۱) الف) $[0, +\infty)$, R ✓ ۱۳ ایلیا سرایی B

ب) ✗ $D_f = D_g = \mathbb{R}$ $f(x) = g(x)$ برابرند

ج) $\varnothing$, $2\sin x$ ✗ $D_f = D_g = \mathbb{R}$ $f(x) = g(x) = 2\sin x$ برابرند ۰٫۵

د) $x \neq 0$, $x \neq 0$ ✗ $D_f = D_g = \mathbb{R} - \{0\}$ $f(x) = g(x)$ برابرند

۲)

الف) $x^2 \geq 1$, $x^2 \neq -1$ ✓

ب) $(-\infty, 0] \cup [1, +\infty) \cup \{\frac{1}{2}\}$, $(-\infty, 0) \cup [1, +\infty)$ ✗ ۱٫۵

ج) $\varnothing$, $(-\infty, 0)$ ✗

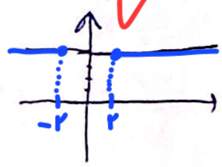
د) $D_f = D_g = \mathbb{R} \rightarrow f(x) = g(x)$ برابرند

۳)
$f^2(x) - g^2(x) = (f(x) + g(x))(f(x) - g(x)) \Rightarrow (x^2 + x + 1)(x^2 - x + 1)$
$= x^4 + x^2 + 1$ ✓

$f(x) + g(x) = x^2 + x + 1$ ۲
$f(x) - g(x) = x^2 - x + 1$

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

۴) $(x - \sqrt{x^2 - 4})(x + \sqrt{x^2 + 4}) = x^2 - x^2 + 4 = 4$ ۱٫۵
$D_f = D_g = \mathbb{R} - (-2, 2)$



۵) $\frac{ax + 2}{x^2 - mx + n} = \frac{x - b}{2x^2 - 3x - 5} \Rightarrow x^2 - mx + n = 2x^2 - 3x - 5 \Rightarrow x^2 - mx + n = x^2 - 3x - 10$ ۰٫۵

$m = \frac{3}{2}$ $n = -\frac{5}{2}$ $am - bn = -\frac{37}{4}$
$\Rightarrow m = 3$ $n = -10$
$a = \frac{1}{2}$ $b = -4$
$ax + 2 = x - b \Rightarrow a = 1$ $b = -2$ $am - bn = 3 - 20 = -17$

۶) ۰ $C = \pm\frac{1}{2}$

$8x + b \neq 0$ $c \neq 0$ $a = \frac{-b}{8}$

$x \neq \frac{-b}{8}$ $\frac{bx + 2}{8x + b} = c \rightarrow bx + 2 = 8cx + cb \rightarrow \begin{cases} b = 8c \\ bc = 2 \end{cases}$

$c = \frac{1}{2} \rightarrow b = 4 \rightarrow a = -\frac{1}{2} \rightarrow \frac{ab}{c} = -4$

$c = -\frac{1}{2} \rightarrow b = -4 \rightarrow a = \frac{1}{2} \rightarrow \frac{ab}{c} = 4$

(۷) [illegible]

$2f-1=\{(-1,3)(2,7)(3,-5)(0,0)\}$ ①

$f=\{(-1,2)(2,4)(3,-2)(0,\frac{1}{2})\}$ ✓

$g=\{(2,4)(3,6)(-1,-4)(5,0)\}$ $\frac{2g}{f+g}=\{(1,8),(2,\frac{8}{11})(3,12)\}$

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

$f+g=\{(-1,-1)(2,11)(3,1)\}$

(۸)

$a=-1$ $-2-2b=1 \Rightarrow -2b=4 \Rightarrow b=-2$ ②

$c=5$ $d=-1$ $5+(-1)=4$ ✓

(۹)

$-x^2+x-m\geq 0 \Rightarrow x^2-x+m\leq 0$ $\Delta=1-4m$

$\Delta=0 \Rightarrow m=\frac{1}{4}$ $x^2-x+\frac{1}{4}=(x-\frac{1}{2})^2=0 \Rightarrow x=\frac{1}{2}$

$a=\frac{1}{2}$ $f(\frac{1}{2})=\sqrt{-(\frac{1}{2})^2+\frac{1}{2}-\frac{1}{4}}$ $\Rightarrow a+b=\frac{1}{2}+0=\frac{1}{2}$ ✓ ②

(۱۰)

$\frac{2x+a}{x^2+6x+b}=\frac{2}{x-c} \Rightarrow (2x+a)(x-c)=2(x^2+6x+b)$

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

$x^2+6x+b=(x-c)^2 \Rightarrow x^2+6x+b=x^2-2cx+c^2 \Rightarrow 6=-2c$

$\Rightarrow a=6$
$b=9$
$c=-3$
$6+9-3=12$ ✓ ②