

الف) $y^3 = 2x^2 + 2x - 1 \Rightarrow y = \sqrt[3]{2x^2 + 2x - 1} \rightarrow$ تابع است ✓
 ب) if $x = \frac{\pi}{2} \Rightarrow \frac{\pi}{2} \cos y = y \cos \frac{\pi}{2} \Rightarrow \frac{\pi}{2} \cos y = 0 \Rightarrow \cos y = 0 \Rightarrow y = \frac{\pi}{2} + k\pi \quad k \in \mathbb{Z} \Rightarrow$ تابع نیست ✓
 ج) $(x+y)^2 = 4xy \Rightarrow x^2 - 2xy + y^2 = 0 \Rightarrow (x-y)^2 = 0 \Rightarrow x = y$ تابع است ✓
 د) $x(y^2+2) - y(y^2+2) = 0 \Rightarrow (y^2+2)(x-y) = 0 \Rightarrow x-y=0 \Rightarrow x=y$ تابع است ✓

الف) if $y \geq 0 \Rightarrow y + x^2 = 2y \Rightarrow y = x^2$ ✓
 if $y < 0 \Rightarrow -y + x^2 = 2y \Rightarrow 3y = x^2 \Rightarrow y = \frac{x^2}{3} \rightarrow y > 0$ ✓
 تابع است ✓
 ب) $[y] = 1 \Rightarrow 1 \leq y < 2$ ✓
 تابع نیست ✓

$x=3$ اگر $|x-1| \geq 2 \Rightarrow x \geq 3$ ✓
 $0 \leq x \leq 3$ ✓
 $2(3)^2 - b = a + 2(3) \Rightarrow 11 - b = a + 6 \Rightarrow a + b = 11$ ✓

$x^2 + bx + a = 0 \rightarrow$ جمع ریشه ها $= a+b = s \Rightarrow a+b = -b \Rightarrow a+2b=0$
 ضرب: $ab = \frac{a}{-1} = -a \Rightarrow ab = -a$
 $a+2b=0 \Rightarrow a=-2b$
 $a+b = -2b - b = -3b = 1 \Rightarrow b = -\frac{1}{3}$ ✓

$ax^2 + bx + c > 0$ شب بودن عبارت در $x < 2$ باید تابع در $x=2$ نباشد $\leftarrow a=0$
 $bx + c \bullet x=2 \rightarrow 2b + c = 0 \Rightarrow c = -2b$ ✓
 $\frac{3a+c-3|b|}{3} \Rightarrow 3(0) - 2b - 3(-b) = -2b + 3b = b$ ✓

$$2x + b = 0 \xrightarrow{x=2} 2 + b = 0 \Rightarrow b = -2 \quad \checkmark$$

نقطه مرزی

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الف) $x^3 - x \geq 0 \Rightarrow x(x^2 - 1) \geq 0$
 $\Rightarrow x(x-1)(x+1) \geq 0$
 $D_f = [-1, 0] \cup [1, +\infty) \quad \checkmark$

ب) $|x| - 1 > 0$
 $\Rightarrow |x| > 1 \rightarrow x > 1$
 $\rightarrow x < -1$
 $\Rightarrow D_f = (-\infty, -1) \cup (1, +\infty) \quad \checkmark$

الف) $|x| - [x] \neq 0$
 $x - [x] \neq 0$
 (در صورتی منفی شود که $x \in \mathbb{W}$ اعداد صحیح)
 $D_f = \mathbb{R} - \{\mathbb{W}\} \quad \checkmark$

ب) $\sqrt{y} = 9 - 5x \rightarrow$ نامفی
 $\Rightarrow 9 - 5x \geq 0 \Rightarrow 9 \geq 5x$
 $\Rightarrow 0 \leq x \leq 1.8$
 $D_f = [0, 1.8] \quad \checkmark$

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

ب) $2x + \frac{3}{2} = 2x - \frac{1}{2} + 2$
 $[2x + \frac{3}{2}] = [2x - \frac{1}{2}] + 2$

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

$$\Rightarrow 2x - \frac{1}{2} \geq 0 \Rightarrow 2x \geq \frac{1}{2} \Rightarrow x \geq \frac{1}{4} \Rightarrow D_f = [\frac{1}{4}, +\infty) \quad \checkmark$$

$2x - a > 0 \Rightarrow x > \frac{a}{2}$; $1 - \log(2x - a) \geq 0$
 $\Rightarrow \log(2x - a) \leq 1 \Rightarrow 10 \geq 2x - a \Rightarrow x \leq \frac{10+a}{2}$
 $\Rightarrow C = \frac{10+a}{2}$ $C - b = \frac{10+a}{2} - \frac{a}{2} = \frac{10}{2} = 5 \quad \checkmark$