[illegible]

①

الف) $f(x) \to D_f = x|x| \geq 0$ $\begin{matrix} +\checkmark \\ -\times \\ 0\checkmark \end{matrix}$ $\Big\{ x\in[0,+\infty)$ $g(x): D_g = \mathbb{R}$ برابر نیست

ب) $f(x) \to 0 >$ مخرج $\to$ بی‌نهایت $\to D_f = \mathbb{R}$, $D_g = \mathbb{R} \to$ اگر $f(x)$ را ساده کنیم برابر g $\to$ برابر است

ج) $D_g = \mathbb{R}$, $D_f = \mathbb{R}$ چون $\to 2\sin x - 3 = 0 \to \sin x = 3/2$ امکان ندارد می‌شود. $(D_f = \mathbb{R}) \to \dfrac{2\sin x\,(2\sin x - 3)}{2\sin x - 3}$ برابر

د) $D_f = \mathbb{R} - \{0\}$, $D_g = \mathbb{R} - \{0\} \to$ برابر

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②

الف) $f(x)\ \left[1 - \dfrac{1}{x^2+1}\right] = 0$, $g(x) = [x - [x]] = 0$ $D_g = \mathbb{R}$
$D_f = \mathbb{R}$

ب) $D_f) = [2x] \neq 0 \to x \neq [0, 1/2) = \mathbb{R} - \{[0, 1/2)\}$, $D_g = 2[x] \neq 0 \to [x] \neq 0 \to [0,1)$

ج) $D_f \to x - |x| > 0 \to D_f = \varnothing$, $D_g \to |x| - x > 0 \to (0, +\infty)$ $\mathbb{R} - \{[0,1)\} \to$ برابر نیست

د) $\dfrac{x^3 - x}{x - 1} = \dfrac{x(x^2-1)}{x-1} \to \dfrac{x(x-1)(x+1)}{x-1} = x^2 + x$ برابر , $x = 1 \to$ برابر است

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③

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

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

$2f(x) = 2x^2 + 2 \to f(x) = \boxed{x^2+1}$ $\qquad f^2(x) - g^2(x) = \boxed{x^4 + x^2 + 1}$

$\boxed{g(x) = x}$

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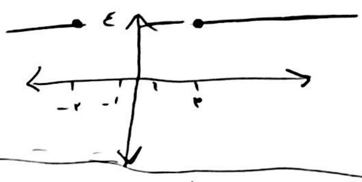
④

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

$x^2 - 4 \geq 0 \to 4 \leq x^2 \to$ $\begin{cases} 2 \leq x \\ x \leq -2 \end{cases} D_f$



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⑤

$g(x) = \dfrac{x - b}{2x^2 - 3x - 5} \to D_g = \mathbb{R} - \{5/2, -1\}$

$\hookrightarrow x^2 - 3x - 10$, $(x-5)(x+2)$ $\quad \begin{cases} 5/2 \\ \frac{-2}{2} = 1 \end{cases}$

$f(x) = \dfrac{ax + 2}{(x - 5/2)(x+1)}$

$x^2 - 1{,}5x - 2{,}5$

$g(x) = f(x) \to 2ax^3 - 3ax^2 - 5ax + 4x^2 - 6x - 10$

$x^3 - 1{,}5x^2 - 5/2\,x - bx^2 + 1{,}5bx + 5/2\,b$

$b = -4$, $a = 1/2$ $\quad ax - bx = 1/2 \times 1{,}5 - (-4 \times -2{,}5) = 3/4 - 40/4 = \boxed{-37/4}$

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⑥

$f(x) = c \to \dfrac{bx + 2}{8x + b} = c$, $bx + 2 = c(8x + b)$ $\quad -8c = b \quad c = b/8$

$bc = 2 \to b \times b/8 = 2$

$8a + b = 0 \to 8a = -b \to a = \dfrac{-b}{8}$

$\dfrac{b^2}{8} = 2 \to b^2 = 16 \to b = \pm 4$

$\dfrac{ab}{c} \to \dfrac{\frac{-b}{8} \times b}{\frac{b}{8}} = -b \to \pm 4$

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⑦

$2f = \{(-1,4), (3,8), (2,-4), (0,1)\} \to f = \{(-1,2), (3,4), (2,-2), (0,1/2)\}$

$2g = \{(2,8), (3,12), (-1,-8), (5,0)\}$, $f+g = \{(-1,-2), (2,8), (3,4)\}$

$\dfrac{2g}{f+g} = \{(3,1), (2,2), (-1,4)\}$

⑧

$a - 3b = c$ ____ $-1 - 3(-2) = 5 = c$

$3a - 2b = 1$ ____ $3(-1) - 2b = 1 \to b = -2$

$a = d = -1$ $\quad d + c = -1 + 5 = \boxed{4}$

⑨

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

$-(a^2 - a + x)$

$\hookrightarrow x = 1/4 \to \sqrt{-(a - 1/2)^2} \to -|a - 1/2| = b$

$-a + 1/2 = b$ $\quad \boxed{a + b = 1/2}$

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$g(x) \cdot f(x) \rightarrow D_g , D_f \rightarrow = C \longrightarrow$

$\hookrightarrow R - \{c\}$

$x^2 + 6x + b \rightarrow 9$

$\dfrac{2}{\underbrace{1-(-3)}_{4}} = \dfrac{2+a}{16} \quad \xrightarrow{x=1} \quad c = -3 \qquad -3 \in D_g \rightarrow (x+3)^2$

$b = 9$

$32 = 8 + 4a \rightarrow 4a = 24 \quad a = 6$

$a + b + c = 12$