

الف) $f(x) = \sqrt{x|x|} \Rightarrow x|x| \geq 0 \Rightarrow \begin{cases} x > 0 \\ x = 0 \\ x < 0 \end{cases} \Rightarrow D_f = \{0\} \cup \mathbb{R}^+ \Rightarrow D_g = \mathbb{R}$ مساوی نیستند

ب) $F(x) = \frac{x^2 + x + 3 + x + 4}{x^2 + 2x + 1} = 1$ ، $g(x) = 1$ مساوی هستند

$x^2 + 2x + 1 \neq 0 \Rightarrow \Delta = 2^2 - 4 \cdot 1 = -3 \Rightarrow$ ریشه ندارد

ج) $F(x) = \frac{4\sin^2 x - 4\sin x}{4\sin x - 3} \Rightarrow 4\sin x - 3 \neq 0 \Rightarrow \sin x \neq \frac{3}{4} \Rightarrow 1 \gg \sin x \ll 1 \Rightarrow D_f = \mathbb{R} \Rightarrow D_g = \mathbb{R}$ مساوی اند

د) $F(x) = \frac{x}{|x|} \Rightarrow x \neq 0$ ، $g(x) = \frac{|x|}{x} \Rightarrow x \neq 0 \Rightarrow D_f = \mathbb{R} - \{0\}$ ، $x > 0 \Rightarrow 1$ ، $x < 0 \Rightarrow -1$ مساوی هستند

الف) $F(x) = \left[\frac{x^2}{x^2 + 1} \right] \Rightarrow x^2 + 1 \neq 0 \Rightarrow x^2 \neq -1 \Rightarrow \checkmark \Rightarrow \begin{cases} x = 0 \Rightarrow \left[\frac{0}{1} \right] = 0 \\ x \neq 0 \Rightarrow \frac{x^2}{x^2 + 1} < 1 \Rightarrow \left[\frac{x^2}{x^2 + 1} \right] = 0 \end{cases}$ مساوی هستند

$g(x) \Rightarrow x - [x] \Rightarrow 0 \leq x - [x] < 1 \Rightarrow [x - [x]] = 0$

ب) $F(x) = \frac{1}{[2x]} \Rightarrow [2x] \neq 0 \Rightarrow D_f = \mathbb{R} - [0, \frac{1}{2}) \Rightarrow D_f \neq D_g \Rightarrow$ مساوی نیستند

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

ج) $F(x) = \frac{1}{\sqrt{x-1|x|}} \Rightarrow x-1|x| > 0 \Rightarrow$ اعداد مثبت $\Rightarrow D_f = \emptyset$ ، $D_g = \mathbb{R}$ مساوی نیستند

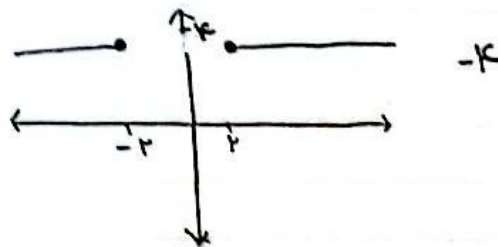
$g(x) = \frac{1}{\sqrt{x|x|-x}} \Rightarrow |x|-x > 0 \Rightarrow D_g = \mathbb{R}$

د) $F(x) = \begin{cases} \frac{x^2 - x}{x-1} ; x \neq 1 \\ 2 ; x = 1 \end{cases}$ ، $g(x) = x^2 + x \Rightarrow g(1) = F(1) = 2$ ، $g(x \neq 1) = x^2 + x = x(x+1)$ ، $F(x \neq 1) = x(x+1) = \frac{x(x+1)(x+1)}{(x-1)}$ مساوی اند

$$\left\{ \begin{array}{l} F(x) + g(x) = x^r + x + 1 \\ F(x) - g(x) = x^r - x + 1 \\ \frac{1}{2}g(x) = 1 \Rightarrow g(x) = x \Rightarrow \\ F(x) + x = x^r + x + 1 = x^r + 1 \end{array} \right\} \Rightarrow F^r(x) - g^r(x) = (x^r + 1)^r - x^r = x^{kr} + 1 + x^r$$

$$F \circ g = (x - \sqrt{x^r - 1})(x + \sqrt{x^r - 1}) = x^r - (x^r - 1) = 1$$

$$D_f \cdot D_g = (-\infty, 1] \cup [1, +\infty)$$



$$F(x) = \frac{ax + r}{x^r - mx + n} \Rightarrow (x+1)(x - \frac{1}{p}) = x^r - \frac{m}{p}x - \frac{a}{p} = 9m = \frac{r}{p}, n = -\frac{a}{p}$$

$$g(x) = \frac{x-b}{rx^r - mx - a} \Rightarrow rx^r - mx - a \neq 0 \Rightarrow (rx - a)(x+1) \neq 0 \Rightarrow D_g = \mathbb{R} - \{-1, \frac{a}{r}\}$$

$$\frac{ax+r}{x^r - \frac{r}{p}x - \frac{a}{p}} = \frac{x-b}{rx^r - mx - a} \Rightarrow \begin{cases} rax + r = x - b \\ rax + r = x - b \end{cases} \Rightarrow \begin{cases} b = -r \\ ra + r = 1 + \frac{r}{p} \Rightarrow a = \frac{1}{p} \end{cases} \Rightarrow am - bn = \frac{1}{p} \times \frac{r}{p} - (-\frac{a}{p} \times -r) = -\frac{r}{p}$$

$$\frac{bx+r}{1x+b} = C \Rightarrow bx+r = Cx+bc \Rightarrow \begin{cases} C = \frac{1}{p} \\ b = \pm r \end{cases} \quad ad \cdot bc \Rightarrow b^r \cdot 1r \Rightarrow b = \pm r$$

$$1x+r \neq 0 \Rightarrow F(rx+1) \neq 0 \Rightarrow rx+1 \neq 0, x \neq -\frac{1}{p} \Rightarrow \frac{ab}{c} = \frac{(-\frac{1}{p}) \times r}{\frac{1}{p}} = -r$$

$$1x-r \neq 0 \Rightarrow F(rx-1) \neq 0 \Rightarrow rx-1 \neq 0 \Rightarrow \frac{ab}{c} = \frac{(-\frac{1}{p}) \times -r}{\frac{1}{p}} = r$$

$$P_f = \{(-1, r), (1, 1), (r, -r), (0, 1)\} \Rightarrow F = \{(-1, r), (1, r), (r, -r), (0, \frac{1}{p})\} \Rightarrow$$

$$\frac{P_g}{F_g} \left\{ \begin{array}{l} x=1 \Rightarrow \frac{-1}{-p} = r \\ x=r \Rightarrow \frac{1}{1} = 1 \\ x=r \Rightarrow \frac{1r}{r} = r \end{array} \right\} \Rightarrow R = 1, r, r$$

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$$f = \{(r, a), (-r, 3a+rb), (c, a), (r, d)\} \Rightarrow a=d$$

$$g = \{(r, -1), (-r, 1), (a-3b, a)\} \quad a=d=-1 \quad 3x-1-2b=1 \quad b=-2$$

$$-1-3(-r)=c \quad c=a \quad d+c=-1+2=1$$

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$$-(x^2 - x + m) \geq 0 \rightarrow \text{المعادلة التربيعية} \rightarrow \sqrt{-(x-a)^2}$$

$$\rightarrow -x^2 + 2ax - a^2 = -x^2 + x - m$$

$$-a^2 = -m$$

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

$$m = \frac{1}{4}$$

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$$x=0 \rightarrow \frac{r}{-c} = \frac{a}{b} \quad rh = -ac$$

$$\frac{r}{x-c} = \frac{r(x+\frac{a}{r})}{(x-c)(x+\frac{a}{r})}$$

$$\frac{a}{r} - c = 9$$

$$a - rc = 12$$

$$-rc - rc = 12$$

$$-r = 12$$

$$c = -3$$

$$a = 9$$

$$b = 9$$

$$D_f \cdot D_g \rightarrow R - \left\{c, -\frac{a}{r}\right\} = R - \{c\} \rightarrow c = -\frac{a}{r}$$

$$a = -rc$$

$$a+b+c = 9+9-3=12$$