

دوم دختر B

نیکی تابش

الف) $f(x) = \sqrt{x|x|} \Rightarrow x|x| \geq 0 \Rightarrow \begin{cases} x > 0 \\ x = 0 \\ x < 0 \end{cases} \Rightarrow D_f = \{0\} \cup \mathbb{R}^+ \Rightarrow D_g = \mathbb{R}$ مساوی نیستند

ب) $f(x) = \frac{x^2 + 2x + 3 + x + 1}{x^2 + 2x + 1} = 1, g(x) = 1 \Rightarrow$ مساوی هستند

$x^2 + 2x + 1 \neq 0 \Rightarrow \Delta = 2^2 - 4 \cdot 1 = -3 < 0$ ریشه ندارد

ج) $f(x) = \frac{2 \sin^2 x - 3 \sin x}{2 \sin x - 3} \Rightarrow 2 \sin x - 3 \neq 0 \Rightarrow \sin x \neq \frac{3}{2} \Rightarrow \sin x < 1 \Rightarrow D_f = \mathbb{R} \Rightarrow D_g = \mathbb{R}$ مساوی هستند

د) $f(x) = \frac{x}{|x|} \Rightarrow x \neq 0, g(x) = \frac{|x|}{x} \Rightarrow x \neq 0 \Rightarrow D_f = \mathbb{R} \setminus \{0\}, D_g = \mathbb{R} \setminus \{0\}, x > 0 \Rightarrow 1, x < 0 \Rightarrow -1$ مساوی هستند

الف) $f(x) = \left[\frac{x^2}{x^2 + 1} \right] \Rightarrow \frac{x^2}{x^2 + 1} \neq 0 \Rightarrow x^2 \neq 0 \Rightarrow x \neq 0 \Rightarrow \left\{ \begin{array}{l} x \neq 0 \\ x \neq 0 \end{array} \right\} \Rightarrow \frac{x^2}{x^2 + 1} < 1 \Rightarrow \left[\frac{x^2}{x^2 + 1} \right] = 0$
 $g(x) = \lfloor x - [x] \rfloor \Rightarrow 0 \leq x - [x] < 1 \Rightarrow [x - [x]] = 0$ مساوی هستند

ب) $f(x) = \frac{1}{[2x]} \Rightarrow [2x] \neq 0 \Rightarrow D_f = \mathbb{R} \setminus \{0, \frac{1}{2}\} \Rightarrow D_g = \mathbb{R} \setminus \{0, 1\} \Rightarrow D_f \neq D_g \Rightarrow$ مساوی نیستند

ج) $f(x) = \frac{1}{\sqrt{x-|x|}} \Rightarrow x-|x| > 0 \Rightarrow x > |x| \Rightarrow D_f = \emptyset$
 $g(x) = \frac{1}{\sqrt{|x|-x}} \Rightarrow |x|-x > 0 \Rightarrow D_g = \mathbb{R}^+$ مساوی نیستند

د) $f(x) = \begin{cases} \frac{x^2 - 2}{x-1}; & x \neq 1 \\ 2; & x = 1 \end{cases}, g(x) = x^2 + x \Rightarrow g(1) = f(1) = 2, f(x \neq 1) = x(x+1) = \frac{x(x-1)(x+1)}{(x-1)} = x^2 + x = g(x \neq 1)$ مساوی هستند

$\left. \begin{array}{l} f(x) + g(x) = x^2 + x + 1 \\ f(x) - g(x) = x^2 - x + 1 \\ g(x) = 2x \Rightarrow g(x) = 2 \Rightarrow f(x) + x = x^2 + x + 1 = x^2 + 1 \end{array} \right\} \Rightarrow f^2(x) - g^2(x) = (x^2 + 1)^2 - x^2 = x^4 + 1 + x^2$

$f \circ g = (x - \sqrt{x^2 - 4})(x + \sqrt{x^2 + 4}) = x^2 - (x^2 - 4) = 4$
 $D_f = D_g = (-\infty, -2] \cup [2, +\infty)$



