

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

ب) $f(x) = \frac{(x+1)(x+1)+x+1}{x^2+5x+7} = \frac{x^2+1x+1+x+1}{x^2+5x+7} = \frac{x^2+2x+2}{x^2+5x+7} = 1 \rightarrow$ یکسان هستند
 $g(x) = 1$ $D_f = D_g$

ج) $f(x) = \frac{1 \sin^2 x - 4 \sin x}{1 \sin x - 1}$, $g(x) = 1 \sin x$ $\frac{1 \sin x (1 \sin x - 4)}{1 \sin x - 1} = 1 \sin x \rightarrow$ یکسان هستند
 $D_f = D_g$

د) $f(x) = \frac{x}{|x|}$, $g(x) = \frac{|x|}{x}$ $D_f = D_g = \mathbb{R} \setminus \{0\} \rightarrow$ یکسان هستند

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

$\left[\frac{x^2+1}{x^2+1} \right] = \left[1 - \frac{1}{x^2+1} \right] = 0$ $1 > x - [x] > 0 \Rightarrow [x - [x]] = 0$

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

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

$x - |x| > 0 \Rightarrow x > |x|$ $|x| - x > 0$
 $\Rightarrow D_f = \emptyset$ $|x| > x \Rightarrow D_g = (-\infty, 0)$

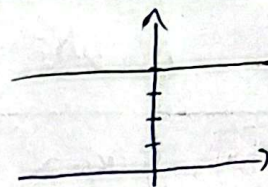
د) $f(x) = \begin{cases} \frac{x^2-x}{x-1} & x \neq 1 \\ 1 & x = 1 \end{cases}$, $g(x) = x^2 + x \rightarrow$ یکسان است

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

$f(x) + g(x) = x^2 + x + 1$
 $f(x) - g(x) = x^2 - x + 1$ $\left. \begin{aligned} f(x) + g(x) + f(x) - g(x) &= 2x^2 + 2 = 2 + f(x) \Rightarrow f(x) = x^2 + 1, \\ g(x) &= x \end{aligned} \right\}$

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

$$f(x) \times g(x) = (x - \sqrt{x^2 + 1}) \times (x + \sqrt{x^2 + 1}) = x^2 - x^2 - 1 = -1$$



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$$\frac{x-b}{1x^2-3x-a} = \frac{ax+1}{x^2-mx+n} \times \frac{1}{1} \Rightarrow \frac{x-b}{1x^2-3x-a} = \frac{1ax+1}{1x^2-1mx+1n}$$

$$\Rightarrow 1ax = x \Rightarrow a = \frac{1}{1}, 1 = -b \Rightarrow b = -1, 1x = -1mx \Rightarrow m = \frac{1}{1}, -a = 1n \Rightarrow n = \frac{-a}{1}$$

$$\Rightarrow am - bn = \left(\frac{1}{1} \times \frac{1}{1}\right) - \left(-1 \times \frac{-a}{1}\right) = \frac{1}{1} - 1 = \frac{-1}{1}$$

2

$$f(x) = g(x) \Rightarrow \frac{bx+1}{1x+b} = c \quad Dg = \mathbb{R} - \{a\}$$

$$1x+b \rightarrow 1x+b \neq 0 \Rightarrow 1x \neq -b \Rightarrow x \neq \frac{-b}{1} \Rightarrow a = \frac{-b}{1} \Rightarrow b = -1a$$

$$1cx+b \quad c = bx+1 \Rightarrow 1cx = bx \Rightarrow c = \frac{b}{1} \Rightarrow b = 1c \rightarrow -1a = 1c \Rightarrow a = -c, c = -a$$

$$\hookrightarrow bc = 1, c = \frac{b}{1} \Rightarrow \frac{b}{1} = 1 \Rightarrow b = 1, c = 1 \Rightarrow b = 1, c = 1 \Rightarrow a = -1, c = 1$$

$$\text{جواب } \rightarrow 1 + \frac{1}{1} - \frac{1}{1} = 1 \quad 1 \text{ جواب } \rightarrow 1 - \frac{1}{1} + \frac{1}{1} = 1$$

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$$1f-1 = \{(-1, 1), (1, 1), (1, -1), (0, 1)\} \Rightarrow 1f = \{(-1, 1), (1, 1), (1, -1), (0, 1)\}$$

$$\Rightarrow f = \{(-1, 1), (1, 1), (1, -1), (0, 1)\}, g = \{(1, 1), (1, -1), (-1, -1), (0, 0)\}$$

$$\frac{1g}{f+g} = \left\{(-1, \frac{1 \times 1}{1+1}), (1, \frac{1 \times 1}{1+1}), (1, \frac{1 \times -1}{1+1}), (0, \frac{1 \times 0}{1+1})\right\}$$

$$\Rightarrow \frac{1g}{f+g} = \left\{(-1, \frac{1}{2}), (1, \frac{1}{2}), (1, -\frac{1}{2}), (0, 0)\right\} \rightarrow R = \left\{\frac{1}{2}, 1, 1\right\}$$

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$$g = f \Rightarrow \{(1, -1), (-1, 1), (a-1b, a)\} = \{(1, a), (-1, 1a-1b), (c, a), (1, d)\}$$

$$\Rightarrow (1, -1) = (1, a) = (1, d) \Rightarrow d = a = -1, (-1, 1) = (-1, 1a-1b) \Rightarrow 1a-1b = 1 \Rightarrow -1-1b = 1$$

$$\Rightarrow -1b = 2 \Rightarrow b = -2, (a-1b, a) = (c, a) \Rightarrow a-1b = c \Rightarrow -1+2 = c \Rightarrow c = 1$$

$$\Rightarrow d + c = -1 + 1 = 0$$

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$f(x) = g(x)$ فقط یک عدد
 و فقط یک زوج
 مرتب دارد

$f(x) \rightarrow -x^2 + x - m = 0 \Rightarrow x = \frac{-1 \pm \sqrt{1 - 4(-1)(-m)}}{-2}$
 $m = \frac{1}{4}$
 $\Delta = 0 \Rightarrow$

$f(a) = \sqrt{-a^2 + a - \frac{1}{4}} = b$
 $-x^2 + x - \frac{1}{4} = 0 \Rightarrow x = \frac{-1 \pm \sqrt{1 - 4(-1)(-\frac{1}{4})}}{-2} = \frac{1}{2}$

$f(\frac{1}{2}) = \sqrt{-(\frac{1}{2})^2 + \frac{1}{2} - \frac{1}{4}} =$
 $\sqrt{-\frac{1}{4} + \frac{1}{2} - \frac{1}{4}} = 0 = b$
 $a = \frac{1}{2}$ تحریر شده است
 پس تابع فقط در

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

$$\frac{y^1 x + a}{x^1 + y^1 x + b} = \frac{y^1}{x - c}$$

$$D_g = D_f - 1R - \{c\} \Rightarrow x^1 + y^1 x + b \rightarrow$$

$$\Rightarrow \Delta = 0 \Rightarrow y^1 - y^1 c b = 0 \Rightarrow y^1 y = c b \Rightarrow b = y$$

$$x^1 + y^1 x + y = (x + y^1)^1 \Rightarrow D_f = 1R - \{y^1\} \Rightarrow c = -y^1 \Rightarrow \frac{y^1 x + a}{x^1 + y^1 x + y} = \frac{y^1}{x + y^1}, x = -1, \frac{-y^1 + a}{1 - y + y} = \frac{y^1}{-1 + y^1}$$

$$\Rightarrow \frac{-y^1 + a}{y^1} = \frac{y^1}{y} \Rightarrow -y^1 + a = y^1 \Rightarrow a = y$$

$$\Rightarrow a + b + c = y + y - y^1 = 1y^1$$