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بنیامین نوری - یازدهم پسر B - تکلیف شماره ۵

$$x^w f(x+1) \geq 0$$

$$x^w \left(\left(\frac{1}{x} \right)^{x-1} - 1 \right) \geq 0 \rightarrow \left(\frac{1}{x} \right)^{x-1} = 1 \Rightarrow x-1=0 \Rightarrow x=1$$

$$f(x+1) = \left(\frac{1}{x} \right)^{x+1-x} - 1$$

$$x^w = 0 \Rightarrow x=0$$

$$\frac{0}{-\phi + \phi} \Rightarrow D_f = [0, 1]$$

۲) ۱

$$f(-x) = \sqrt{-x + |-x+2|}$$

$$x > 2 \rightarrow -x + x - 2 = -2$$

$$x = 2 \rightarrow -x \geq 0 \Rightarrow x \leq 0$$

$$x < 2 \rightarrow -x - x + 2 = -2x + 2 \geq 0 \Rightarrow x \leq 1$$

$$D_f = (-\infty, 1]$$

۲) ۲

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

$$x=0, 1, 2, 3$$

$$\frac{-x-1}{-\frac{1}{x} + \phi - \frac{1}{x} + \frac{1}{x}} \Rightarrow D_f = (-x, 1] \cup (2, 3)$$

۲) ۳

$$(9x^x - 7x^x - 5x - 2) = (9x^x - 5x^x + 1) - (x^x + 5x + 2) = (4x^x - 1) = (x+2)^x$$

$$\Rightarrow 4x^x - 1 - x - 2 = 0 \Rightarrow 4x^x - x - 3 = 0 \Rightarrow 4x^x + ax + b \Rightarrow \sqrt{-(-4)} = 2$$

$$\Rightarrow \frac{1}{4} - \frac{1}{4} = 0 \Rightarrow b = -3$$

$$\Rightarrow \frac{1}{4} - \frac{1}{4} = 0 \Rightarrow a = -3$$

۲) ۴

$$f(x) - f\left(\frac{x}{2}\right) \geq 0 \Rightarrow x^w + x - \left(\left(\frac{x}{2} \right)^w + \frac{x}{2} \right) \geq 0 \Rightarrow x^w + x - \left(\frac{x^w + 5x^w}{2} \right) \geq 0 \Rightarrow \frac{x^w + x^w - 5x^w - 5x^w}{2} \geq 0$$

$$\text{اگر } x^w = t \Rightarrow t^w + t - t^w - 5t = 0 \Rightarrow 6t + 15 - 15 - 6t = 0 \Rightarrow x = \pm 2$$

$$\frac{-x}{-\phi + \frac{1}{x} - \phi + \frac{1}{x}} \Rightarrow D_f = [-2, 0) \cup [2, +\infty)$$

۲) ۵

$$x^w + x = 10 \Rightarrow x^w + x - 10 = 0 / f(10) = 10 - 1 = 9$$

$$x^w + x = 2 \Rightarrow x = 1 \Rightarrow f(2) = 2 - 1 = 1$$

۲) ۶

$$f(x) = x^3 - 6x(x-2) \Rightarrow x+1 + \cancel{6\sqrt{x^2}} + \cancel{12\sqrt{x}} + (-6\sqrt{x^2} - 12\sqrt{x}) = 1 \quad (2) \quad (5)$$

$$g(x) = x^3 + 9x^2 + 2\sqrt{x} \Rightarrow \cancel{12\sqrt{x}} - \cancel{9\sqrt{x^2}} + \cancel{2\sqrt{x}} + \cancel{9\sqrt{x^2}} - \cancel{12\sqrt{x}} + \cancel{12\sqrt{x}} - \cancel{12\sqrt{x}} + \cancel{12\sqrt{x}} - \cancel{12\sqrt{x}} + \cancel{12\sqrt{x}} - \cancel{12\sqrt{x}} = -20$$

$$\Rightarrow \frac{g(\sqrt{x}-2)}{f(\sqrt{x}+2)} = (-2) \quad \checkmark$$

$$\Rightarrow f(x) + g(x) = \sqrt{(x-2)-4\sqrt{x-2}+4} + \sqrt{(x-2)+4\sqrt{x-2}+4} - \sqrt{(\sqrt{x-2}-2)^2} + \sqrt{(\sqrt{x-2}+2)^2}$$

$$= |\sqrt{x-2}-2| + |\sqrt{x-2}+2| \Rightarrow \sqrt{x-2} = a+b\sqrt{x+c} \quad \left. \begin{array}{l} a=0 \\ b=1 \\ c=-2 \end{array} \right\} \frac{a+b}{c} = \left(\frac{-1}{2}\right) \quad \checkmark$$

$$\frac{g}{f} = \{g(x) \cap f(x)\} - \{x | f(x) = 0\}$$

$$\Rightarrow \{(2, 1), (1, 0), (3, 2), (0, 4)\}$$

$$\Rightarrow \frac{g}{f} = \{(2, \frac{1}{2}), (0, 4)\} \quad \checkmark$$

$$\frac{x+2}{x^2-4x+4} = \frac{x+2}{(x-2)(x-2)}$$

$$\begin{array}{l} x=2 \Rightarrow f(2) = \frac{4}{-1} = (-4) \\ x=0 \Rightarrow f(0) = \frac{2}{4} \end{array}$$

$$\frac{g}{f} = \{(2, \frac{1}{-4}), (0, \frac{2}{4})\}$$

$$الف) f(x) = \{(1, 2), (\frac{3}{2}, -1), (2, 2), (-\frac{1}{2}, 2)\} \quad \checkmark$$

(2) (10)

$$ب) f(x^2) = \{(1, 2), (\sqrt{3}, -1), (2, 2), (-1, 2), (-\sqrt{3}, -1), (-2, 2)\} \quad \checkmark$$

$$ج) 2g(x)+1 = \{(-2, 1), (1, 3), (3, 9), (-1, 1)\} \quad \checkmark$$

$$د) \frac{x}{g} = \{(1, -4), (3, -1), (-\frac{1}{2}, \frac{2}{5})\} \quad \checkmark$$

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