

①

الف)  $y^3 - 2x^2 = 2x - 1$

ب)  $x \cos y = y \cos x \xrightarrow{x=\frac{\pi}{2}} \frac{\pi}{2} \cos y = 0 \rightarrow \cos y = 0 \rightarrow y = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \dots$  تابع نیست

ج)  $\frac{x+y}{y} = \sqrt{xy} \rightarrow x+y = y\sqrt{xy} \rightarrow x+y - y\sqrt{xy} = (\sqrt{x} - \sqrt{y})^2 = 0 \rightarrow \sqrt{x} = \sqrt{y} \xrightarrow{\substack{x>0 \\ y>0}} x=y$  تابع هست

د)  $xy^2 + 2x - y^3 - 2y = 0 \rightarrow x(y^2 + 2) - y(y^2 + 2) = 0 \rightarrow (y^2 + 2)(x - y) = 0 \xrightarrow{y^2+2 \neq 0} x - y = 0 \rightarrow x = y$  تابع هست

الف)  $|y| + x^2 = 2y \rightarrow x^2 = 2y - |y| \xrightarrow{x^2 \geq 0} 2y - |y| \geq 0 \xrightarrow{y \geq 0} |y| = y \rightarrow y = x^2$  تابع هست  
 ب)  $[y] + [x] = 1 \xrightarrow{x=0} [y] = 1 \rightarrow 1 \leq y < 2$  تابع نیست

الف)  $f(x) = \begin{cases} 2x^2 - b & |x-1| \geq 2 \rightarrow x \geq 3, x \leq -1 \\ a + 2x & 0 \leq x \leq 2 \end{cases} \quad f(3) = 11 - b = a + 2 \rightarrow a + 11 = a + b = 2 \times 3$

$a - b(b) - (b)^2 = 0 \rightarrow 2b^2 = a$   
 $a - b(a) - (a)^2 = 0 \rightarrow a^2 + ab - 2b^2 = 0 \rightarrow a = \frac{-b \pm \sqrt{9b^2}}{2} \rightarrow \frac{-b \pm 3b}{2} \rightarrow \begin{cases} a = b \text{ (مورد اول)} \\ a = -2b \end{cases}$   
 اگر  $a = b$  و  $a + b = 2$  باشد،  $2b = 2 \rightarrow b = 1, a = 1$   
 اگر  $a = -2b$  و  $a + b = 2$  باشد،  $-2b + b = 2 \rightarrow -b = 2 \rightarrow b = -2, a = 4$

$ax^2 + bx + c > 0 \xrightarrow{D=(-\infty, 2)} a=0, b < 0, 2b + c = 0 \rightarrow c = -2b \Rightarrow 3(0) + (-2b) - 3(-b) = -2b + 3b = b$

$\frac{3x+2+a+b}{x+b} \geq 0 \rightarrow \frac{(a+3)x+2+b}{x+b} \xrightarrow{D=(2, +\infty)} \begin{cases} a+3=0 \rightarrow a=-3 \\ 2+b=0 \rightarrow b=-2 \end{cases}$

الف)  $x^3 - x \geq 0 \rightarrow x(x^2 - 1) \geq 0 \xrightarrow{x \neq 0} x^2 - 1 \geq 0 \rightarrow x^2 \geq 1 \rightarrow x \geq 1 \text{ یا } x \leq -1$   
 $\Rightarrow D = [-1, 0] \cup [1, +\infty)$

ب)  $|x| - 1 > 0 \rightarrow |x| > 1 \rightarrow x > 1 \text{ یا } x < -1$   
 $\Rightarrow D = \mathbb{R} - [-1, 1]$

الف)  $|x| - [x] \neq 0 \rightarrow x \notin \mathbb{W} \Rightarrow D = \mathbb{R} - \mathbb{W}$

ب)  $\sqrt{x} + \sqrt{y} = 4 \xrightarrow{\sqrt{x}, \sqrt{y} \geq 0} \sqrt{y} = 4 - \sqrt{x} \xrightarrow{\sqrt{y} \geq 0} 4 - \sqrt{x} \geq 0 \rightarrow \sqrt{x} \leq 4 \rightarrow 0 \leq x \leq 16$   
 $\Rightarrow D = [0, 16]$

$[x - \frac{1}{x}] + [x + \frac{3}{x}] > 0 \rightarrow [x - \frac{1}{x}] + [x + \frac{3}{x} - 2] + 2 > 0 \rightarrow 2[x - \frac{1}{x}] + 2 > 0 \rightarrow [x - \frac{1}{x}] > -1 \rightarrow x - \frac{1}{x} > -1 \rightarrow x > \frac{1}{x} \rightarrow x > \frac{1}{x}$

$1 - \log_2(x-a) > 0 \rightarrow 1 > \log_2(x-a) \rightarrow 1 > x-a \rightarrow \frac{1+a}{2} > x \rightarrow \frac{1+a}{2} = c$   
 $x-a > 0 \rightarrow x > \frac{a}{2} \rightarrow b = \frac{a}{2} \Rightarrow \frac{1+a}{2} - \frac{a}{2} = \frac{1}{2} = a$