به نام خدا

ماهان نژادکرد — تکلیف ۲ — دوازدهم تجربی B

۱-

$$f(x) = (x+1)^2 + (3x-1)^2 + mx^2 + nx + mn = A \quad (A \in \mathbb{R})$$

$$= x^2 + 2x + 1 + 9x^2 + 1 - 6x + mx^2 + nx + mn = A$$

$$= x^2(10+m) + x(n-4) + mn + 2 = A$$

$$\Rightarrow \begin{cases} 10 + m = 0 \Rightarrow \boxed{m = -10} \\ n - 4 = 0 \Rightarrow \boxed{n = 4} \end{cases}$$

$$g(x) = \{(4,-10), (4, P+1), (P+2, -1), (-9, P+k)\}$$

$$\left.\begin{array}{l} (4,-10) \in g(x) \\ (4, P+1) \in g(x) \end{array}\right\} \Rightarrow -10 = P + 1 \Rightarrow \boxed{P = -11}$$

$$\left.\begin{array}{l} (P+2, -1) = (-9, -1) \in g(x) \\ (-9, P+k) = (-9, -11+k) \in g(x) \end{array}\right\} \Rightarrow -1 = -11 + k \Rightarrow \boxed{k = 10}$$

$$\Rightarrow m + n + P + k = (-10) + (4) + (-11) + 10 = -7$$

۲-

الف) $y = \sqrt{\dfrac{x-2}{x^4 - 2x^2 - 8}} = \sqrt{\dfrac{(x-2)}{(x^2-4)(x^2+2)}} = \sqrt{\dfrac{(x-2)}{(x-2)(x+2)(x^2+2)}}$

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

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$$D_f = (-2, +\infty) - \{2\}$$

ب) $\dfrac{3x^2+1}{4 - 2[-x]} \Rightarrow 4 - 2[-x] \neq 0 \Rightarrow [-x] \neq 2 \Rightarrow 2 \le -x < 3$

$$-3 < x \le -2$$

$$\Rightarrow D_f = \mathbb{R} - (-3, -2]$$

۳- الف) $f(x) = \dfrac{\sqrt{x(x^2-1)}}{\sqrt{|x|+x}} \Rightarrow x(x^2-1) \geq 0$ $\Rightarrow x \in [-1,0] \cup [1,+\infty)$

$|x|+x > 0 \Rightarrow x \in (0,+\infty)$

$\Rightarrow D_f = [1,+\infty)$

ب) $f(x) = \dfrac{\sqrt{|x-2|-x^2}}{|x|-1} \Rightarrow \begin{cases} |x-2|-x^2 \geq 0 \\ |x|-1 \neq 0 \Rightarrow |x| \neq 1 \Rightarrow x \neq \pm 1 \quad \mathrm{I} \end{cases}$

$|x-2|-x^2 \geq 0 \Rightarrow \begin{cases} -x^2+x-2 \geq 0, \ x \geq 2 & \Delta < 0 \ \ a<0 \Rightarrow \varnothing \\ -x^2-x+2 \geq 0, \ x < 2 & \Rightarrow x \in [-2,1] \end{cases} \quad \mathrm{II}$

$\overset{\mathrm{I},\mathrm{II}}{\Rightarrow} D_f = [-2,1) - \{-1\}$

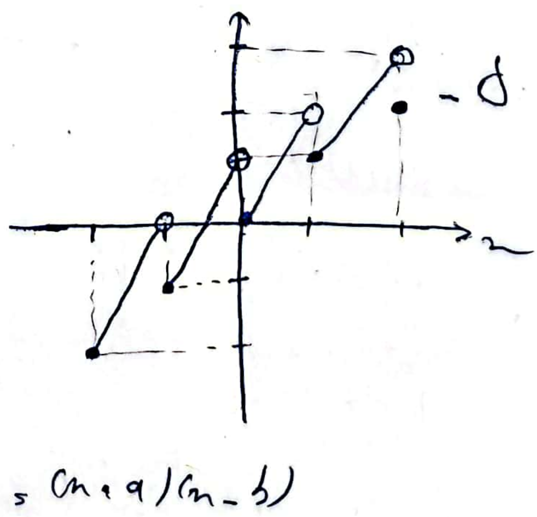
۴- $y = \dfrac{1}{||x-2|-1|-k} \Rightarrow ||x-2|-1| = k$

$\Rightarrow |x-2| = \pm k+1 \Rightarrow x = \begin{cases} k+3 \\ k+1 \\ -k+1 \\ -k+3 \end{cases}$

دامنه‌ها یکسان پس $\Rightarrow \begin{cases} -k+3 = k+1 \Rightarrow k=1 \Rightarrow D_f = \mathbb{R} - \{4,2,0\} \\ -k+3 = k+3 \Rightarrow k=0 \Rightarrow D_f = \mathbb{R} - \{3,1\} \quad \text{غ ق ق} \end{cases}$

$\Rightarrow \boxed{k=1}$

۵- $f(x) = 3x - [x] = \begin{cases} 3x+2 & -2 \leq x < -1 \\ 3x+1 & -1 \leq x < 0 \\ 3x & 0 \leq x < 1 \\ 3x-1 & 1 \leq x < 2 \\ 4 & x = 2 \end{cases}$



۶- $f(x) = \dfrac{x^2-4x+3}{x+a} + b = x \Rightarrow x^2-4x+3 = (x+a)(x-b)$

$\Rightarrow x^2-4x+3 = x^2 + x(a-b) - ab \Rightarrow \begin{cases} a-b = -4 \\ ab = -3 \end{cases} \Rightarrow \begin{cases} a = -3 \\ b = +1 \end{cases}$

$$f(x)=\begin{cases}\dfrac{x^3+2x^2-x-2}{x^2-1} & x\neq\pm1\\[2mm] \dfrac{ax+2}{x+b} & x=\pm1\end{cases}$$ ۷-

$g(x)=x+c$

$f(x)=g(x)$; $\dfrac{x^3+2x^2-x-2}{x^2-1}=\dfrac{(x-1)(x+1)(x+2)}{(x-1)(x+1)}=x+2$ $(x\neq\pm1)$

$\Rightarrow \boxed{c=2}$ $\quad g(1)=f(1)=3=\dfrac{2+a}{b+1}\Rightarrow 3b+3=2+a$ $\quad a=2/5$

$g(-1)=f(-1)=1=\dfrac{2-a}{b-1}\Rightarrow b-1=2-a$ $\quad b=0/5$

$\Rightarrow b+c=2+0/5=2/5$

$f(x)=\sqrt{4x-3a}+k-1\Rightarrow D_f:[\frac{3}{4}a,+\infty)$ ۸-

$g(x)=\sqrt{b-4x}+3k\Rightarrow D_g=(-\infty,\frac{b}{4}]$

$D_f\cap D_g=\{+1\}\Rightarrow \frac{3}{4}a=\frac{b}{4}=1\Rightarrow b=4,\ a=\frac{4}{3}$

$\Rightarrow f(x)=\sqrt{4x-4}+k-1\ ,\ g(x)=\sqrt{4-4x}+3k$

$2f(1)-g(1)=2k-2-3k=-k-2=k\Rightarrow \boxed{k=-1}$

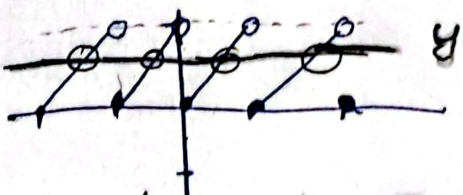
$\Rightarrow 3a-\frac{b}{2}-k=4-2+1=3$

$f(x)=\sqrt{m-x}+x\Rightarrow D_f=(-\infty,m]$ $\quad g(x)=\sqrt{2x+2}\Rightarrow D_g=[-1,+\infty)$ ۹-

$D_f\cap D_g=[-1,m]=[-1,7]\Rightarrow\boxed{m=7}\Rightarrow f(x)=\sqrt{7-x}+x$

$f(a)-g(a)=(2+n)-(4\sqrt{2})\Rightarrow\boxed{n=4\sqrt{2}-2}\Rightarrow\boxed{m+n=4\sqrt{2}+5}$

$y=(-1)^{2}(x-[x])=x-[x]$



$y=\frac{1}{2}$ ۱۰-

۴ جواب دارد