

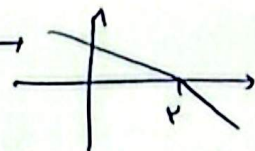
الف) $y^3 = 2x^2 + 2x - 1$ $y_1^3 = y_2^3 \Rightarrow y_1 = y_2$ تابع هست
 $y^3 = 2x^2 + 2x - 1$ تابع نیست

ب) $x \cdot y = 2\sqrt{xy} \rightarrow x \cdot y - 2\sqrt{xy} = 0$
 $\rightarrow (\sqrt{x} - \sqrt{y})^2 = 0 \rightarrow \sqrt{x} = \sqrt{y} \Rightarrow x = y$ تابع است

الف) $y > 0 \rightarrow y = x^2$
 $y < 0 \rightarrow y = \frac{x^2}{x}$ تابع است
 ب) $x^2 y = 0 \rightarrow x = 0$ تابع نیست

$f(x) = \begin{cases} 2x^2 - b & |x-1| > 2 \\ a+2x & 0 \leq x \leq 3 \end{cases}$
 $x=2 \rightarrow 2 \cdot 4 - b = a+2 \rightarrow a+b = 12$
 $\rightarrow 12 - b - b = a+2 \rightarrow a+b = 12 \rightarrow a+b = 12$

$P(x) = \sqrt{a-bx-x^2}$ $D = [b, a]$
 $-x^2 - bx + a \geq 0 \rightarrow -(x-b)(x-a) = -x^2 + (a+b)x - ab$
 $\rightarrow a+b = -b \rightarrow a = -2b$ $ab = a \xrightarrow{a \neq 0} b = -1 \rightarrow a = 2$
 $a+b = 2-1=1$

$a=0 \rightarrow bx+c=0 \rightarrow$  $b < 0$
 $x=2 \rightarrow y=0 \rightarrow 2b+c=0 \rightarrow c = -2b$

$\frac{2}{3}x + c = 3|b|$
 $6 - 2b + 3b = b$

$$y = \sqrt{\frac{rx+r}{x+b}} + a \quad D = (r, +\infty)$$

$$\frac{rx+r}{x+b} + a \geq 0 \rightarrow \frac{rx+rx+ra+ba}{x+b} \geq 0 \rightarrow \frac{(r+a)x + r+ab}{x+b} \geq 0$$

$$\rightarrow \frac{r}{r+a} \Rightarrow x = -b \rightarrow -b = r \rightarrow b = -r$$

$$1) y = \sqrt{x^2 - x}$$

$$x^2 - x \geq 0 \rightarrow x(x-1) \geq 0$$

$$\begin{array}{c} -1 & 0 & 1 \\ + & - & + \end{array}$$

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

$$2) y = \frac{1}{\sqrt{|x|-1}}$$

$$|x|-1 > 0 \rightarrow |x| > 1 \rightarrow \begin{array}{l} x > 1 \\ x < -1 \end{array}$$

$$D = (-\infty, -1) \cup (1, +\infty)$$

$$1) y = \sqrt{\frac{1}{|x| - [x]}}$$

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

$$D = \mathbb{R} - \mathbb{Z}$$

$$2) \sqrt{x} + \sqrt{y} = 9$$

$$\sqrt{x} = 9 - \sqrt{y} \rightarrow (9 - \sqrt{y})^2 = x \rightarrow x = 81 - 18\sqrt{y} + y$$

$$x \geq 0 \rightarrow D = [0, +\infty)$$

$$\sqrt{y} = -\sqrt{x} + 9 \rightarrow -\sqrt{x} + 9 \geq 0$$

$$\rightarrow \sqrt{x} \leq 9 \rightarrow 0 \leq x \leq 81$$

$$D = [0, 81]$$

$$y = \frac{1}{\sqrt{[rx + \frac{1}{r}] + [rx + \frac{r}{r}]}} \rightarrow [rx + \frac{1}{r}] + [rx + \frac{r}{r}] \geq 0 \rightarrow [rx + \frac{1}{r} - 1] + [rx + \frac{1}{r} + 1]$$

$$\rightarrow [rx + \frac{1}{r}] - 1 + [rx + \frac{1}{r}] + 1 \geq 0 \rightarrow 2[rx + \frac{1}{r}] \geq 0 \rightarrow [rx + \frac{1}{r}] \geq 0$$

$$\rightarrow rx + \frac{1}{r} \geq 0 \rightarrow rx \geq -\frac{1}{r} \rightarrow x \geq -\frac{1}{r^2}$$

$$y = \sqrt{1 - \log(r(x-a))} \quad D = (b, c)$$

$$1) r(x-a) > 0 \rightarrow x > \frac{a}{r}$$

$$2) 1 - \log(r(x-a)) \geq 0 \rightarrow 1 \geq \log(r(x-a)) \rightarrow 1 \geq r(x-a) \rightarrow \frac{1+a}{r} \geq x$$

$$\rightarrow b = \frac{a}{r}, c = \frac{1+a}{r} \rightarrow c-b = \frac{1+a}{r} - \frac{a}{r} = \frac{1}{r} = d$$