

۱) الف) $y^3 - 2x^2 = 2x - 1$

$$y_1^3 = 2x^2 + 2x - 1$$

$$y_2^3 = 2x^2 + 2x - 1$$

$$y_1^3 = y_2^3 \quad y_1 = y_2 \quad \text{تابع است}$$

ب) $x \odot y = y \odot x$

$$x = \frac{1}{2} \quad \frac{1}{2} \odot y = y \odot \frac{1}{2} \quad \frac{1}{2} \odot x = 0 \quad \odot y = 0$$

و می تواند $\frac{1}{2} - \frac{1}{2} = 0$ باشد
تابع نیست x .

پ) $x + y = 2\sqrt{xy}$

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

تابع است ✓

د) $x^2y^2 + 2x - y^3 - 2y = 0$

$$y^2(x-y) + 2(x-y) = (x-y)(y^2+2) = 0 \Rightarrow (x-y) = 0 \Rightarrow x = y$$

تابع است ✓

۲)

$$f(x) = \begin{cases} 2x^2 - b & |x-1| > 2 \\ a + 2x & -3 \leq x \leq -1 \end{cases}$$

$$x-1 > 2 \Rightarrow x-1 \leq -2$$

$$x > 3 \quad x \leq -1$$



..... > -3 <= x <= 1 (در نقطه در صورتی برابرند)

۳)

$$\frac{b}{-q} + \frac{a}{p} = \frac{0}{-}$$

$$-x^2 - bx + a \geq 0 \Rightarrow x^2 + bx - a \leq 0$$

$$a+b=-b \quad 2b=-a \quad b=-\frac{a}{2}$$

$$ab = -a \xrightarrow{\div a} b = -1 \quad a = 2$$

$$|a+b| = 2-1 = 1$$

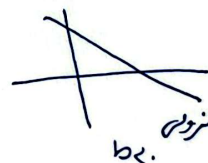
$$a \neq 0$$

$$b \in \mathbb{Z}$$

~~0, 0, 0, 0~~

۴) $y = \frac{2}{\sqrt{ax^2+bx+c}}$

$$\frac{2}{+q-}$$



۰, ۲, ۳, ۴, ۵, ۶

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

فقط $a=0$

$$3a+c+2b \xrightarrow{} -2b+2b=b$$

$$3a+c-2|b| \rightarrow b < 0$$

۵) الف) $f(x) = \sqrt{\frac{1}{|x|-[x]}}$

$$|x| - [x] \neq 0$$

$$|x| \neq [x]$$

$$\mathbb{R} - (\mathbb{Z}^+, 0)$$

ب) $f(x) = \sqrt{x} + \sqrt{y} = 9 \Rightarrow \sqrt{y} = 9 - \sqrt{x} \Rightarrow 9 - \sqrt{x} \geq 0 \Rightarrow \sqrt{x} \leq 9 \Rightarrow x \leq 81$ II

$\sqrt{x} \rightarrow x > 0 \rightarrow Df$ I

محدوده مثبت

$$I \cap II : [0, 81]$$

$$1) \sqrt{f(x) - x + 1}$$

$$f(x) \begin{cases} rx-1 & [x] > \varepsilon & x > \omega \\ rx+1 & [x] < \varepsilon & x < \omega \end{cases}$$

$$f(x) - x + 1 \geq 0 \Rightarrow f(x) \geq x-1 \begin{cases} x > \omega \rightarrow rx-1 \geq x-1 \Rightarrow rx \geq 0 \xrightarrow{x > \omega} [\omega, +\infty) \\ \vdots \\ x < \omega \rightarrow rx+1 \geq x-1 \Rightarrow rx \geq -2 \Rightarrow x \geq -\frac{2}{r} \xrightarrow{x < \omega} [-\frac{2}{r}, \omega) \end{cases} \xrightarrow{\text{union}} [-\frac{2}{r}, +\infty)$$

$$9) \frac{rx^r + rx^r + 1rx + 1}{(\varepsilon x^r + \varepsilon x + 1)^r} = \frac{r(1x^r + 1x^r + 1x + 1)}{(rx+1)^r} = \frac{r(rx+1)^r}{(rx+1)^r} = \frac{r}{rx+1}$$

$$rx+1 \neq 0 \Rightarrow rx \neq -1 \Rightarrow x \neq -\frac{1}{r}$$

$$10) \sqrt{1 - \log(rx-a)}$$

$$1 - \log(rx-a) \geq 0 \Rightarrow \log(rx-a) \leq 1 \Rightarrow rx-a \leq 10 \Rightarrow rx \leq 10+a$$

$$rx-a > 0 \Rightarrow rx > a \Rightarrow x > \frac{a}{r}$$

$$\Rightarrow x \leq \frac{10+a}{r} \Rightarrow x \leq \omega + \frac{a}{r}$$

$$\frac{a}{r} < x \leq \omega + \frac{a}{r} \Rightarrow \left(\frac{a}{r}, \omega + \frac{a}{r} \right] \quad c-b = \omega + \frac{a}{r} - \frac{a}{r} = \omega$$