

الف) $f(x) = \sqrt{x|x|} \rightarrow \begin{cases} x < 0 \rightarrow -x^2 \rightarrow x \\ x > 0 \rightarrow x^2 \rightarrow x \end{cases} \rightarrow D_f = [0, +\infty)$
 $g(x) = x \rightarrow D_g = \mathbb{R}$ برابر نیستند ✓

ب) $f(x) = \frac{(x+2)(x+1)+x+2}{x^2+2x+2} \rightarrow \frac{x^2+3x+4}{x^2+2x+2} = 1$
 $g(x) = 1$ برابرند ✓
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ج) $f(x) = \frac{x \sin x - x \sin x}{x \sin x - x} \rightarrow \sin x \neq \frac{x}{x} \rightarrow \sin x \neq 1$
 $g(x) = x \sin x \rightarrow D_g = \mathbb{R}$ برابر نیستند ✓

د) $f(x) = \frac{x}{|x|} \rightarrow D_f = \mathbb{R} - \{0\}$
 $g(x) = \frac{|x|}{x} \rightarrow D_g = \mathbb{R} - \{0\}$ برابرند ✓

عبارت برداشته، برای بری ضابطه هم باید یک شود ۵۱۲۵

الف) $f(x) = \left[\frac{x^2}{x^2+1} \right] \rightarrow D_f = \mathbb{R}$
 $g(x) = [x - [x]] \rightarrow D_g = \mathbb{R}$ برابرند ✓
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ب) $f(x) = \frac{1}{[x]} \rightarrow D_f = \mathbb{R} - \{0\}$
 $g(x) = \frac{1}{x[x]} \rightarrow D_g = \mathbb{R} - \{0, 1\}$ برابر نیستند ✓

ج) $f(x) = \frac{1}{\sqrt{x-|x|}} \rightarrow D_f = \emptyset$ ✗
 $g(x) = \frac{1}{|x|-x} \rightarrow D_g = \emptyset$

د) $f(x) = \begin{cases} \frac{x^2-x}{x^2-1} & ; x \neq 1 \\ x & ; x = 1 \end{cases} \rightarrow \frac{x(x-1)}{(x-1)(x+1)} = \frac{x}{x+1}$ ✗
 $g(x) = x^2+x \rightarrow x(x+1)$

$\begin{cases} f(x)+g(x)=x^2+x+1 \\ f(x)-g(x)=x^2-x+1 \end{cases} \rightarrow \begin{cases} f(x)=x^2+1 \\ g(x)=x \end{cases}$

$f^2(x) - g^2(x) = (f(x)+g(x))(f(x)-g(x))$
 $(x^2+x+1)(x^2-x+1) = x^2 - x^2 + x^2 + x^2 - x^2 + x + x^2 - x + 1 = x^2 + x^2 + 1$ ۳

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

$f \times g = (x - \sqrt{x^2-x})(x + \sqrt{x^2-x}) = (x)^2 - (\sqrt{x^2-x})^2 = x^2 - x^2 + x = x$ ۳

$f(x) = \frac{ax+b}{x^2-mx+n} = g(x) = \frac{x-b}{x^2-\frac{m}{r}x-\frac{a}{r}} = \frac{x-b}{r(x^2-\frac{m}{r}x-\frac{a}{r})} = \frac{x-b}{r(x+1)(x-\frac{a}{r})}$ ۳

$x^2 - \frac{m}{r}x - \frac{a}{r} = (x+1)(x-\frac{a}{r})$
 $x^2 - \frac{m}{r}x - \frac{a}{r} = x^2 + (1-\frac{a}{r})x - \frac{a}{r}$
 $-\frac{m}{r} = 1 - \frac{a}{r} \rightarrow m = a - r$
 $-\frac{a}{r} = -\frac{a}{r}$

$r \times (ax+b) = x-b \rightarrow rax+rb = x-b \rightarrow b = +r \Rightarrow b = -r$
 $rx=1 \Rightarrow x = \frac{1}{r}$

$am-bn \rightarrow \frac{1}{r} \times \frac{m}{r} - (-r) \times (-\frac{a}{r}) = \frac{m}{r^2} - 1 = -1/20$

$$\left. \begin{aligned} f(x) &= \frac{bx+r}{\lambda x+b} \\ g(x) &= c \in Dg = \mathbb{R} - \{a\} \end{aligned} \right\} \Rightarrow \frac{bx+r}{\lambda x+b} = c \rightarrow \left. \begin{aligned} bx+r &= c(\lambda x+b) \\ bx+r &= \lambda cx + bc \end{aligned} \right\} \Rightarrow \left. \begin{aligned} bx - \lambda cx &= bc - r \\ x(b - \lambda c) &= bc - r \end{aligned} \right\} \Rightarrow \left. \begin{aligned} x &= \frac{bc-r}{b-\lambda c} \\ &\Rightarrow b \neq \lambda c \end{aligned} \right\}$$

$$\wedge x + b = 0 \Rightarrow x = -\frac{b}{\wedge} \quad \left. \begin{array}{l} \Rightarrow \frac{bc-r}{b-\wedge c} = -\frac{b}{\wedge} \\ \Rightarrow \wedge(bc-r) = -(b)(b-\wedge c) \end{array} \right\} \begin{array}{l} -1r = -b^r \\ \Rightarrow b^r = 1r \Rightarrow b = \pm r \end{array} \quad \textcircled{5}$$

$$\frac{ab}{c} \rightarrow \frac{(-\frac{b}{\lambda})b}{c} = -\frac{b^2}{\lambda c} \left\{ \begin{array}{l} b=r, a=-\frac{r}{\lambda} = -\frac{1}{r} \\ b=-r, a=-\frac{-r}{\lambda} = \frac{1}{r} \end{array} \right\} \Rightarrow \frac{ab}{c} = -\frac{r}{c}, c \neq \frac{b}{\lambda}, b = \pm r \Rightarrow \frac{ab}{c} \in \mathbb{R} \setminus \{-\frac{1}{c}, \frac{1}{c}\} \Rightarrow \frac{ab}{c} = \pm \frac{1}{r}$$

$$Y f^{-1} = \{(-1, v), (v, v), (v, -w), (0, 0)\} \Rightarrow Y f = \{(1, v), (v, v), (v, -w), (0, 0)\}$$

$$\Rightarrow f = \{(1, 1), (1, 2), (2, 1), (2, 2)\}$$

$$g = \{(x, x), (x, y), (-1, x), (\omega, y)\}$$

$$\frac{rg}{f+g} = \left\{ \left(-1 \pm \frac{-\lambda}{-r} \right), \left(r \pm \frac{\lambda}{\lambda} \right), \left(r \pm \frac{1r}{r} \right) \right\} \Rightarrow R = \{ r, 1, r \}$$

$$f = \{(r, a), (-r, r_a - r_b), (c, \omega), (r, d)\} = g = \{(r, -1), (-r, 1), (a - r_b, \omega)\}$$

$\downarrow$ $\downarrow$ $\searrow$
 $\omega = c$ $a = d = -1$ $-1 + r = c \Rightarrow c = \omega$
 $r_a - r_b = 1 \Rightarrow -r - r_b = 1 \Rightarrow -r_b = r + 1 \Rightarrow b = -r - 1$

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

$$f(x) = \sqrt{-x^2 + x - m} = g(x) = \{(a, b)\}$$

$$-x^r + x - m \geq 0$$

$$\Rightarrow x^r - x + m \geq 0 \rightarrow x = \frac{1 \pm \sqrt{1 - 4rm}}{r} \rightarrow 1 - 4rm \geq 0 \Rightarrow m \leq \frac{1}{4r} \left. \vphantom{\frac{1}{4r}} \right\} x = \frac{1}{r}$$

$$f\left(\frac{1}{r}\right) \sqrt{-\left(\frac{1}{r}\right)^r + \frac{1}{r} - \frac{1}{r}} = \sqrt{-\frac{1}{r} + \frac{1}{r} - \frac{1}{r}} = \sqrt{0} = 0 \Rightarrow g(x) = \{(a, b)\} = \left\{\left(\frac{1}{r}, 0\right)\right\} \Rightarrow a+b = \frac{1}{r} + 0 = \frac{1}{r}$$

$$f(x) = \frac{rx+d}{x^2+qx+b} = g(x) = \frac{r}{x-c} \Rightarrow \frac{r(x+\frac{d}{r})}{x^2+qx+b} = \frac{r}{x-c} \Rightarrow (x+\frac{d}{r})(x-c) = x^2+qx+b$$

$$\Rightarrow -c = \frac{d}{r} \Rightarrow c = -\frac{d}{r} = -\frac{-5}{-2} = -\frac{5}{2}$$

$$a+b+c = 4 + 9 + (-15) = 15$$

$$\left(x + \frac{a}{r}\right)^r = x^r + r x^{r-1} \frac{a}{r} + \dots = x^r + a x^{r-1} + \left(\frac{a}{r}\right)^r$$