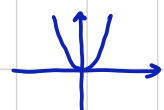


الف) $y^r - 2n^r = 2n - 1$ $\xrightarrow{\text{تعریف (الف)}} y_1^r - 2n_1^r = 2n_1 - 1$ $\xrightarrow{n_1 = n_2} y_1^r = y_2^r$ $\xrightarrow{\text{تابع هست}} y_1 = y_2$ (1) (1.5)

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) $xy^2 + 2n - y^2 - 2y = 0 \rightarrow x(y^2 + 2) - y(y^2 + 2) = 0 \rightarrow (y^2 + 2)(x - y) = 0 \xrightarrow{y^2+2 \neq 0} x - y = 0 \rightarrow x = y$ 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 ✓  (2) (2)

ب) $[y] + [x] = 1 \xrightarrow{x=0} [y] = 1 \rightarrow 1 \leq y < 2$ تابع نیست ✓

$f(x) = \begin{cases} 2x^2 - b & |x-1| \geq 2 \rightarrow x \geq 3, x \leq -1 \\ a + 2x & 0 \leq x \leq 2 \end{cases}$ $f(2) = 12 - b = a + 2 \rightarrow a + 12 = a + b = 14$ (3) (1.75)

$a - b(b) - (b)^2 = 0 \rightarrow 2b^2 = a$
 $a - b(a) - (a)^2 = 0 \rightarrow a^2 + ab - 2b^2 = 0 \rightarrow a = \frac{-b \pm \sqrt{9b^2}}{2} \rightarrow \frac{-b \pm 3b}{2}$
 $\begin{cases} a = b \text{ (Q.E.D.)} \\ a = -2b \rightarrow 2b^2 = -2b \Rightarrow 2b^2 + 2b = 0 \Rightarrow 2b(b+1) = 0 \end{cases}$
 $\begin{matrix} a+b=1 \\ \uparrow \\ b=0 \text{ (Q.E.D.)} \\ \uparrow \\ b=-1, a=2 \end{matrix}$ (4) (2)

$ax^2 + bx + c > 0 \xrightarrow{D=(-\infty, 2)} a=0, b < 0, 2b + c = 0 \rightarrow c = -2b \Rightarrow 3(0) + (-2b) - 3(-b) = -2b + 3b = b$ (5) (2)

$\frac{3x+2+a+b}{x+b} \geq 0 \rightarrow \frac{(a+3)x+2+b}{x+b} \xrightarrow{D=(2, +\infty)} \begin{cases} a+3=0 \rightarrow a=-3 \\ 2+b=0 \rightarrow b=-2 \end{cases}$ (6) (2)

الف) $x^2 - x \geq 0 \rightarrow x(x-1) \geq 0 \xrightarrow{\substack{x \geq 0 \\ x \leq 1}} \begin{matrix} -1 & 0 & 1 \\ | & | & | \\ -\phi & + & \phi - \phi + \end{matrix} \Rightarrow D = [-1, 0] \cup [1, +\infty)$ ✓ $\Rightarrow D = \mathbb{R} - [-1, 1]$ ✓ (7) (2)

الف) $|x| - [x] \neq 0 \rightarrow x \notin \mathbb{W} \Rightarrow D = \mathbb{R} - \mathbb{W}$ ✓ $\Rightarrow \sqrt{x} + \sqrt{y} = 9 \xrightarrow{\sqrt{x}, \sqrt{y} \geq 0} \sqrt{y} = 9 - \sqrt{x} \xrightarrow{4-\sqrt{x} \geq 0} 9 \geq \sqrt{x} \xrightarrow{\text{قوانین}} 0 \leq x \leq 81 \Rightarrow D = [0, 81]$ ✓ (8) (2)

$[x_n - \frac{1}{p}] + [x_n + \frac{r}{p}] > 0 \rightarrow [x_n - \frac{1}{p}] + [x_n + \frac{r}{p} - 2] + 2 > 0 \rightarrow 2[x_n - \frac{1}{p}] + 2 > 0 \rightarrow [x_n - \frac{1}{p}] > -1 \rightarrow x_n - \frac{1}{p} > 0 \rightarrow x > \frac{1}{p}$ (9) (2)

$1 - \log(x_n - a) > 0 \rightarrow 1 > \log(x_n - a) \rightarrow 10 > x_n - a \rightarrow \frac{10+a}{y} > x \rightarrow \frac{10+a}{y} = c$
 $x_n - a > 0 \rightarrow x > \frac{a}{y} \rightarrow b = \frac{a}{y} \Rightarrow \frac{10+a}{y} - \frac{a}{y} = \frac{10}{y} = 2$ ✓ (10) (2)