

الف)  $y''' - 2y'' = 2y - 1 \rightarrow y_1''' - 2y_1'' = 2y_1 - 1$   
 $y_2''' - 2y_2'' = 2y_2 - 1 \Rightarrow y_1''' - 2y_1'' = y_2''' - 2y_2''$   
 $\Downarrow$   
 $y_1''' = y_2''' \quad y_1'' - y_2'' = 0$   
 $y_1 = y_2 \Leftarrow (y_1 - y_2)(y_1' + y_1 y_2' + y_2') = 0$

(۲)

تابع است  $\Leftarrow$  همراه مثبت است و در حالت  $y_1 = y_2$  صفری شود

ب)  $x \cos y = y \cos x$

مثال نقض  $\Rightarrow x = \frac{\pi}{4} \Rightarrow \frac{\pi}{4} \cos y = y \cos(\frac{\pi}{4})$

$\Downarrow$   
 $\frac{\pi}{4} \cos y = 0 \Rightarrow y = (\pi M + \frac{\pi}{4})$   
 تابع نیست  $\Leftarrow$

ج)  $\frac{x+y}{y} = \sqrt{xy}$

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

د)  $xy^2 + 2x - y - 2y = 0$

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

$(x-y)(y^2+2) = 0 \Rightarrow x=y$  تابع است  $\checkmark$   
 همراه مثبت  $\rightarrow$

الف)  $|y| + x^2 = 2y$   
 $y > 0 \Rightarrow y + x^2 = 2y \Rightarrow x^2 = y$   
 $y < 0 \Rightarrow -y + x^2 = 2y \Rightarrow x^2 = 3y$

ب)  $[y] + [x] = 1$

$[y]_{x=0} = 1$   
 $y = [1 \ 2]$

(۲) تابع نیست  $\Leftarrow$  مثال نقض  $\Leftarrow$

$y > 0 \Rightarrow x^2 = y$

$y < 0 \Rightarrow x^2 = 3y \Rightarrow y = \frac{x^2}{3}$   
 تناقض  $\rightarrow$  همراه مثبت  
 است اما فرض  $y < 0$  است

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

$x \geq 3 \Rightarrow x^2 - b$   
 $0 \leq x \leq 3 \Rightarrow a + 2x$   
 $x \leq -1 \Rightarrow x^2 - b$

$x=2 \Rightarrow f(2) - b = a + f(2)$   
 $12 = b + a$

$a - b - x^2$

$x=a$  نیست  
 $x=b$  نیست

$a - a - a^2 = 0$   
 $a - b^2 - b^2 = 0$

$a(1-b-a) = 0$   
 $a=0$  صحیح  
 $b+a=1$   
 $a=-b+1$   
 $-1=b \Rightarrow a=1$   
 $\frac{1}{x}=b \Rightarrow a=\frac{1}{x}$

$1 = a+b$

عقود

$$y = \frac{r}{a^2 + b^2 + c^2}$$

$$ra + rb + c = 0$$

$$\Rightarrow rb + c = 0 \quad b < 0$$

$$(r) - d$$

$$a = 0 \Rightarrow \text{ت/ب}$$

$$c = -rb \checkmark$$

$$ra + c - r(b) \Rightarrow -rb + rb = \boxed{b} \checkmark$$

$$y = \sqrt{\frac{ra+r}{a+b}}$$

$$r+b=0 \Rightarrow \boxed{b=-r} \checkmark$$

$$(r) - s$$

$$y = \sqrt{a^2 - x^2} \quad x > a$$

$$x(x-1)(x+1) \cdot D_f = [-1, 0] \cup [1, +\infty) \checkmark$$

$$(r) - v$$

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

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

$$|x| > 1$$

$$\begin{array}{ccc} -1 & 1 \\ + & - \\ + & - \end{array}$$

$$D_f = (-\infty, -1) \cup (1, +\infty) \checkmark$$

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

$$|x| - [2] \neq 0$$

$$x \neq \pm \sqrt{2} \Rightarrow \sqrt{x} + \sqrt{y} = 9 \quad x > 0$$

$$(r) - \wedge$$

$$D_f = \mathbb{R} - \sqrt{2}$$

$$9 - \sqrt{x} > 0 \Rightarrow x < 81$$

$$D_f = [0, 81] \checkmark$$

$$y = \frac{1}{\left(x - \frac{1}{r}\right) + \left(x + \frac{r}{r}\right)}$$

$$\left(x - \frac{1}{r}\right) + \frac{r}{r} \left(x + \frac{r}{r}\right) \Rightarrow \left(x - \frac{1}{r}\right) + \left(x + \frac{r}{r} - \frac{r}{r}\right) \cdot \frac{r}{r}$$

$$(r) - q$$

$$r \left(x - \frac{1}{r}\right) + 1$$

$$r \left(x - \frac{1}{r}\right) - r$$

$$\left(x - \frac{1}{r}\right) - 1$$

$$x - \frac{1}{r} > 0$$

$$\boxed{x > \frac{1}{r}}$$

$$D_f = \left[\frac{1}{r}, +\infty\right) \checkmark$$

$$y = \sqrt{1 - \log(x-a)}$$

$$\log(x-a) < 1 \Rightarrow x-a < 10 \Rightarrow$$

$$x-a = 10$$

$$x-b = \frac{a}{r}$$

$$c = \frac{10+a}{r}$$

$$b = \frac{a}{r}$$

$$c-b = \frac{10+a - \frac{a}{r}}{r} = \boxed{d} \checkmark$$

$$(r) - 10$$