1x^2 + 2x - 1$ و $y_2^2 = 2x^2 + 2x - 1 \rightarrow y_1^2 = y_2^2 \Rightarrow y_1 = y_2 \rightarrow$ تابع است
 ب) $y = 0$ و $y = 2x$ $\xrightarrow{\text{نمای مختصات}} \Rightarrow$ مثال نقض $\Rightarrow$ تابع نیست
 ج) $x+y = 2\sqrt{xy} \Rightarrow x^2 + y^2 + 2xy = 4xy \Rightarrow (x-y)^2 = 0 \Rightarrow y = x \rightarrow$ تابع است
 د) $y^2(x-y) + 2(x-y) = (y^2+2)(x-y) = 0 \Rightarrow y = x \rightarrow$ تابع است
 جواب مثبت

۱-۱) بین دایره و تابع مشترک است. $\left. \begin{array}{l} |x-1| \geq 2 \rightarrow x-1 \geq 2 \rightarrow x \geq 3 \\ x-1 \leq -2 \rightarrow x \leq -1 \end{array} \right\} \rightarrow$

$2(-1)^2 - b = a + 2(-1) \Rightarrow 2 - b = a - 2 \Rightarrow \underline{a+b=4}$

$f(x) = \sqrt{a-bx-x^2}$ تابع راسته $\rightarrow \begin{cases} x=a \rightarrow a-ab-a^2=0 \Rightarrow 1-b-a=0 \\ x=b \rightarrow a-b^2-b^2=0 \Rightarrow a=2b^2 \end{cases}$
 $1-b-a=0 \Rightarrow 1-b-2b^2=0 \rightarrow (2b-1)(b+1)=0 \rightarrow b=-1 \Rightarrow \left\{ \begin{array}{l} 1 \\ -1 \end{array} \right\}$ چون $b=-1 \Rightarrow a=2$
 $a+b=1$
 $b=-1 \Rightarrow -b=1$

 $y = \frac{2}{\sqrt{ax^2+bx+c}}$
 $bx+c > 0 \rightarrow x > \frac{-c}{b}$
 $x < 1$ و $x < \frac{-c}{b}$
 $\frac{-c}{b} = 2 \Rightarrow c = -2b$
 $\frac{0}{a} + \frac{2b}{-2b} = 2b - 2(-b) = 4b$
 چون تابع مثبت است $\Rightarrow b < 0 \rightarrow \frac{0}{a} + \frac{2b}{-2b} = 2b - 2(-b) = 4b$

الف) $|x| - [x] \neq 0 \rightarrow f(x) = \begin{cases} x - [x] & x \geq 0 \\ -x - [x] & x < 0 \end{cases} \rightarrow f(x) \neq 0 \rightarrow Df = \mathbb{R} - \mathbb{N}$
 به معنی تمام اعداد حقیقی به جز اعداد صحیح

ب) $9 - \sqrt{x} = \sqrt{y} \Rightarrow 9 - \sqrt{x} \geq 0 \Rightarrow 9 \geq \sqrt{x}$
 $\rightarrow 81 \geq x \geq 0$

$$\text{الف) } 2x-1 \geq 0 \rightarrow x \geq \frac{1}{2}, x=0, x+1 \geq 0 \rightarrow \log_2 2x-1 \geq 0 \rightarrow 2x-1 \geq 1$$

$$2x \geq 2 \Rightarrow x \geq 1 \Rightarrow Df = [\frac{1}{2}, +\infty) - [1]$$

ب) $f(x) = \begin{cases} 4+\sqrt{x}-x & x \geq 0 \\ 4+\sqrt{x}+x & x < 0 \end{cases} \Rightarrow \sqrt{x} = x-4 \Rightarrow x^2 = x^2 - 12x + 16$

$$x^2 + 12x + 16 = 0 \Rightarrow x^2 - 12x + 16 = 0 \Rightarrow (x-4)(x-4) = 0$$

$$Df = [0, 4] \cup [9, +\infty)$$

$$y = \sqrt{\frac{3x+1}{x+b}} + a \Rightarrow y = \sqrt{\frac{(a+3)x + ab+1}{x+b}} \rightarrow \text{لا يخرج من الاست}$$

$$\frac{(a+3)x + ab+1}{x+b} \geq 0 \Rightarrow x+b \geq 0 \Rightarrow \begin{cases} x \geq -b \\ x \geq -\frac{1}{a+3} \end{cases} \Rightarrow \boxed{b = -1}$$

$$\begin{cases} [x] \geq 1 \rightarrow x \geq 1 \\ [x] \leq 1 \rightarrow x < 1 \end{cases} \Rightarrow f(x) = \begin{cases} 2x-1 & x \geq 1 \\ 2x+3 & x < 1 \end{cases}$$

$$f'(x) = \begin{cases} \sqrt{2x-1} - x+1 = \sqrt{x} & x \geq 1, \text{ اشك } x \geq 1 \\ \sqrt{2x+3} - x+1 = \sqrt{x+1} & x < 1, \text{ اشك } x < 1 \end{cases}$$

$$Df: [1, +\infty) \cup [-\frac{1}{2}, 1) \Rightarrow Df = [-\frac{1}{2}, +\infty)$$

$$y = \frac{3(2x+1)^3}{(2x+1)^4} = \frac{3}{2x+1} \rightarrow \text{مخرج مختلف صفر است}$$

$$\Rightarrow 2x+1 = 0 \Rightarrow x = -\frac{1}{2} \rightarrow Df = \mathbb{R} - [-\frac{1}{2}]$$

$$2x-d \geq 0 \rightarrow x \geq \frac{d}{2}, 1 - \log(2x-d) \geq 0 \Rightarrow 1 \geq \log(2x-d)$$

$$\Rightarrow 1 \geq 2x-d \rightarrow \frac{1+d}{2} \geq x \rightarrow Df = \left[\frac{d}{2}, \frac{1+d}{2} \right]$$

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