

الف) $f(x) = \sqrt{x|x|}$, $g(x) = x \rightarrow x|x| \geq 0 \rightarrow x \geq 0 \rightarrow f(x) = g(x)$ ✓
 $\rightarrow D_f = \mathbb{R}$ ✓

ب) $f(x) = (x+3)(x+1) + x + 1$, $g(x) = 1 \rightarrow D_f = \mathbb{R}$, $D_g = \mathbb{R} \rightarrow f(x) = g(x)$ ✓

ج) $f(x) = \frac{x \sin^2 x - 4 \sin x}{x \sin x - 2}$, $g(x) = x \sin x \rightarrow -2 \leq \sin x \leq 2 \rightarrow D_g = \mathbb{R}$
 $x \sin x - 2 \neq 0 \rightarrow \sin x \neq \frac{2}{x} \rightarrow D_f = \mathbb{R} \rightarrow f(x) = g(x)$ ✓

د) $f(x) = \frac{x}{|x|}$, $g(x) = \frac{|x|}{x} \rightarrow x \neq 0 \rightarrow |x| \neq 0 \rightarrow x \neq 0 \rightarrow f(x) = g(x)$ ✓

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

ب) $f(x) = \frac{1}{[x]}$, $g(x) = \frac{1}{[x]}$ ✓
 $[x] \neq 0 \rightarrow x \in (0, 1) \cup \frac{1}{x}$ ✓
 $D_f = (-\infty, 0) \cup [\frac{1}{x}, +\infty)$ ✓

ج) $f(x) = \frac{1}{\sqrt{x-1}}$, $g(x) = \frac{1}{f(x)}$ ✓
 $x-1 > 0 \rightarrow x > 1$ ✓
 $|x-1| > 0 \rightarrow D_g = \emptyset$ ✓
 $x-1 \neq 0 \rightarrow x \neq 1 \rightarrow D_f = \mathbb{R}$ ✓
 $D_g = \mathbb{R} \rightarrow f(x) = g(x)$ ✓

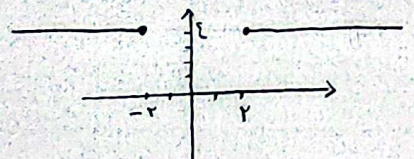
د) $f(x) = \begin{cases} \frac{x^2-1}{x} & ; x \neq 1 \\ x-1 & ; x=1 \end{cases}$, $g(x) = x^2+x$ ✓
 $f(x) \neq g(x)$ ✓
 $x-1 \neq 0 \rightarrow x \neq 1 \rightarrow D_f = \mathbb{R}$ ✓
 $D_g = \mathbb{R} \rightarrow f(x) = g(x)$ ✓

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

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

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

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


 $x \geq 2$
 $x \leq -2$
 $\Rightarrow D_{f \cdot g} = (-\infty, -2] \cup [2, +\infty)$ ✓

$f(x) = \frac{ax+b}{x^2-mx+n}$ ✓
 $g(x) = \frac{x-b}{x^2-rx-\omega}$ ✓

$-m = \frac{\omega}{r} + 1 = -\frac{r}{r} \rightarrow m = \frac{r}{r}$ ✓
 $n = -\frac{\omega}{r} \times 1 = -\frac{\omega}{r}$ ✓

$\frac{a}{r} = -1$ ✓
 $\uparrow \div r$ ✓

$x^2 - r - 10 = (x-5)(x+2) = 0 \rightarrow 5, -2$ ✓

$\frac{x}{r} - \frac{b}{r} = \frac{ax+b}{x^2-mx+n} \rightarrow -\frac{b}{r} = 2 \rightarrow b = -2$ ✓

$am - bn = (\frac{1}{r} \times \frac{r}{r}) - ((-2) \times (-\frac{\omega}{r}))$ ✓
 $= \frac{r}{r} - 10 = -9, 15$ ✓

$\frac{x^2 - \frac{r}{r}x - \frac{\omega}{r}}{x^2 - \frac{r}{r}x - \frac{\omega}{r}} \rightarrow a = \frac{1}{r}$ ✓

$$f(x) = \frac{bx+2}{x+b} \rightarrow x+b \neq 0 \rightarrow x \neq -\frac{b}{1}$$

$$g(x) = c \rightarrow D_g = \mathbb{R} - \{c\}$$

$$a = -\frac{b}{1} \rightarrow (b(-\frac{b}{1}) + 2 = 0 \rightarrow \frac{+b^2}{1} = -2 \rightarrow b = \pm 2, a = \mp \frac{1}{2}, c = \pm \frac{1}{2}$$

$$\frac{ab}{c} = \frac{\frac{1}{2} \times 2}{\frac{1}{2}} = 2$$

$$f^{-1} = \{(-1, 3), (2, 7), (3, -5), (0, 0)\} \rightarrow f = \{(-1, 2), (2, 2), (3, -2), (0, \frac{1}{2})\}$$

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

$$\{(-1, -2), (2, 2), (3, 4)\}$$

$$\{1, 4, 3\} = \text{برونایع} \leftarrow \{(2, 1), (-1, 4), (3, 3)\}$$

$$f = \{(2, a), (-3, 3a-2b), (c, d), (2, d)\} \rightarrow a = d = -1$$

$$g = \{(2, -1), (-3, 1), (a-3b, d)\} \rightarrow a-3b = c \xrightarrow{\frac{a=-1}{b=-2}} -1-(-6) = 5$$

$$a = -1, b = -2, c = 5, d = -1$$

$$d+c = -1+5 = 4$$

$$f(x) = \sqrt{-x^2+x-m} \rightarrow \text{Max}$$

$$g(x) = \{(a, b)\}$$

$$b^2 - 4ac \rightarrow 1 - 4m = 0 \rightarrow m = \frac{1}{4}$$

$$f(x) = \sqrt{-x^2+x-\frac{1}{4}}$$

$$\text{Max Ext} \left| \frac{1}{4} \right| \Rightarrow a = \frac{1}{4}, b = 0 \rightarrow a+b = \frac{1}{4} + 0 = \frac{1}{4}$$

$$f(x) = \frac{2x+a}{x^2+4x+b} \quad x=c \text{ می باشد بنابراین خارج صفا باید برابر } x=c \text{ باشد}$$

$$g(x) = \frac{2}{x-c}$$

$$\frac{2x+a}{(x-c)^2} = \frac{2x+a}{x^2-2cx+c^2} = \frac{2x+a}{x^2+4x+b}$$

$$\rightarrow b = c^2 \rightarrow b = 9$$

$$-2c = 4 \rightarrow c = -2$$

$$a+b+c = 4+9-2 = 11$$

$$\Rightarrow 3x = 1+fa \rightarrow a = 4$$