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Date

علم الهدی     یازدهم دخترانه B     حسابان ۱ شماره ۴

۱- الف) $\frac{x-1}{x}-\frac{x}{x-1}\geq 0 \Rightarrow \frac{x^2-2x+1-x^2}{x(x-1)}\geq 0 \Rightarrow \frac{1-2x}{x(x-1)}\geq 0$   $\frac{1}{2}$

$\Rightarrow \begin{array}{cccccc} & 0 & & \frac{1}{2} & & 1 \\ + & & - & & + & - \end{array} \Rightarrow D=(-\infty,0)\cup[\frac{1}{2},1)$

ب) $\dfrac{\frac{1}{x+1}-\frac{2}{x}}{\frac{3}{x-1}+\frac{1}{x+2}} \Rightarrow$ ① $x\neq 0$ ② $x\neq -1$ ③ $x\neq 1$ ④ $x\neq -2$ ⑤ $\frac{3}{x-1}+\frac{1}{x+2}\neq 0$

$\Rightarrow \frac{3x+6+x-1}{(x-1)(x+2)}=\frac{4x+5}{(x-1)(x+2)}\neq 0 \rightarrow x\neq\frac{-5}{4} \Rightarrow D=\mathbb{R}-\{-2,\frac{-5}{4},-1,0,1\}$

۲- الف) $((\frac{1}{3})^x-9)(32-4^x)\geq 0 \Rightarrow (\underbrace{3^{-x}-3^2}_{x=-2})(\underbrace{2^5-2^{2x}}_{x=\frac{5}{2}})\geq 0 \Rightarrow \begin{array}{cccc} & \frac{-5}{2} & & -2 \\ - & & + & - \end{array}$

$D=[\frac{-5}{2},-2]$

ب) $\sqrt[4]{x-1}+\sqrt{y+1}=3 \Rightarrow \sqrt{y+1}=3-\sqrt[4]{x-1}$   ① $x-1\geq 0 \Rightarrow x\geq 1$

② $3-\sqrt[4]{x-1}\geq 0 \Rightarrow \sqrt[4]{x-1}\leq 3 \Rightarrow x-1\leq 81$   $x\leq 82$   $D=[1,82]$

۳- $\dfrac{\log_4(x^2-x-2)}{\sqrt{x^2-1}+1} \Rightarrow$ ① $x^2-x-2>0 \Rightarrow (x-2)(x+1)>0$   $\begin{array}{ccccc} & -1 & & 2 & \\ + & & - & & + \end{array} \Rightarrow (-\infty,-1)\cup(2,+\infty)$

② $x^2-1\geq 0 \Rightarrow \begin{array}{ccccc} & -1 & & 1 & \\ + & & - & & + \end{array} \Rightarrow (-\infty,-1]\cup[1,+\infty)$

③ $\sqrt{x^2-1}\neq -1$ ✓ $\Rightarrow D=(-\infty,-1)\cup(2,+\infty)$

۴- $D=[-2,b] \Rightarrow 3+ax-x^2=-(x^2-ax-3)=(x+2)(x-b)$

$\Rightarrow x^2-ax-3=(x+2)(x+b)=x^2+(2+b)x+2b \Rightarrow 2b=-3$   $b=\frac{-3}{2}$

$2+b=-a \Rightarrow a=-(\frac{-3}{2}+2)=\frac{-1}{2}$   $a+b=\frac{-3}{2}-\frac{1}{2}=-2$

۵- $f(x)-x\geq 0$

$\nearrow$ $f(x)\geq x \Rightarrow \text{if } x\geq 1 \longrightarrow 3x-2-x\geq 0 \Rightarrow 2x-2\geq 0$   $x\geq 1$ ✓

$\searrow$ $\text{if } x<1 \longrightarrow 2x+3-x\geq 0 \Rightarrow x\geq -3 \Rightarrow D=[-3,1)\cup[1,+\infty)$

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$$\left.\begin{array}{l} f(a) = (a+1)\times 7 = 7a+7 \\ f(2) = 3a + (-4) \end{array}\right\} \Rightarrow 2(7a+7) = 3a-4+a$$ ۶-

$$14a+14 = 4a-4 \Rightarrow 10a = -18 \quad a = -1.8$$

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$$f(2-\sqrt{3}) + f(2+\sqrt{3}) = \sqrt{2-\sqrt{3}} + \frac{1}{\sqrt{2-\sqrt{3}}} + \sqrt{2+\sqrt{3}} + \frac{1}{\sqrt{2+\sqrt{3}}} + 4$$ ۷-

$$= \sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} + \frac{\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}}{\underbrace{(\sqrt{2-\sqrt{3}})(\sqrt{2+\sqrt{3}})}_{4-3=1}} + 4 \Rightarrow 2(\underbrace{\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}}}_{t}) + 4 = A$$

$$\Rightarrow t^2 = (\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}})^2 = 2-\sqrt{3}+2+\sqrt{3}+2 = 6 \Rightarrow t = \sqrt{6}$$

$$A = 2(\sqrt{6}) + 4 = \boxed{2\sqrt{6}+4}$$

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$$\left.\begin{array}{l} \xrightarrow{x} (2f(x) - 3f(-x) = 4x^2 - x)^{\times 2} \\ \xrightarrow{-x} (2f(-x) - 3f(x) = 4x^2 + x)^{\times 3} \end{array}\right. \Rightarrow \left|\begin{array}{l} 4f(x) - 6f(-x) = 8x^2 - 2x \\ 6f(-x) - 9f(x) = 12x^2 + 3x \end{array}\right.$$ ۸-

$$\overset{+}{\Rightarrow} -5f(x) = 20x^2 + x \Rightarrow f(x) = \frac{-20x^2 - x}{5}$$

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$$\xrightarrow{x=0} 2f(0) = 3m-1 \Rightarrow f(0) = \frac{3m-1}{2}$$ ۹-

$$\xrightarrow{x=-2} 6f(0) = 16+2m+3m-1 = 5m+15 \Rightarrow f(0) = \frac{5m+15}{6}$$

$$\frac{3m-1}{2} = \frac{5m+15}{3\times 2} \Rightarrow 9m-3 = 5m+15 \Rightarrow 4m = 18 \rightsquigarrow m = \frac{18}{4}$$

$$\Rightarrow f(0) = \frac{3(\frac{18}{4})-1}{2} = \frac{\frac{54-4}{4}}{2} = \frac{50}{8} = \frac{25}{4}$$

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$$\left.\begin{array}{l} f(x) = ax+b \\ f(\frac{1}{x}) = \frac{a}{x}+b \end{array}\right\} f(x) + f(\frac{1}{x}) = \frac{ax^2+a+2bx}{x} = \frac{3x^2-12x+3}{x}$$ ۱۰-

$$\Rightarrow a = 3 \quad . \quad b = \frac{-12}{2} = -6$$

$$f(-1) = 3(-1) - 6 = \boxed{-9}$$