

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) $f(x) = \frac{(x+1)(x+1)+x+1}{x^2+5x+6} = \frac{x^2+1x+1+x+1}{x^2+5x+6} = \frac{x^2+2x+2}{x^2+5x+6} = 1 \rightarrow$ یکسان هستند $D_f = D_g$

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

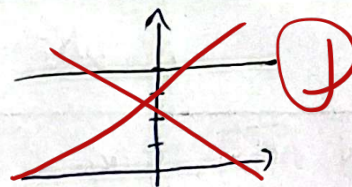
$\frac{x^2-x}{x-1} = \frac{x(x-1)}{x-1} = x$ $\frac{x(x+1)(x-1)}{x-1} = x^2+x$

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

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

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

با درج اول با توجه به دامنه است



۴

$$\frac{x-b}{2x^2-3x-a} = \frac{ax+c}{x^2-mx+n} \times \frac{y}{y} \Rightarrow \frac{x-b}{2x^2-3x-a} = \frac{yax+cy}{x^2-mx+n}$$

$$\Rightarrow yax = x \Rightarrow a = \frac{1}{y}, c = -b \Rightarrow b = -c, 2yx = -ymx \Rightarrow m = \frac{y}{y}, -a = -n \Rightarrow n = \frac{a}{y}$$

$$\Rightarrow am - bn = \left(\frac{1}{y} \times \frac{y}{y}\right) - \left(-c \times \frac{a}{y}\right) = \frac{y}{y} - 10 = \frac{-y}{y}$$

۵

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

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

$$\lambda cx + b = bx + c \Rightarrow \lambda cx = bx + c \Rightarrow c = \frac{b}{\lambda} \Rightarrow b = \lambda c \Rightarrow -\lambda a = \lambda c \Rightarrow a = -c, c = -a$$

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

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

۹

$$f^{-1} = \{(-1, 1), (2, 4), (3, 9), (0, 0)\} \Rightarrow f = \{(-1, 1), (2, 4), (3, 9), (0, 0)\}$$

$$\Rightarrow f = \{(-1, 1), (2, 4), (3, 9), (0, 0)\}, g = \{(1, 1), (2, 4), (-1, -1), (0, 0)\}$$

$$\frac{fg}{f+g} = \left\{(-1, \frac{1 \times 1}{1+1}), (2, \frac{2 \times 4}{4+4}), (3, \frac{3 \times 9}{9+9})\right\}$$

۱, ۲, ۳

۷

$$\Rightarrow \frac{fg}{f+g} = \left\{(-1, \frac{1}{2}), (2, 1), (3, 1.5)\right\} \Rightarrow R = \left\{\frac{1}{2}, 1, 1.5\right\}$$

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

$$\Rightarrow (1, -1) = (1, a) = (1, d) \Rightarrow d = a = -1, (-3, 1) = (-3, 3a-2b) \Rightarrow 3a-2b = 1 \Rightarrow -3-2b = 1$$

$$\Rightarrow -2b = 4 \Rightarrow b = -2, (a-3b, a) = (c, a) \Rightarrow a-3b = c \Rightarrow -1+6 = c \Rightarrow c = 5$$

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

۸

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

فقط یک عدد

فقط یک زوج و
مربع دارد

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

$$A = 0 \Rightarrow$$

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

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

$$f\left(\frac{1}{2}\right) = \sqrt{-\left(\frac{1}{2}\right)^2 + \frac{1}{2} - \frac{1}{4}} =$$

$$\sqrt{-\frac{1}{4} + \frac{1}{2} - \frac{1}{4}} = 0 = b$$

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

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

$$a = \frac{1}{2}$$

تحریف شده است

نس تابع فقط در

9

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

$$D_g = D_f - 1R - \{c\} \Rightarrow x^1 + y^1 x + b \rightarrow \text{مشتق با نسبت به } x$$

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

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

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

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

(y)