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

ب) $D_f = \mathbb{R}$ و $D_g = \mathbb{R}$ $f(x) = \frac{(x+2)(x+1) + (x+2)}{(x+2)(x+1) + (x+2)}$
 $\Rightarrow f(x) = 1 = g(x)$ ✓

ج) $\frac{x \sin x (x \sin x + 1)}{(x \sin x + 1)} = x \sin x$ $D_f = \mathbb{R} = D_g \Rightarrow f(x) = g(x)$ ✓

د) $D_f = D_g = \mathbb{R} - \{0\}$ و $f(x) = g(x) \Rightarrow \frac{1}{x} = \frac{1}{x} \Rightarrow x^2 = x^2 = f(x) = g(x)$ ✓

الف) $D_f = D_g = \mathbb{R}$ و $f(\frac{1}{x}) = 0$ $g(\frac{1}{x}) = -x$ $f(x) \neq g(x)$
 $f(x) = 0$ $g(x) = 0$ $f(x) = g(x)$

ب) $D_f = [0, \frac{1}{2})$ و $D_g = [0, 1) \Rightarrow D_f \neq D_g \Rightarrow f(x) \neq g(x)$ ✓

ج) $D_f = (0, +\infty)$ و $D_g = \mathbb{R} - \{0\} \Rightarrow D_f \neq D_g \Rightarrow f(x) \neq g(x)$ ✓

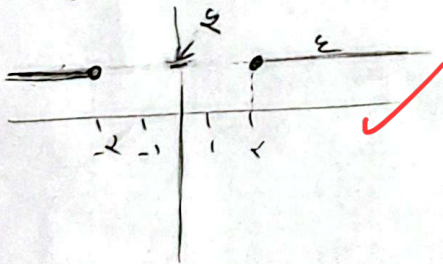
د) $D_f = D_g = \mathbb{R}$ و $f(x) = \frac{x^2 + x + 1}{x-1}$ $g(x) = \frac{x(x+1)(x-1)}{x-1} = x(x+1)$
 $g(x) = x^2 + x = x(x+1) \Rightarrow g(x) = f(x)$ ✓ ۱۱۵

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

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

$2f(x) = 2x^2 + 2 \Rightarrow f(x) = x^2 + 1$ ✓ و $g(x) = x$ ✓

$f \times g = (x + \sqrt{x^2 - 2})(x - \sqrt{x^2 - 2}) \xrightarrow{\text{تفاوت مزدوج}} x^2 - |x^2 - 2| \Rightarrow y = 2$



$\Rightarrow f \times g = 2$

$D_f = \mathbb{R} - (-2, 2)$ ✓

$D_g = \mathbb{R} - \{-1, \frac{5}{2}\} \Rightarrow f(\frac{5}{2}) \neq f(-1)$ ✓

$f(-1) = 1 + m + n = 0$

$f(\frac{5}{2}) = \frac{25}{4} - \frac{5}{2}m + n = 0$

$g(1) = \frac{1-b}{-4} = f(1) = \frac{a+1}{-3} \Rightarrow 1-b = 4a+4$ ✓

$g(x) = f(x) \Rightarrow \frac{x-b}{-4} = \frac{a+x}{-3}$

$\Rightarrow \frac{x-b}{-4} = \frac{2a+xb}{-4}$

$\Rightarrow x-b = 2a+xb \Rightarrow x-b = 2a+xb$

$1-b = 2a+b \Rightarrow b = -2a-1$

$a \cdot m = b \cdot n = \frac{1}{4} \times \frac{5}{2} = \frac{5}{8} = \frac{5}{8} - 1$

$= -\frac{3}{8}$ ✓

$$\text{دالة } f(x) \text{ و } g(x) \text{ حيث } 1a+b=0 \Rightarrow a = -\frac{b}{1}$$

$$\text{دالة } f(x) \text{ و } g(x) \text{ حيث } \frac{bx+y}{1a+b} \Rightarrow \frac{b}{1} = \frac{y}{b} \Rightarrow b^2 = 14 \Rightarrow b = \pm \sqrt{14}$$

$$b = \pm \sqrt{14} \Rightarrow c = \frac{y}{b} = \frac{1}{\pm \sqrt{14}} \quad b = -\sqrt{14} \Rightarrow c = \frac{-1}{-\sqrt{14}} = \frac{1}{\sqrt{14}} \quad \text{و } \frac{1}{\pm \sqrt{14}} \Rightarrow a = -\frac{b}{1} = -\frac{1}{\pm \sqrt{14}} \Rightarrow a = \mp \frac{1}{\sqrt{14}}$$

$$f(x) - 1 = y \Rightarrow f(x) = y \quad (x = -1)$$

$$f(x) - 1 = y \Rightarrow f(x) = y \quad (x = y)$$

$$f(x) - 1 = -x \Rightarrow f(x) = -x \quad (x = -1)$$

$$f(x) - 1 = 0 \Rightarrow f(x) = 1 \quad (x = 0)$$

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

$$f + g = \{(y, 1), (y, y), (-1, -1)\}$$

$$f + g = \{(y, 1), (y, y), (-1, -1)\}$$

$$f + g = \{(y, 1), (y, y), (-1, -1)\}$$

$$\text{دالة } f(x) \text{ و } g(x) \text{ حيث } a = d = -1$$

$$(-1, 1) = (-1, xa - yb) \Rightarrow xa - yb = 1 \Rightarrow -1 - yb = 1 \Rightarrow b = -\frac{2}{y}$$

$$(c, d) = (a - yb, d) \Rightarrow c = -1 + y \Rightarrow c = a$$

$$c + d = a - 1 = \frac{1}{2}$$

$$f(x) = \sqrt{-x^2 + x - m}$$

$$f(x) = b$$

$$g(x) = \{(a, b)\} \Rightarrow g(a) = b$$

$$-x^2 + x - m \geq 0 \Rightarrow \Delta = 0 \Rightarrow x = \frac{-b}{2a} = \frac{-(-1)}{2} = \frac{1}{2} \Rightarrow \Delta = 1 - 4(-m) = 0 \Rightarrow m = -\frac{1}{4}$$

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

$$D_f = D_g$$

$$D_g = \mathbb{R} - \{x = c\}$$

$$c^2 + 4c + b = 0$$

$$a^2 + 4a + b = 0$$

$$\Rightarrow c^2 + 4c = -b$$

$$g(c) = \frac{1}{1-c} = \frac{1+a}{1+b} = f(c)$$

$$\Delta = 0$$

$$\Rightarrow 1 + b = 1 + a - 4c - ca$$

$$c = -1$$

$$b = 9$$

$$a + b + c = 12$$

$$a = 9$$