سجاد سبحانی

شماره تکلیف : ۲

① $f(x) = x^2 + 2x + 1 + 9x^2 - 6x + 1 + mx^2 + nx + mn$

$\left.\begin{matrix} m = -10 \\ n = 4 \end{matrix}\right\} \longrightarrow f(x) = -38$

$g(x) = \{(4, \underset{-10}{m})(\underset{4}{n}, p+1)(\underset{-9}{p+2}, -1)(-9, p+k)\}$

$\left.\begin{matrix} p = -11 \\ k = 10 \end{matrix}\right\} \longrightarrow m + n + p + k = -10 + 4 - 11 + 10 = \boxed{-7}$

② الف) $\dfrac{x-2}{(x^2-4)(x^2+2)} \geq 0 \longrightarrow$

$-2 \qquad 2^*$

$- \quad + \quad +$

$D_f = (-2, 2) \cup (2, +\infty)$

ب) $4 - 2[-x] \neq 0 \Rightarrow [-x] \neq 2 \Rightarrow$ پس نباید

$-3 < x \leq -2 \longrightarrow$

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

③ الف) $y = \dfrac{\sqrt{x(x^2-1)}}{\sqrt{x+|x|}}$ $\qquad x(x^2-1) \geq 0 \longrightarrow$

$-1 \qquad 0 \qquad 1$

$- \quad + \quad - \quad +$

$x + |x| \longrightarrow \mathbb{R}^+$

$\cap \longrightarrow D_f = [1, +\infty)$

ب) $y = \dfrac{\sqrt{|x-2| - x^2}}{|x| - 1}$ $\Rightarrow |x-2| - x^2 \geq 0 \longrightarrow (x - 2 - x^2)(x - 2 + x^2) \geq 0 \longrightarrow$

$|x| - 1 \rightarrow x \neq \pm 1$

$(\cancel{x^2 - x + 2})(x^2 + x - 2) \leq 0$

همواره مثبت

$x \in [-2, 1]$

$\cap \longrightarrow D_f = [-2, 1) - \{-1\}$

(۴)

$$||x-2|-1|-k=0 \longrightarrow ||x-2|-1|=k \longrightarrow k\geq 0$$

$$|x-2|-1=\pm k \longrightarrow |x-2|=\pm k+1 \longrightarrow$$

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

$$\Longrightarrow k\in\{1,3\} \Longrightarrow \begin{cases} k=1 \longrightarrow x=4,\ x=0,\ x=2 \ \checkmark \\ x=3 \longrightarrow x=6,\ x=-2,\ x=0 \end{cases}$$

پس $k=1$ باشد

(۵)

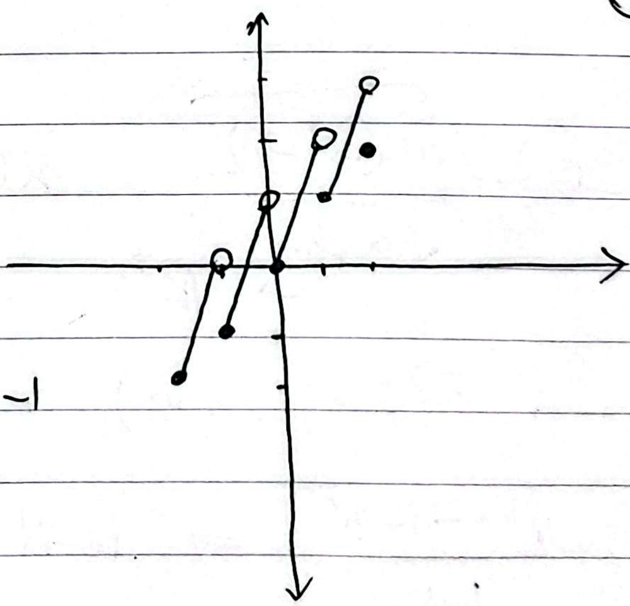
$x\in[-2,-1) \longrightarrow y=2x+2$

$x\in[-1,0) \longrightarrow y=2x+1$

$x\in[0,1) \longrightarrow y=2x$

$x\in[1,2) \longrightarrow y=2x-1$

$x=2 \longrightarrow y=2$



۹

$$a=-1$$

$$f(x)=\begin{cases}\dfrac{(x-1)(x-۲)}{x+a}+b = x-۲+b \to b=۳ \\[2ex] \dfrac{(x-1)(x-۳)}{x-۳}+b = x-1+b \to b=1\end{cases}$$

$$a=-۲$$

$$\rightsquigarrow a-b=-1-۳=-۴$$

۷

$$f(x)=\begin{cases}\dfrac{x(x^۲-1)+۲(x^۲-1)}{x^۲-1} & x\neq \pm 1 \quad \to y=x+۲ \\[2ex] \dfrac{ax+۲}{a+b} & x=\pm 1\end{cases}$$

$$g(x)=x+c \to \boxed{c=۲}$$

$$\rightsquigarrow (1,۳),\ (-1,1) \to \begin{cases}\dfrac{a+۲}{1+b}=۳ \to a+۲=۳+۳b \to ۳b+1=a \to ۳b-a=-1 \\[2ex] \dfrac{-a+۲}{b-1}=1 \to -a+۲=b-1 \to ۳=b+a \to b=۰/۵,\ a=۲/۵\end{cases}$$

$$\to b+c=۰/۵+۲=۲/۵$$

(1)

1) $4x - 2a \geq 0 \to x \geq \frac{2}{4}a \to \frac{2}{4}a = 1 \to \boxed{a = \frac{4}{2}}$

2) $b - 4x \geq 0 \to x \leq \frac{b}{4} \to \frac{b}{4} = 1 \to \boxed{b = 4}$

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

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

$\to 2k - 4 = 3k = k$, $k = -1$

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

(4)

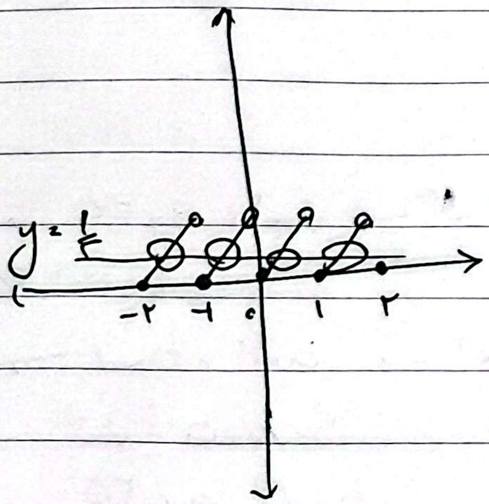
$D_g = [-1, +\infty)$

$D_f = (-\infty, m] \to \boxed{m = 7}$

$(f-g)(3) = 6\sqrt{2} \to 3 + n - 2\sqrt{2} = 6\sqrt{2} \to$

$n = 8\sqrt{2} - 3 \Rightarrow m + n = 4 + 8\sqrt{2}$

$y = \cancel{(-1)}^{2}(x - [x]) = \frac{1}{2} \to x - [x] = \frac{1}{2} \ (x \in [-2, 2])$ (10)



$\boxed{\text{۴ ریشه دارد}}$

s.a.m