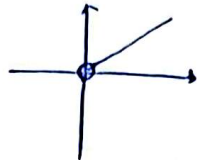


الف) $y^2 = 2x^2 + 2x - 1 \Rightarrow f(x, y) = \begin{cases} y_1 = \sqrt{2x^2 + 2x - 1} \\ y_2 = -\sqrt{2x^2 + 2x - 1} \end{cases} \Rightarrow y_1 = y_2$ تابع است

ب) $x \cos y = y \cos x \xrightarrow{x=\frac{\pi}{2}} \frac{\pi}{2} \cos y = y \cos 0 = 0 \Rightarrow y = \{k\pi + \frac{\pi}{2} \mid k \in \mathbb{Z}\}$ تابع نیست

ج) $x + y = 2\sqrt{xy} \Rightarrow x = 2\sqrt{xy} - y \Rightarrow x - 2\sqrt{xy} + y = 0 \Rightarrow (\sqrt{x} - \sqrt{y})^2 = 0 \Rightarrow \sqrt{x} = \sqrt{y}$

$\sqrt{x} = \sqrt{y} \Rightarrow y = x$



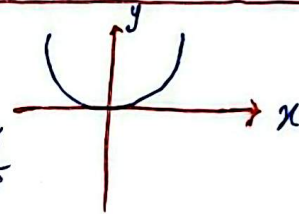
تابع است

د) $y^2(x-y) + 2(x-y) = 0 \Rightarrow (y^2+2)(x-y) = 0 \Rightarrow \begin{cases} y^2+2=0 \Rightarrow y^2=-2 \\ x-y=0 \Rightarrow x=y \end{cases}$

تابع است

الف) $|y| + x^2 = 2y \Rightarrow y = \begin{cases} x^2 & y \geq 0 \\ \frac{x^2}{2} & y < 0 \end{cases}$

$\frac{x^2}{2}$ همیشه بیشتر از صفر است، این رابطہ برقرار نمی شود



تابع است

ب) $[y] + [x] = 1 \xrightarrow{x=0} [y] = 1 \Rightarrow 1 < y < 2$

تابع نیست

$f(x) = \begin{cases} 2x^2 - b & x \geq 3 \\ 2x + a & 0 < x < 3 \\ 2x^2 - b & x < -1 \end{cases} \Rightarrow \begin{cases} f(3) = 18 - b \\ f(3) = 6 + a \end{cases} \Rightarrow 18 - b = 6 + a \Rightarrow a + b = 12$

$y = -x^2 - bx + a \quad x_1 = a \quad x_2 = b$

$S = x_1 + x_2 = -\frac{-b}{-1} = -b = a + b \Rightarrow a = -2b \Rightarrow a = -2$

$a + b = -2 + (-1) = -3$

$P = x_1 \cdot x_2 = \frac{a}{-1} = -a = ab \Rightarrow a(b+1) = 0 \Rightarrow b = -1$

د) با توجه به دامنه باید تابع $y = ax^2 + bx + c$ به صورت خطی باشد $\Leftrightarrow a = 0$

$y = bx + c \xrightarrow{x_1=2, x_2=3} 2b + c = 0 \Rightarrow c = -2b$

ب) زیرا جدول تعیین علامت $bx + c$ پس از ۲ منفی است

$\begin{array}{c|c|c} x & 2 & 3 \\ \hline y & + & - \end{array}$

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

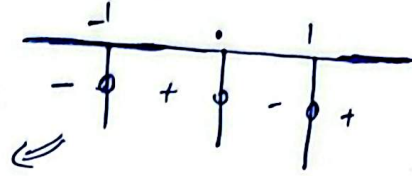
$$y = \sqrt{\frac{3x+2+ax+ab}{x+b}} \Rightarrow y = \sqrt{\frac{(3+a)x+(ab+2)}{x+b}}$$

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با توجه به دامنه تابع عبارت فقط یک ریشه در مخرج دانه است پس $x, 2$ ریشه مخرج است.

$$2+b=0 \Rightarrow b=-2 \quad 3+a=0 \Rightarrow a=-3$$

الف) $y = \sqrt{x^2 - x} = \sqrt{x(x-1)} = \sqrt{x(x-1)/(x+1)}$

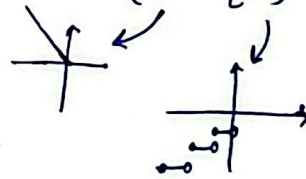
$$D_f = [-1, 0] \cup [1, +\infty)$$



ب) $y = \frac{1}{\sqrt{|x|-1}} \Rightarrow |x|-1 > 0 \Rightarrow |x| > 1 \Rightarrow \begin{cases} x > 1 \\ x < -1 \end{cases} \Rightarrow D_f = (-\infty, -1) \cup (1, +\infty)$

الف) $y = \sqrt[3]{\frac{1}{|x|-[x]}} \Rightarrow |x|-[x] \neq 0 \Rightarrow |x| \neq [x] \Rightarrow \begin{cases} x \neq [x] & x > 0 \\ -x \neq [x] & x < 0 \end{cases} \Rightarrow x \notin \mathbb{W}$

$$\Rightarrow D_f = \mathbb{R} - \mathbb{W}$$



ب) $\sqrt{x} + \sqrt{y} = 9 \rightarrow \begin{cases} x \geq 0 \\ \sqrt{y} = 9 - \sqrt{x} \xrightarrow{y \geq 0} 0 \leq x \leq 81 \end{cases} \Rightarrow D_f = [0, 81]$

الف) $y = \frac{1}{\sqrt{[2x+\frac{5}{4}-2]+[2x+\frac{5}{4}]}} \Rightarrow [2x+\frac{5}{4}-2]+[2x+\frac{5}{4}] > 0 \Rightarrow [2x+\frac{5}{4}]+[2x+\frac{5}{4}]-2 > 0$

$$\Rightarrow 2[2x+\frac{5}{4}] > 2 \Rightarrow [2x+\frac{5}{4}] > 1 \Rightarrow 2x+\frac{5}{4} > 2 \Rightarrow 2x > \frac{3}{4} \Rightarrow x > \frac{3}{8} \Rightarrow D_f = [\frac{3}{8}, +\infty)$$

$$2x-a > 0 \Rightarrow x > \frac{a}{2}$$

ب) $1 - \log(2x-a) > 0 \Rightarrow \log(2x-a) < 1 \Rightarrow 2x-a < 10 \Rightarrow x < 5 + \frac{a}{2} \Rightarrow \frac{a}{2} < x < 5 + \frac{a}{2} \Rightarrow D_f = (\frac{a}{2}, 5 + \frac{a}{2})$

$$D_f = (b, c)$$

$$\Rightarrow \begin{cases} \frac{a}{2} = b \\ 5 + \frac{a}{2} = c \end{cases}$$

$$c - b = 5 + \frac{a}{2} - \frac{a}{2} = 5$$