

الف) $f(x) = \sqrt{x|x|} \Rightarrow x|x| \geq 0 \Rightarrow x \geq 0$ $D_f = [0, +\infty)$ $D_g = \mathbb{R}$ مساوی نیستند ✓

ب) $\frac{(x+3)(x+2)+1}{(x+3)(x+2)+1} = 1$ $g(x) = 1$ $D_g = \mathbb{R}$ $D_f = \mathbb{R}$ مساوی هستند ✓

ج) $f(x) = 2 \sin x - 3 \neq 0$ $\sin x \neq \frac{3}{2}$ مساوی نیستند ✓

د) $D_f = \mathbb{R} - \{0\}$ $D_g = \mathbb{R} - \{0\}$ مساوی هستند ✓

الف) $[1 - \frac{1}{x^2+1}] = 0$ $g(x) = 0$ مساوی نیستند ✓

ب) $D_f = \mathbb{R} - [0, \frac{1}{2})$ $D_g = \mathbb{R} - [0, 1)$ مساوی نیستند ✓

ج) $x - |x| > 0$ $x > |x|$ $D_f = \emptyset$ $|x| - x > 0$ $|x| > x$ $D_g = (0, +\infty)$ مساوی نیستند ✓

د) $D_f = D_g$ $\frac{x^2 - x}{x-1} = \frac{x(x-1)(x+1)}{(x-1)} = x^2 + x$ مساوی هستند ✓

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

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

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

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

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

دامنه و مقدر: ۱، ۵ ✓

$\frac{x-b}{x^2 - mx - a} = \frac{a x + r}{x^2 - mx + n}$ $\frac{x-b}{x^2 - mx - a} = \frac{r(ax+r)}{r(x^2 - mx + n)}$

$am = -r$ $m = \frac{r}{a}$ $rn = -a$ $n = \frac{-a}{r}$ $a=1$ $a = \frac{1}{r}$ $-b = r$ $b = -r$

$am - bn = (\frac{1}{r} \times \frac{r}{r}) - ((-r) \times (-\frac{a}{r})) = \frac{r}{r} - 1 = -\frac{rv}{r}$

$$\frac{bx+r}{\Lambda c+b} = c \quad bx+r = \Lambda cx + bc \quad \Lambda c = b \quad bc = r$$

$$b = \Lambda x \left(\pm \frac{1}{x} \right) = \pm \frac{1}{x} \quad \Lambda c = r \quad c = \pm \frac{1}{r}$$

$$x = -\frac{b}{\Lambda} \Rightarrow a = -\frac{b}{\Lambda} \Rightarrow a = \frac{(\pm \frac{1}{x})}{\Lambda} = \pm \frac{1}{r}$$

$$\boxed{\frac{ab}{c} = \pm 1}$$

$$\frac{ab}{c} = \frac{(\pm \frac{1}{r})(\pm r)}{(\pm \frac{1}{r})} = \pm 1$$

$$f = \{(-1, r), (r, r), (r, -\frac{r}{r}), (0, \frac{1}{r})\}$$

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

$$\boxed{R = \{1, r, r\}}$$

$$\frac{rg}{f+g} = \frac{r \times r}{r+r} = 1$$

$$\frac{rg}{f+g} = \frac{r \times r}{r-r} = r$$

$$\frac{rg}{f+g} = \frac{r \times (-r)}{r-r} = -1$$

$$f = \{(r, a), (r, d), (-r, ra - rb), (c, \omega)\}$$

$$g = \{(r, -1), (-r, 1), (a - rb, \omega)\}$$

$$\boxed{a = -1} \quad \boxed{d = -1} \quad ra - rb = 1 \quad -rb = r \quad \boxed{b = -r}$$

$$a - rb = c \quad -1 + r = c \quad \boxed{c = \omega}$$

$$\boxed{d + c = -1 + \omega = r}$$

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

$$|a - \frac{1}{r}| = 0 \quad \underline{a = \frac{1}{r}}$$

$$-x^r + x - m \geq 0 \Rightarrow \text{discriminant}$$

$$\underline{a+b = \frac{1}{r} + 0 = \frac{1}{r}}$$

$$x \neq c \quad x^r + rx + b \Rightarrow \boxed{b=9} \rightarrow x \neq -r \Rightarrow \boxed{c=-r}$$

$$\frac{r}{x-c} = \frac{rx+a}{x^r+rx+b}$$

$$\frac{r}{x+r} = \frac{rx+a}{(x+r)^r}$$

$$rx+r = rx+a \quad +a=r \quad \boxed{a=r}$$

$$a+b+c = r+r+(-r) = r$$