

۱۷، ۲۵

تکلیف ۵ امیر بیبا زراق

⑦ $f(x) = \left(\frac{1}{x}\right)^{x-2}$, $y = \sqrt{x^x f(x+1)}$, $D_y = ?$ (۲)

$$x^x \left(\frac{1}{x}\right)^{x+1-2} = x^x f(x+1) \geq 0 \rightarrow \text{از این کمال} \rightarrow x^x > 0 \Rightarrow \boxed{x \geq 0} \quad (1)$$

$$\left(\frac{1}{x}\right)^{x+1-2} \geq 0 \Rightarrow \left(\frac{1}{x}\right)^{x-1} \geq 0 \Rightarrow \frac{1}{x} \geq 1 \Rightarrow x-1 \leq 0 \Rightarrow \boxed{x \leq 1} \quad (2)$$

$$D_f = (1) \cap (2) \Rightarrow D_f = [0, 1] \quad \checkmark$$

⑧ $f(x) = \sqrt{x+|x+2|}$, $D_{f(-x)} = ?$ (۲)

$$f(-x) = \begin{cases} 2-x \geq x \Rightarrow 2 \geq 2x \Rightarrow 1 \geq x : x \leq 1 \quad \checkmark \\ x-2 \geq x \Rightarrow -2 \geq 0 : x > 2 \quad \times \end{cases}$$

$$\Rightarrow \boxed{D_f = (-\infty, 1]} \quad \checkmark$$

⑨ $y = \sqrt{\frac{x-1}{f(x)}}$, $D_y = ?$ (۲)

$$\frac{x-1}{f(x)} \geq 0$$

$$x \geq 1 \rightarrow f(x) \neq 0$$

$$\text{مخرج کسر} \Rightarrow x = -5, -4, 2, 3$$

$$\begin{array}{cccc} -5 & -4 & 2 & 3 \\ + & - & - & + & - \end{array}$$

$$x \geq 1 \Rightarrow f(x) > 0 \Rightarrow (2, 3) \cup (3, +\infty) \cup \quad (1)$$

$$x < 1 \Rightarrow f(x) < 0 \Rightarrow (-5, -4) \cup (-4, 1)$$

$$\mathbb{R} - \{-5, -4, 2, 3\} \quad (2) , (1) \cap (2) =$$

$$\boxed{D_f = (-5, -4) \cup (-4, 1] \cup (2, 3)} \quad \checkmark$$

4 $y_1 = \frac{1}{x_1^2 - 10x_1^2 - 6x_1 - 1} \Rightarrow y_1 = \frac{1}{(x_1^2 + x_1 + 1)(x_1^2 - 10x_1 - 1)}$ (P)

$x_1^2 + x_1 + 1 = 0 \Rightarrow \Delta_1 = 1 - 4 = -3 < 0$
 $x_1^2 - 10x_1 - 1 = 0 \Rightarrow \Delta_2 = 100 + 4 = 104 > 0$
 $\Rightarrow x_1 = \frac{10 \pm \sqrt{104}}{2} = 5 \pm \sqrt{26}$
 $\Rightarrow a_2 = 1, b_2 = 5 \Rightarrow \sqrt{-(a+b)} = \sqrt{-(1+5)} = \sqrt{-6} = \sqrt{6} \cdot i$ ✓

5 $f(x) = x^2 + x, y = \sqrt{f(x) - f(\frac{5}{x})}, D_y = ?$

$f(x) = f(\frac{5}{x}) \Rightarrow (x^2 + x) = (\frac{25}{x^2} + \frac{5}{x}) \Rightarrow x^4 + x^3 - 25 - 5x = 0$

$x^4 + x^3 - 5x - 25 = 0 \Rightarrow (x^3 + 1)(x - 5) = 0$

$\Rightarrow y = \sqrt{(x-5)(x+1)(x^3+1)}$ $\Rightarrow x \neq 5, x \neq -1$ (1)

$\Rightarrow x^3 + 1 = 0 \Rightarrow x = -1$ (2) $\Rightarrow x = -1$ is a root of $x^3 + 1 = 0$

$D = \{x \in \mathbb{R} \mid x \neq 5, x \neq -1\}$

6 $f(x^2 + x) = x^2 - 1, f(x) + f(1) = ?$ (P)

$f(x^2 + x) = f(1) \Rightarrow x^2 + x = 1 \Rightarrow x^2 + x - 1 = 0 \Rightarrow x = \frac{-1 \pm \sqrt{5}}{2}$

$f(1) = 1(1) - 1 = 0, f(x^2 + x) = f(1) \Rightarrow x^2 + x - 1 = 0 \Rightarrow x = \frac{-1 \pm \sqrt{5}}{2}$

$f(x) = 1(1) - 1 = 0 \Rightarrow f(1) + f(x) = 0 + 0 = 0$ ✓

1, 2, 3

⑧ $f(m) \sim \sqrt{n+t} \sqrt{n-t}$, mit $f(m) = a+b \sqrt{n+c}$

$$g(n) = \sqrt{n-5}$$

$$\frac{a+b}{c} = q$$

$$\Rightarrow a \geq 1, b \geq 1, c \geq 1 \Rightarrow \frac{a+b}{c}, \frac{1+c}{-c}, \frac{-\Delta}{-c}$$

⑨ $f(x) = \frac{n+r}{n-rn+r}$, $g(x) = \{(r,1), (1,0), (r,\infty), (0,t)\}$

$$D_{\mathbb{P}^2} \mathcal{K} \neq 1, \nu = R - \{1, \nu\}$$

$D_{g_2} \circ \gamma$ حین مکانی مکانی $\left\{ \begin{array}{l} \xrightarrow{g_2 \gamma} g(r), f(r) \end{array} \right.$ $\frac{r+r}{f-r} \cdot \frac{f-r}{-1}$

$$\frac{f}{g}(\cdot) = \frac{\frac{1}{2}}{1} = \frac{1}{2}$$

(y)

$$n_{20} \rightarrow g(\cdot) = f, \quad f(\cdot) = \frac{0+r}{0-0+r} = \frac{r}{r}$$

$\left\{ \left(\frac{1}{2}, 0 \right), \left(\frac{1}{2}, -\frac{1}{2} \right), \left(0, 1 \right) \right\}$

$\frac{f}{g}$

10) $f(m) = \{(1, 2), (3, -1), (4, 2), (1, 4)\}$

$g(m) = \{(-2, 3), (1, -1), (3, 2), (-1, 0)\}$

ا) $f(x) = \{(1, 2), (-1, 2), (\sqrt{2}, -1), (2, 2), (-2, 2)\}$

الف) $f(m) = \{(1, 2), (\frac{3}{2}, -1), (2, 2), (-\frac{1}{2}, 2)\}$

ج) $g^r(m) = \{(-2, 19), (1, 3), (3, 9), (1, 1)\}$ نقد!

د) $\frac{2f}{g} \Rightarrow 2f = \{(1, 4), (3, -2), (2, 4), (-1, 3)\} = \{(1, -4), (3, -1)\}$