

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 $D_g = \mathbb{R}$ و $f(x) = \frac{(x+2)(x+1) + (x+2)}{(x+2)(x+1) + (x+2)}$
 $\Rightarrow f(x) = 1 = g(x)$
 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 $f(x) = g(x) \Rightarrow \frac{1}{x} = \frac{1}{x} \Rightarrow |x|^x = x^x = f(x) = g(x)$

الف) $D_f = D_g = \mathbb{R}$ و $f(-\frac{1}{x}) = 0$ و $g(-\frac{1}{x}) = -x$ $f(x) \neq g(x)$
 ب) $D_f = [0, \frac{1}{x})$ 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 $f(x) = \frac{x^x + x + 1}{x-1}$ و $g(x) = \frac{x(x+1)(x+1)}{x-1} = x(x+1)$
 $g(x) = x^x + x = x(x+1) \Rightarrow g(x) = f(x)$

$$f^x(x) - g^x(x) = \left(\frac{x^x + x + 1}{x^x + x + 1} \right) \left(\frac{x^x - x + 1}{x^x - x + 1} \right) = \frac{x^x + 1 - x^x}{1}$$

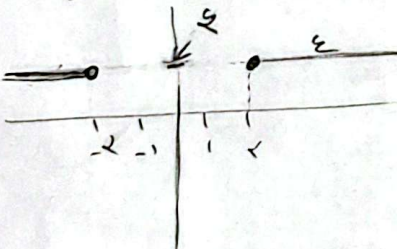
$$f(x) + g(x) = x^x + x + 1$$

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

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

$$g(x) = x^x$$

$f \times g = (x + \sqrt{x^x - x})(x - \sqrt{x^x - x}) \stackrel{\text{اشاره شود}}{=} x^x - |x^x - x| \Rightarrow y = x$
 $\Rightarrow f \times g = x$
 $D_f = \mathbb{R} - (-x, x)$



$D_g = \mathbb{R} - \left\{ -1, \frac{a}{x} \right\} \Rightarrow f\left(\frac{a}{x}\right) \text{ و } f(-1)$
 $f(-1) = 1 + m + n = 0$
 $f\left(\frac{a}{x}\right) = \frac{1-a}{x} - \frac{1}{x} m + n = 0$
 $g(1) = \frac{1-b}{-4} = f(1) = \frac{a+1}{-3} \Rightarrow 1-b = 4a+4$
 $\Rightarrow \begin{cases} 1-b = 4a+4 \\ 1-b = 4a+4 \end{cases} \Rightarrow \begin{cases} a = \frac{1}{4} \\ b = -\frac{3}{4} \end{cases}$
 $a \cdot m = b \cdot n = \frac{1}{4} \times \frac{1}{4} = \frac{1}{16} = \frac{1}{4} \times \frac{1}{4}$

$$\text{في } \mathbb{R}^2 \text{ حيث } 1a+b=0 \Rightarrow a = -\frac{b}{1}$$

$$\text{في } \mathbb{R}^2 \text{ حيث } g(x) = \frac{bx+y}{1a+b} \Rightarrow \frac{b}{1} = \frac{y}{b} \Rightarrow b^2 = y \Rightarrow b = \pm \sqrt{y}$$

$$b = \pm \sqrt{y} \Rightarrow c = \frac{y}{1} = \frac{1}{y} \quad | \quad b = -\sqrt{y} \Rightarrow c = \frac{-y}{1} = -y$$

$$\Rightarrow a = -\frac{b}{1} = -\frac{1}{y} \quad | \quad a = \frac{1}{y}$$

$$\frac{ab}{c} = \frac{-\frac{1}{y} \cdot \sqrt{y}}{\frac{1}{y}} = -\sqrt{y} \quad | \quad \frac{ab}{c} = \frac{\frac{1}{y} \cdot (-\sqrt{y})}{-y} = \frac{1}{\sqrt{y}}$$

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

$$yf - 1 = y \Rightarrow f(x) = \frac{1}{y} \quad (x = y)$$

$$yf - 1 = -y \Rightarrow f(x) = -y \quad (x = \frac{1}{y})$$

$$yf - 1 = 0 \Rightarrow f(x) = \frac{1}{y} \quad (x = 0)$$

$$y \cdot g = \{(y, 1), (y, y), (-1, -1), (1, 0)\}$$

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

$$(x = -1) \Rightarrow y \cdot g$$

$$f + g$$

$$\{(y, 1), (y, y), (-1, -1)\} \cup \{(y, 1), (y, y), (-1, -1)\}$$

$$\text{في } \mathbb{R}^2 \text{ حيث } f(x) = y \Rightarrow a = d = -1$$

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

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

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

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

$$f(a) = b$$

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

$$-x^2 + x - m \geq 0 \Rightarrow \Delta = 0$$

$$-x^2 + x - m = 0 \Rightarrow \Delta = 0$$

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

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

$$g(x) = \{(\frac{1}{2}, 0)\} \Rightarrow a + b = \frac{1}{2}$$

$$D_f = D_g$$

$$D_g = \mathbb{R} - \{x = c\} \Rightarrow c^2 + 4c + b = 0$$

$$\Rightarrow c^2 + 4c = -b \quad g(c) = \frac{1}{1-c} = \frac{y+a}{y+b} = f(c)$$

$$\Rightarrow \frac{1}{1-c} + b = y + a - y - c - ca$$