مینا رضایی

۱) $f(x)=(10+m)x^2+(n-4)x+mn+2 \xrightarrow{\text{ثابت}} 10+m=0 \to m=-10\,,\ n-4=0 \to \underline{n=4}$

$\to f(x)=-38$

$g(x)=\{(4,-10),(4,p+1),(\underbrace{p+2}_{\to -9},-1),(-9,p+K)\} \xrightarrow{\text{تابع}} p+1=-10 \to \underline{p=-11}\,,\ -11+K=-1 \to \underline{K=10}$

$m+n+p+K=-10+4+(-11)+10=\underline{-7}$

۲) الف) $y=g(x)=\sqrt{\dfrac{x-3}{x^4-2x^2-8}} \to x^4-2x^2-8=0 \xrightarrow{x^2=K} K^2-2K-8=0 \to \begin{cases} K=x^2=4 \to x=\pm 2 \\ K=x^2=-2 \ \text{غ ق ق} \end{cases}$

$x-3=0 \to x=3$

$\dfrac{x-3}{x^4-2x^2-8} \geq 0 \quad \dfrac{-2 \quad 2 \quad 3}{+\ -\ +\ -\ +} \to D_g=R-\{\pm 2\}$

ب) $f(x)=\dfrac{2x^2+1}{4-2[-x]} \to D_g=4-2[-x]\neq 0 \to [-x]\neq 2 \to \underbrace{2\leq -x<3 \to -3<x\leq -2}_{\text{نباید باشد}}$

$D_f=R-[-3,-2)$

۳) الف) $f(x)=\dfrac{\sqrt{x(x^2-1)}}{\sqrt{|x|+x}} \qquad D_f=\begin{cases} x(x^2-1)\geq 0 \quad \dfrac{-1 \quad 0 \quad 1}{-\ +\ -\ +} \to x\in[-1,0]\cup[1,\infty) \\ |x|+x>0 \to x\in(0,\infty) \end{cases} \xrightarrow{\cap} D_f=(1,\infty)$

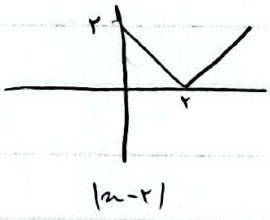
ب) $f(x)=\dfrac{\sqrt{|x-2|-x^2}}{|x|-1}$

$D_g=\begin{cases} |x-2|-x^2\geq 0 & \begin{cases} x\geq 2 \to -x^2+x-2\geq 0 \quad \Delta<0 \ \text{جواب ندارد} \\ x<2 \to -x^2-x+2\geq 0 \quad \dfrac{-2 \quad 1}{-\ +\ -} \to x\in[-2,1] \end{cases} \\ |x|-1\neq 0 \to |x|\neq 1 \to x\neq \pm 1 \end{cases} \xrightarrow{\cap} [-2,1)-\{-1\}$

۴)

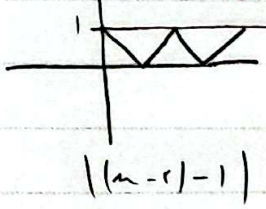
$y=\dfrac{1}{\underbrace{||x-2|-1|-K}}\to ||x-2|-1|=K$

مخرج را برابر صفر می‌گذاریم به ازای ... ریشه ثبت پیدا کرد



$|x-2|$

$\to$



$y=K \to \underline{K=1}$

$||x-2|-1|$

۵)

$y = 2x - [x] \quad , [-2,2]$

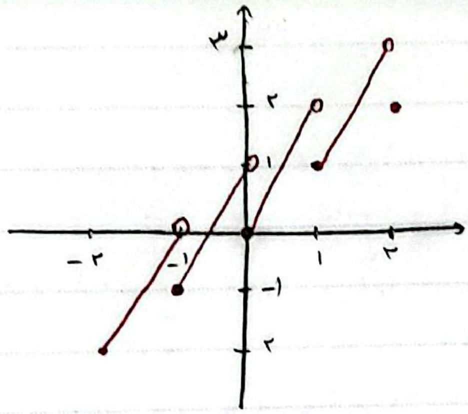
$-2 \leqslant x < -1 \rightarrow y = 2x+2 \quad \begin{cases} -2 \rightarrow -2 \\ -1 \rightarrow 0 \end{cases}$

$-1 \leqslant x < 0 \rightarrow y = 2x+1 \quad \begin{cases} -1 \rightarrow -1 \\ 0 \rightarrow 1 \end{cases}$

$0 \leqslant x < 1 \rightarrow y = 2x \quad \begin{cases} 0 \rightarrow 0 \\ 1 \rightarrow 2 \end{cases}$

$1 \leqslant x < 2 \rightarrow y = 2x-1 \quad \begin{cases} 1 \rightarrow 1 \\ 2 \rightarrow 3 \end{cases}$

$x = 2 \rightarrow y = 2x-2 \rightarrow 2 \rightarrow 2$



۶)

$f(x) = \dfrac{x^2-4x+3}{x+a} + b$ (فرد) $\longrightarrow f(0) = 0 \longrightarrow \dfrac{3}{a} + b = 0 \longrightarrow 3 = -ab \longrightarrow a = -3$

$\longrightarrow f(1) = 1 \longrightarrow \dfrac{0}{1+a} + b = 1 \longrightarrow b = 1$

$a - b = -3 - 1 = \underline{-4}$

۷)

$f(x) = g(x) \rightarrow f(0) = g(0) \rightarrow 2 = c \rightarrow g(x) = x+2$

$g(1) = f(1) \rightarrow g(1) = 3, \quad f(1) = \dfrac{a+2}{1+b} \Big\} \; a+2 = 3+3b \rightarrow a - 3b = 1$

$g(-1) = f(-1) \rightarrow g(-1) = 1, \quad f(-1) = \dfrac{-a+2}{-1+b} \Big\} -a+2 = b-1 \rightarrow b+a = 3$

$\begin{cases} -a+3b = -1 \\ a+b = 3 \end{cases} \quad 4b = 2 \quad b = \frac{1}{2}$

$b + c = \frac{1}{2} + 2 = \underline{\underline{\frac{5}{2}}}$

۸)

$f(x) = \sqrt{4x-3a} + k = 1 \qquad g(x)\sqrt{b-4x} + 2k \qquad 2f - g = \{(1,k)\}$

$D_{f\cap g} = \{1\} \quad \begin{cases} 4x - 3a \geqslant 0 \rightarrow x \geqslant \frac{3a}{4} \rightarrow \frac{3a}{4} = 1 \rightarrow a = \frac{4}{3} \\ b - 4x \geqslant 0 \rightarrow \frac{b}{4} \geqslant x \rightarrow \frac{b}{4} = 1 \rightarrow b = 4 \end{cases}$

$2f(1) - g(1) = 2k - 2 - 2k = k \rightarrow k = 1 \qquad 3a - \frac{b}{2} - k = 4 - 2 - 1 = \underline{1}$

۹)

$f(x) = \sqrt{\frac{m}{7} - x} + n \qquad D_g = 2x+2 \geqslant 0 \rightarrow x \geqslant -1$

$D_f = m - x \geqslant 0 \rightarrow m \geqslant x \rightarrow m = 7$

$D_{f+g} = [-1,7] \rightarrow D_f \cap D_g \rightarrow [-1,7]$

$f - g(2) = 6\sqrt{2} \longrightarrow \sqrt{7-2} + n - 2\sqrt{2} = 6\sqrt{2} \longrightarrow n = 8\sqrt{2} - 2$

$\Big\} \; m + n = 8\sqrt{2} - 2 + 7 = 8\sqrt{2} + 5$

۱۰)

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

$x - [x] = \frac{1}{2}$

$y = \frac{1}{2} \rightarrow$ جواب ۴