آزمون تستی

۱)

الف) $\begin{cases} y_1^3 = 2x^2 + 2x - 1 \\ y_2^3 = 2x^2 + 2x - 1 \end{cases} \Rightarrow y_1^3 = y_2^3 \quad y_1 = y_2$ تابع است

ب)

ج) $x + y = 2\sqrt{xy} \rightarrow x - 2\sqrt{xy} + y = 0 \quad (\sqrt{x} - \sqrt{y})^2 = 0$ تابع است

د) $\begin{cases} x(y_1^2 + 2) - y_1(y_1^2 + 1) = 0 \Rightarrow x = y_1 \\ x(y_2^2 + 2) - y_2(y_2^2 + 1) = 0 \Rightarrow x = y_2 \end{cases} \Rightarrow y_1 = y_2$ تابع است

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۲)

$|x-1| \geq 2 \rightarrow \begin{cases} x - 1 \geq 2 \rightarrow x \geq 3 \Rightarrow 2x^2 - b = f(x) \\ x - 1 \leq -2 \rightarrow x \leq -1 \Rightarrow 2x^2 - b = f(x) \end{cases}$

$f(-1) = 2 - b = a - 2$

$\underline{a + b = 4}$

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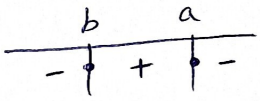
۳)

$\sqrt{-x^2 - bx + a} \quad -x^2 - bx + a \geq 0$



$-(x-b)(x-a) = -x^2 - bx + a$

$-x^2 + (a+b)x - ab = -x^2 - bx + a \rightarrow a + b = -b \rightarrow a = -2b \rightarrow a = 2$

$-ab = a \rightarrow b = -1$

$\underline{a + b = 1}$

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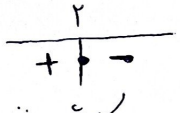
۴)

$\frac{2}{\sqrt{ax^2 + bx + c}} \quad ax^2 + bx + c > 0 \quad a = 0$



$bx + c > 0$

شیب منفی $\Rightarrow b < 0$

$2b + c = 0$

$2b = -c$

$c = -2b$

$2a + c - 2|b| = 0 \quad -2b + 2b = b$

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۵)

الف) $|x| - [x] \neq 0$ ← $z^+ \alpha$, $0\ \alpha$, $z^- \alpha$

$D_f = R - Z^+ - \{0\}$

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

$D_f = [0, 81]$

۶) الف) ① $2x-1>0 \quad x>1/2$ ② $x>0$ ③ $x\neq 1$

$\log_x^{2x-1} \geq 0 \rightarrow \begin{cases} 0<x<1 \rightarrow x \leq 1/2 \\ x>1 \quad 2x-1 \geq 1 \end{cases}$ آخرین شرط $x \geq 1/2$

ب) $\frac{1}{6+\sqrt{|x|}-|x|} > 0$

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۷) $\frac{2ax+2a+ax+ab}{a(x+b)} \geq 0 \rightarrow$ $\frac{a(2x+2+x+b)}{a(x+b)} \geq 0$ $(2,+\infty)$

$-b$

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۸) $\begin{cases} 2x-1 & x \geq 5 \rightarrow \sqrt{2x-1-x+1} \rightarrow x \geq 0 \Rightarrow x \geq 0 \\ 4x+2 & x<5 \rightarrow \sqrt{4x+2-x+1} \rightarrow 3x+3 \geq 0 \quad x \geq -3/3 \Rightarrow 0 \leq x \leq 3/3 \end{cases}$

$D = [-3/3, +\infty)$

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۹) $4x^2+4x+1 \neq 0 \rightarrow x^2+4x+4 \neq 0 \quad (x-2)^2 \neq 0 \rightarrow x \neq -2/2 = -1/4$

$D_f = R - \{-1/4\}$

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۱۰) $2x-a>0 \quad x>a/2 \qquad 1-\log_{10}^{2x-a} \geq 0 \quad \log_{10}^{2x-a} \leq 1$

$2x-a \leq 10 \quad 2x \leq 10+a \quad x \leq 5+a/2 \qquad D_f = (a/2, 5+a/2)$

$5+a/2-a/2 = 5$