

$$الف) f(x) = x \rightarrow D_f = \mathbb{R}$$

برابر نیست

$$f(x) = \sqrt{x/x} \rightarrow D_f = \mathbb{R}^+ \cup \{0\}$$

$$ب) \frac{(x+3)(x+1)+x+5}{x^2+5x+7} \rightarrow \Delta < 0 \Rightarrow \text{ریشه ندارد} \rightarrow D_f = \mathbb{R} \rightarrow D_g = 1 \rightarrow \text{برابر نیست} \times$$

$$ج) \frac{4 \sin^3 x - 4 \sin x}{2 \sin x - 3} = \frac{2 \sin x (2 \sin^2 x - 2)}{2 \sin x - 3} = 2 \sin x$$

$$\Rightarrow f(x) = g(x) \rightarrow \text{برابر نیست}$$

$$د) \begin{cases} |x| \neq 0 \Rightarrow D_f = \mathbb{R} - \{0\} \\ x \neq 0 \Rightarrow D_g = \mathbb{R} - \{0\} \end{cases} \Rightarrow \text{برابر نیست}$$

$$\text{برابر نیست} \rightarrow f(x) = g(x)$$

$$ه) f(x) = \left[\frac{x^2}{x^2+1} \right] = 0 \rightarrow \text{برابر نیست}$$

$$g(x) = [x - [x]] = 0$$

$$و) x = \frac{1}{2} \rightarrow \begin{cases} f(x) = \frac{1}{1} = 1 \\ g(x) = \frac{1}{2} \rightarrow 0 \end{cases} \Rightarrow \text{برابر نیست} \times$$

$$ز) f(x) \rightarrow x - |x| > 0 \rightarrow x > |x| \rightarrow D_f = \emptyset$$

$$g(x) \rightarrow |x| - x > 0 \rightarrow |x| > x \rightarrow g(x) = \mathbb{R}^- \rightarrow \text{برابر نیست} \times$$

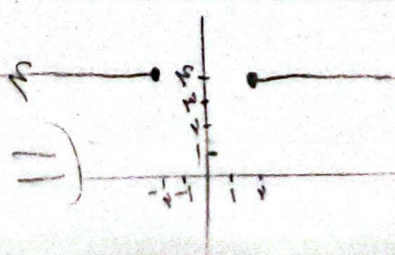
$$ح) \begin{cases} D_f = \mathbb{R} \\ D_g = \mathbb{R} \end{cases} \rightarrow \text{if } x = -2 \begin{cases} f(-2) = 3 \\ g(-2) = 2 \end{cases} \rightarrow \text{برابر نیست} \times$$

$$ط) f(x) = 2x^2 + 4 \rightarrow f(x) = x^2 + 1 \Rightarrow g(x) = x$$

$$f^2(x) - g^2(x) = (x^2 + 1)^2 - x^2 = x^4 + 1 + 2x^2 - x^2 = x^4 + x^2 + 1$$

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

$$D_f = D_g = \mathbb{R} - (-2, 2)$$



$$g(x) = f(x) \rightarrow D_g = D_f$$

$$x^2 - x - \frac{1}{4} = 0 \rightarrow \begin{cases} x = -1 \\ x = \frac{1}{4} \end{cases} \Rightarrow D_g = D_f = \mathbb{R} - \left\{ -1, \frac{1}{4} \right\}$$

$$\Rightarrow -x = \frac{1}{4} \rightarrow 1 - \frac{1}{4} = m \Rightarrow m = \frac{3}{4} \rightarrow \frac{x - b}{x^2 - \frac{3}{4}x - \frac{1}{4}} = \frac{ax + \frac{1}{4}}{x^2 - \frac{3}{4}x - \frac{1}{4}}$$

$$\Rightarrow ax + \frac{1}{4} = \frac{x}{4} - \frac{b}{4} \Rightarrow a = \frac{1}{4} \text{ و } b = -\frac{1}{4}$$

$$am - bn = \frac{3}{4} - \left(-\frac{1}{4} \times -\frac{1}{4} \right) = \frac{-3}{4}$$

$$k(bx + c) = \Lambda x + b \Rightarrow k = \pm 1 \text{ و } b = \pm 1 \Rightarrow f(x) = g(x) = c = \pm \frac{1}{4}$$

$$\Lambda x - 1 = 0 \rightarrow x = \frac{1}{\Lambda} \Rightarrow a = \pm \frac{1}{4}$$

$$\Lambda x + 1 = 0 \rightarrow x = -\frac{1}{\Lambda}$$

$$\frac{a}{c} \rightarrow \text{و } \frac{b}{d} \rightarrow \pm 1$$

$$f = \left\{ (-1, 1), (1, 1), (1, -1), (0, \frac{1}{4}) \right\}$$

$$\frac{fg}{f+g} = \left\{ (1, 1), (1, 1), (-1, \frac{1}{4}) \right\} \Rightarrow R_f = \left\{ 1, 1, \frac{1}{4} \right\}$$

$$\begin{cases} x^2 a - x^2 b = 1 \\ c = a - x^2 b \\ a = d = -1 \end{cases} \Rightarrow -x^2 b = 1 \Rightarrow b = -\frac{1}{x^2} \Rightarrow c = d \Rightarrow c + d = 1$$

$$f(x) = g(x) \Rightarrow \Delta = 0 \Rightarrow 1 - \frac{1}{4}x = 0 \Rightarrow x = \frac{1}{4}$$

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

$$\Rightarrow (a, b) = \left(\frac{1}{4}, 0\right) \rightarrow a + b = \frac{1}{4}$$

$$(x+a)(x-c) = x^2 + (a-c)x - ac = x^2 + 1 + ax + bx$$

$$\rightarrow a - c = 1 \text{ و } -ac = 1 \rightarrow a + b + c = 1 + 1 - c^2 - c + c = -c^2 - c + 1$$