محمد باباعباسی

پاسخ پرسش شماره ۲

الف) $f(x)=\sqrt{x|x|}$, $g(x)=x \longrightarrow D_f=[0,+\infty)$, $D_g=\mathbb{R} \longrightarrow \boxed{f(x)\neq g(x)}$ برابر نیستند X

ب) $f(x)=\dfrac{(x+3)(x+1)+x+4}{x^2+5x+7}$, $g(x)=1 \longrightarrow f(x)=\dfrac{x^2+4x+3+x+4}{x^2+5x+7}=\dfrac{x^2+5x+7}{x^2+5x+7}=1 \longrightarrow x^2+5x+7\neq 0$

$\Delta = 25-28=-3 \longrightarrow$ ریشه ندارد

$\longrightarrow \boxed{f(x)=g(x)}$ برابرند ✓

ج) $f(x)=\dfrac{4\sin^2 x-6\sin x}{2\sin x-3}$, $g(x)=2\sin x \longrightarrow f(x)=\dfrac{(2\sin x-3)2\sin x}{2\sin x-3}=2\sin x=g(x) \longrightarrow \boxed{f(x)=g(x)}$ برابرند ✓

$\underbrace{2\sin x-3} \longrightarrow$ همواره $\neq 0 \longrightarrow D_f=D_g$

$2\sin x\neq 3$

$\sin x\neq 1/5$ ✓

د) $f(x)=\dfrac{x}{|x|}$, $g(x)=\dfrac{|x|}{x} \longrightarrow D_f=D_f=\mathbb{R}-\{0\} \longrightarrow \boxed{f(x)=g(x)}$ برابرند ✓

الف) $f(x) = 0 \quad , \quad g(x) = 0 \longrightarrow \boxed{f(x) = g(x)}$ برابرند ✓

ب) $f(x) = \dfrac{1}{[2x]} \quad , \quad g(x) = \dfrac{1}{2[x]} \longrightarrow D_f = \mathbb{R} - [0, 0/5) \,,\, D_g = \mathbb{R} - [0, 1) \longrightarrow \boxed{f(x) \neq g(x)}$ نابرابرند

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ج) $f(x) = \dfrac{1}{\sqrt{x - |x|}} \longrightarrow x - |x| \leq 0 \longrightarrow \underline{D_f = \varnothing} \,,\, g(x) = \dfrac{1}{\sqrt{|x| - x}} \longrightarrow |x| - x \geq 0$

$\boxed{f(x) \neq g(x)}$ نابرابرند ✗ $\qquad \underline{D_g = \mathbb{R}^-}$

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

$$D_f \longrightarrow \frac{x^3-x}{x-1}=\frac{x(x^2-1)}{x-1}=\frac{x(x-1)(x+1)}{x-1} \longrightarrow$$

x		-1		0		1	
	$+$	ϕ	$-$	ϕ	$+$	ن	$+$

← در اگر $x=1$ ، حاصل مبهم است.

$$\rightarrow D_f=\mathbb{R}$$

$$g(x)=\mathbb{R}$$

$$f(x)=\frac{x\cancel{(x-1)}(x+1)}{\cancel{x-1}}=x(x+1)=x^2+x=g(x)\longrightarrow \boxed{f(x)=g(x)}$$

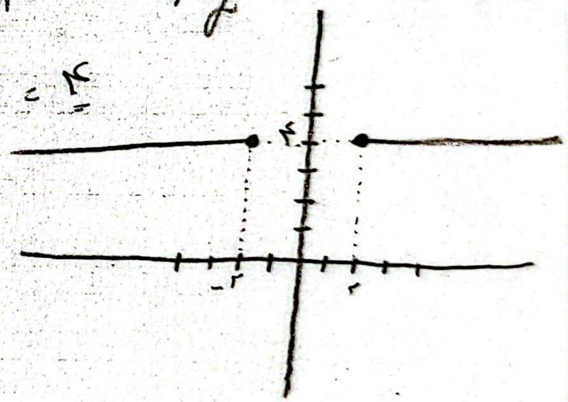
تابع ها برابرند.

$$
\begin{aligned}
+\quad & f(x)+g(x) = x^2+x+1 \\
& f(x)-g(x) = x^2-x+1 \\
\hline
& 2f(x) = 2x^2+2 \longrightarrow \boxed{f(x) = x^2+1} \longrightarrow \boxed{g(x) = x}
\end{aligned}
$$ ۳

$$f^2(x) - g^2(x) = (x^2+1)^2 - (x)^2 = x^4+1+2x^2-x^2 = \boxed{x^4+x^2+1}$$

$$D_f = D_g \longleftrightarrow x^2-4 \geq 0 \longrightarrow x^2 \geq 4 \longrightarrow \begin{cases} x \geq 2 \\ x \leq -2 \end{cases} \longrightarrow D_{f\times g} = (-\infty, -2] \cup [2, +\infty)$$

$$f(x) \times g(x) = \left(x - \sqrt{x^2-4}\right)\left(x + \sqrt{x^2-4}\right) = x^2 - x^2 + 4 = 4$$



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$$\frac{x-b}{2x^2-3x-5} = \frac{\frac{x}{2} - \frac{b}{2}}{x^2 - \frac{3}{2}x - 2/5} = \frac{ax+2}{x^2-mx+n} \longrightarrow \begin{cases} a = \frac{1}{2} \\ b = 2\times(-2) = -4 \\ m = \frac{3}{2} \\ n = -\frac{5}{2} \end{cases}$$

$$am - bn = \left(\frac{1}{2} \times \frac{3}{2}\right) - \left(-4 \times \left(-\frac{5}{2}\right)\right) = \frac{3}{4} - 10 = -\frac{37}{4} = \boxed{-9/25}$$ ۵

$8x+b \neq 0 \to 8a = -b \to a = \frac{-b}{8}$

$g(x) = c$ عدد همواره ثابتی است بنابراین x ها باید بی تاثیر باشد $\longrightarrow c = \frac{bx+2}{8x+b}$

$b=4 \to \frac{4x+2}{8x+4} = \frac{1}{2}$

$b=-4 \to \frac{-4x+2}{8x-4} = -\frac{1}{2}$

$\frac{ab}{c}$ if $b=4 \to \frac{a\times b}{c} = \frac{-\frac{b}{8}\times b}{\frac{1}{2}} = \frac{-\frac{1}{2}\times 4}{\frac{1}{2}} = \boxed{-4}$ ۶

if $b=-4 \to \frac{\frac{1}{2}\times(-4)}{-\frac{1}{2}} = \boxed{+4}$

$f = \frac{(2f-1)+1}{2} \longrightarrow \left\{\left(-1, \frac{3+1}{2}\right), \left(2, \frac{7+1}{2}\right), \left(3, \frac{-5+1}{2}\right), \left(0, \frac{0+1}{2}\right)\right\} = \left\{(-1,2), (2,4), (3,-2), \left(0, \frac{1}{2}\right)\right\}$

$g = \{(2,4), (3,6), (-1,-4), (5,0)\}$

$\frac{2g}{f+g} = \frac{\{(2,8), (3,12), (-1,-8)\}}{\{(2,8), (3,4), (-1,-2)\}} = \boxed{\{(2,1), (3,3), (-1,4)\}} \longrightarrow R_{\frac{2g}{f+g}} = \{1,3,4\}$ ۷

$a = \alpha = -1$

$1 = 3a - 2b = 3(-1) - 2b = -2b - 3$

$4 = -2b$

$-2 = b \longrightarrow c = a - 3b \to c = -1 - 3(-2) = 5$ ۸

$\alpha + c = -1 + 5 = \boxed{4}$

$-(x^2 - x + m) \geq 0$

$x^2 - x + m \leq 0 \xrightarrow{\text{ریشه ها}} \frac{1 \pm \sqrt{1-4m}}{2} \xrightarrow{\text{ریشه مضاعف}} 1 - 4m = 0 \to m = \frac{1}{4}$

$x = a \to f(a) = \sqrt{-\frac{1}{4} + \frac{1}{2} - \frac{1}{4}} = 0$ $\quad \frac{1}{2}$ $\quad - \quad +$ ۹

$a + b = \frac{1}{2} + 0 = \boxed{\frac{1}{2}}$

$x^2 + 6x + b = 0$

$\frac{-6 \pm \sqrt{36 - 4b}}{2}$

$-3 \pm \sqrt{9-b}$ $\quad c = -3 \pm \sqrt{9-b} \longrightarrow f(x) = \frac{2x+a}{x^2+6x+9} = \frac{2x+a}{(x+3)^2}$ ۱۰

$c = -3 \longrightarrow 9 = b$

$\frac{1}{2} = \frac{2}{(1-(-3))^2} = \frac{2+a}{16} \longrightarrow 2(2+a) = 16 \longrightarrow 2 + a = 8 \longrightarrow a = 6$

$a + b + c = 6 + 9 - 3 = \boxed{12}$