نام و نام خانوادگی ...ساینا دهقی... پاسخنامه تشریحی تکلیف شماره ...۵... کلاس ...دهم دهتر... B

پاسخ نامه را با دقت مطالعه کن! ۸/۵

۱ (۲)

الف) $f(x)=\sqrt{x|x|}\ ,\ g(x)=x$

$f(x)=x|x|\geqslant 0 \to x\geqslant 0 \to x^2\geqslant 0$

$f(x)=\sqrt{x|x|}=\sqrt{x.x}=\sqrt{x^2}=|x|=x$

$f(x)=x=g(x)$

$f(x)=[0,+\infty)\quad g(x)=\mathbb{R}$

برابر نیست ✓

فقط در $[0,+\infty)$ برابرند.

ب) $f(x)=\frac{(x+3)(x+1)+x+4}{x^2+5x+7}\ ,\ g(x)=1$

$f(x)=\frac{x^2+4x+3+x+4}{x^2+5x+7}=\frac{x^2+5x+7}{x^2+5x+7}$

$f(x)=1=g(x)$

$\Delta=b^2-4ac$ دلتا ← $25-28=-3$ دلتا منفی یعنی مخرج صفر نمی شود ✓

$D_f=\mathbb{R}\quad D_g=\mathbb{R}\quad D_f=D_g$ برابر

ج) $f(x)=\frac{4\sin^2 x-6\sin x}{2\sin x-3}\ ,\ g(x)=2\sin x$

$f(x)=\frac{2\sin x(2\sin x-3)}{2\sin x-3}=2\sin x$

$f(x)=2\sin x=g(x)$

$2\sin x-3=0 \to 2\sin x=3 \to \sin x=\frac{3}{2}$

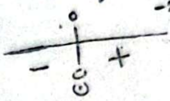
$\frac{3}{2}>1$ ✓

$D_f=\mathbb{R}\quad D_f=D_g\quad D_g=\mathbb{R}$ برابر

د) $f(x)=\frac{x}{|x|}\ ,\ g(x)=\frac{|x|}{x}$

$x>0 \to f(x)=\frac{x}{x}=1\ ,\ g(x)=\frac{x}{x}=1$

$x<0 \to f(x)=\frac{x}{-x}=-1\ ,\ g(x)=\frac{-x}{x}=-1$



$D_f=D_g$ ✓ برابر

۲ (۱/۵)

الف) $f(x)=\left[\frac{x^2}{x^2+1}\right]\ ,\ g(x)=[x-[x]]$

$f(x)=\left[\frac{x^2+1-1}{x^2+1}\right]=\left[1-\frac{1}{x^2+1}\right]$

$\Rightarrow [1^-]=0$

$g(x)=[x-[x]]=0$ ثابت صفر

$D_f=D_g$ ✓ برابر

ب) $f(x)=\frac{1}{[2x]}\ ,\ g(x)=\frac{1}{2[x]}$

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

$D_f=[2x]\neq 0\quad x\notin[0,\frac{1}{2})$

$D_g=2[x]\neq 0\quad [x]\neq 0$

$x\notin[0,1)$

$D_f\neq D_g$ ✗

ج) $f(x)=\frac{1}{\sqrt{x-|x|}}\ ,\ g(x)=\frac{1}{\sqrt{|x|-x}}$

$D_f=\varnothing$

$D_g=(-\infty,0)$

$D_f\neq D_g$ ✗

د) $f(x)=\begin{cases}\frac{x^3-x}{x-1} & ;x\neq 1\\ 2 & ;x=1\end{cases}\quad g(x)=x^2+x$

$f(x)=\begin{cases}x^2+x & x=1\\ 2 & x\neq 1\end{cases}$ ✓

$g(x)=x^2+x$

$D_f=D_g=\mathbb{R}\quad g(1)=f(1)\quad g(x)=f(x)$

۳ (۰/۷۵)

$f^2(x)-g^2(x)=(f(x)-g(x))(f(x)+g(x)) \to (x^2-x+1)(x^2+x+1)=x^4+x^2+1$

$f(x)-g(x)=x^2-x+1$

$f(x)+g(x)=x^2+x+1 \quad\to\quad f(x)=x^2+1\quad g(x)=x$

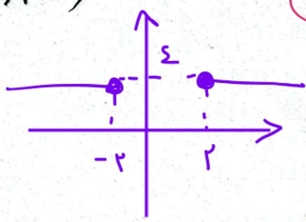
۴ (۱)

$f(x)=x-\sqrt{x^2-4} \to x^2-4\geqslant 0 \to x^2\geqslant 4 \to \begin{cases}x\geqslant 2\\ x\leqslant -2\end{cases}\quad D_f=(-\infty,-2]\cup[2,+\infty)$

$g(x)=x+\sqrt{x^2-4} \to x^2-4\geqslant 0 \to x^2\geqslant 4 \to \begin{cases}x\geqslant 2\\ x\leqslant -2\end{cases}\quad D_g=(-\infty,-2]\cup[2,+\infty)$

$f\times g=(-\infty,-2]\cup[2,+\infty)$ ✓

$f\times g=x^2-(x^2-4)=4$



۵ (۰/۷۵)

$g(x)=f(x)$

$\frac{ax+2}{x^2-mx+n}=\frac{x-b}{2x^2-3x-5}=2ax^3-3ax^2-5ax+4x^2-6x-10=x^3-mx^2+nx-bx^2-bmx-\ldots$

$am-bn=$

$2(x^2-\frac{3}{2}x-\frac{5}{2}) \to m=\frac{3}{2}\quad n=-\frac{5}{2}$

$\to \frac{ax+2}{x^2-\frac{3}{2}x-\frac{5}{2}}=\frac{x-b}{2(x^2-\frac{3}{2}x-\frac{5}{2})}$

$2ax+4=x-b \to a=\frac{1}{2}\quad b=-4$

$am-bn=\frac{3}{4}-10=-\frac{37}{4}$

$\lambda c = b$, $bc = 2$ $\rightarrow \lambda c^2 = 2 \rightarrow c = \pm \frac{1}{2}$

$\hookrightarrow c = \frac{1}{2} \rightarrow a = \frac{1}{2} \rightarrow b = 2 \rightarrow \frac{ab}{c} = -4$

$\hookrightarrow c = -\frac{1}{2} \rightarrow a = \frac{1}{2} \rightarrow b = -2 \rightarrow \frac{ab}{c} = +4$

$f(x) = \{(-1,2),(2,4),(3,-1),(0,\frac{1}{2})\}$ $\quad g(x) = \{(1,4),(3,9),(-1,-3),(5,0)\}$

$\frac{2g}{f+g} = \frac{\{(2,8),(3,12),(-1,-3),(5,0)\}}{\{(2,8),(3,4),(-1,-2)\}} = \{(2,1),(3,3),(-1,4)\}$

$R = \{(2,1),(3,3),(-1,4)\}$

$f(x) = \{(2,a),(-3,2a-2b),(c,5),(2,d)\}$ $\quad g(x) = \{(2,-1),(-3,1),(a-2b,5)\}$

$f = g$

$a = -1$ $\quad -2b = 4 \rightarrow b = -2$

$-3 - 2b = 1 \rightarrow -2b = 2 \rightarrow b = 1$

$\frac{a}{-1} - 2\underbrace{b}_{1} = c \rightarrow -1 - 2 = -3 \rightarrow c = -3$

$d = -1$ $\quad -1 - 2(-2) = 3 \rightarrow c = 3$

$d + c = -4 - 1 = -5$

$d + c = -5$

$d + c < 4$

$f(x) = \sqrt{-x^2 + x - m} = -x^2 + x - m \geq 0 \rightarrow -x^2 + x \geq m \rightarrow -x(+x-1) \geq m$

$\Delta < 0 \rightarrow m < \frac{1}{4}$

$f_{(m)} = \sqrt{-(x - \frac{1}{2})^2} \rightarrow a < \frac{1}{2}$, $b = 0$

$f(x) = g(x) \rightarrow \frac{2x + a}{x^2 + 4x + b} = \frac{2}{x - c} \rightarrow 2x^2 + ax + 2cx - ac = 2x^2 + 12x + 2b$

$\rightarrow 2x^2 - 2x^2 = 12x + 2b - ax + 2cx + ac \rightarrow 12x + ac + 2b + 2cx - ax = 0 \rightarrow 12x + 2cx - ax = -ac - 2b$

$\Delta = 0 \rightarrow b = 9 \rightarrow D_f = D_g \rightarrow c = -3$

$\frac{2x + a}{x + 3} = 2 \rightarrow a = 6$

$a + b + c = 12$