

الف) $y^2 - 2x^2 = 2x - 1 \Rightarrow y^2 = 2x^2 + 2x + 1$ $(x_1, y_1) \xrightarrow{y_1 = x_1^2} y_1^2 = y_1^2 \rightarrow y_1 = y_2$ تابع است ب) $x \cos y = y \cos x \Rightarrow x = k\pi + \frac{\pi}{4}, y = k\pi + \frac{\pi}{4} \Rightarrow 0 = 0$ $\hookrightarrow x = \frac{\pi}{4}, y = \frac{\pi}{4}$ $x = \frac{\pi}{4}, y = \frac{\pi}{4}$	ج) $\frac{x+y}{2} = \sqrt{xy} \Rightarrow x+y = 2\sqrt{xy} \Rightarrow x^2 + y^2 + 2xy - 4xy = 0$ $\Rightarrow x^2 + y^2 - 2xy = 0 \Rightarrow (x-y)^2 = 0 \Rightarrow x = y$ $(x, y) \in \mathbb{R}^2$ تابع است د) $xy^2 + 2x - y^2 - 2y = 0$ $x(y^2 + 2) - y(y^2 + 2) = 0$ $(x-y)(y^2 + 2) = 0 \Rightarrow x = y \Rightarrow$ تابع است عبارت به صورت $x^2 + y^2 = 0$	۲
$2 \leq x-1 \rightarrow 2 \leq x-1 \Rightarrow 3 \leq x$ $\hookrightarrow x-1 \leq -2 \Rightarrow x \leq -1$ $\Rightarrow x = -1 \rightarrow 2-b = a-2 \Rightarrow a+b=4$ تابع است لا برابر $\rightarrow$ برابر		۲
$f(x) = \sqrt{-x^2 - bx + a} \Rightarrow$ دامنه تابع $\Rightarrow [b, a] \Rightarrow a, b =$ ریشه ها پایه درجه است $S = a+b = -b \Rightarrow a = -2b$ $P = ab = -a \Rightarrow b = -1$ $\Rightarrow a = 2, b = -1 \Rightarrow a+b = 2-1 = 1$		۲
$y = \frac{2}{\sqrt{ax^2 + bx + c}}, D_f = (-\infty, 2) \Rightarrow a = 0$ $bx + c > 0 \rightarrow bx > -c \xrightarrow{b > 0} x > -\frac{c}{b}$ $\xrightarrow{b < 0} x < -\frac{c}{b} \vee \Rightarrow -\frac{c}{b} = 2 \Rightarrow c = -2b$ $\hookrightarrow b = -b$ $\Rightarrow 2a + c - 2 b = 2x_0 + (-2b) - 2(-b) = 2b + 2b = 4b$		۲
الف) $f(x) = \sqrt{\frac{1}{ x - [x]}} \rightarrow$ معنی $\neq 0$ $x \in \mathbb{R} - \mathbb{Z} \rightarrow 0 < x - [x] < 1$ $x \in \mathbb{Z} \xrightarrow{x \geq 0} x - [x] = 0$ و $\rightarrow$ $\xrightarrow{x < 0} -x - [x] = -2n$	ب) $f(x) = \sqrt{x} + \sqrt{y} = 9$ $\Rightarrow \sqrt{x} \geq 0, \sqrt{y} \geq 0 \Rightarrow x \geq 0$ $\Rightarrow \sqrt{y} = 9 - \sqrt{x} \Rightarrow \sqrt{y} \geq 0 \Rightarrow 9 - \sqrt{x} \geq 0 \Rightarrow \sqrt{x} \leq 9 \Rightarrow x \leq 81$ $\Rightarrow D_f = [0, 81]$	۲

الف) $f(x) = \sqrt[n]{\log x}$ $\log a \rightarrow a > 0$ $\log b \rightarrow b > 0, b \neq 1$ $\log x > 0 \Rightarrow x > 1$ $\log x < 0 \Rightarrow 0 < x < 1$ $\log x = 0 \Rightarrow x = 1$ $D_f = \left(\frac{1}{e}, \frac{e}{e}\right] \cup (1, +\infty)$	ب) $f(x) = \log \frac{1}{4 + \sqrt{ x } - x } = \log \frac{1}{-(\sqrt{ x } - 2)(\sqrt{ x } + 2)}$ $\sqrt{ x } \Rightarrow x \geq 0$ $\Rightarrow \frac{1}{-(\sqrt{ x } - 2)(\sqrt{ x } + 2)} > 0$ $\hookrightarrow x = \pm 9$ $\Rightarrow \frac{-9}{\sqrt{9} - 2} + \frac{9}{\sqrt{9} + 2} \Rightarrow D_f = (-9, +9)$	8 9
$y = \sqrt{\frac{x+2}{x+b}} + a \Rightarrow y = \sqrt{\frac{x+2+a+b}{x+b}} = \sqrt{\frac{(x+a)x+(x+b)}{x+b}}$ $x < x \Rightarrow x+a = 0, x+b > 0$ $a = -2, b = -2$ $\Rightarrow y = \sqrt{\frac{x}{x-2}}$ ✓		9 10
$f(x) = \begin{cases} x-1 & x \geq 1 \\ x+2 & x < 1 \end{cases}$ $\Rightarrow y = \sqrt{f(x) - x + 1} = \sqrt{x - x - x + 1} = \sqrt{-x + 1} \Rightarrow x < 1$ $\Rightarrow y = \sqrt{f(x) - x + 1} = \sqrt{x + 2 - x + 1} = \sqrt{x + 3} \Rightarrow x > -3$ $\Rightarrow D = [-3, +\infty)$		1 11
$y = \frac{x^2 + 2x + 1}{(x+1)^2}$ $\Rightarrow y = \frac{(x+1)^2}{(x+1)^2} = 1$ $x+1 \neq 0 \Rightarrow x \neq -1 \Rightarrow D_f = \mathbb{R} - \{-1\}$	$\xrightarrow{\text{Cose}} (1x^2 + 12x + 4x + 1) = (x+1)^2$ $\xrightarrow{\text{Ejao}} (x^2 + 2x + 1)^2 = (x+1)^4 = (x+1)^2$	9 12
$y = \sqrt{1 - \log(x-a)}$ $\Rightarrow x-a > 0 \Rightarrow x > a$ $\hookrightarrow 1 - \log(x-a) \geq 0$ $\Rightarrow \log(x-a) \leq 1$ $x-a \leq 10$ $x \leq \frac{10+a}{1}$	$\frac{1}{1} \Rightarrow \frac{a}{1} < x \leq \frac{10+a}{1}$ $b < x \leq c$ $\Rightarrow b = \frac{a}{1}, c = \frac{10+a}{1} = 10 + a$ $\Rightarrow c - b = 10$	10 13