

(سؤال 1)

الف) $f(x) = \sqrt{x|x|}$, $g(x) = x \rightarrow D_g = \mathbb{R}$

$x|x| > 0 \rightarrow D_f = (0, +\infty)$

مساوی نیستند ✓

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ب) $f(x) = \frac{(x+3)(x+1)+x+7}{x^2+5x+6}$, $g(x) = \frac{1}{x+2}$

$D_f = \mathbb{R}$

$D_g = \mathbb{R}$

مساوی هستند ✓

ج) $f(x) = \frac{4 \sin^2 x - 3 \sin x}{2 \sin x - 3}$, $g(x) = 2 \sin x$

$D_f = \mathbb{R}$

$D_g = \mathbb{R}$

$\Rightarrow f(x) \neq g(x) \Rightarrow$ مساوی نیستند
 $f(x) = g(x)$

$2 \sin x - 3 \neq 0 \rightarrow \sin x \neq \frac{3}{2} \rightarrow -1 \leq \sin x \leq 1$
نمی تواند 3/2 باشد

$D_f \neq D_g$

د) $f(x) = \frac{x}{|x|}$, $g(x) = \frac{|x|}{x} \Rightarrow x \neq 0 \rightarrow D_f = D_g = \mathbb{R} - \{0\} \Rightarrow$ مساوی هستند ✓

(سؤال 2)

الف) $f(x) = \left\lfloor \frac{x^2}{x^2+1} \right\rfloor$, $g(x) = \lfloor x - [x] \rfloor$

$D_f = \mathbb{R}$

$D_g = \mathbb{R}$

$\Rightarrow D_f = D_g$

مساوی هستند

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$\left\lfloor \frac{x^2+1-1}{x^2+1} \right\rfloor = \left\lfloor 1 - \frac{1}{x^2+1} \right\rfloor = 0$

ب) $f(x) = \frac{1}{\{x\}}$, $g(x) = \frac{1}{x - [x]}$

$D_f \neq D_g$

$\Rightarrow$ مساوی نیستند ✓

ج) $f(x) = \frac{1}{\sqrt{x-|x|}}$, $g(x) = \frac{1}{\sqrt{|x|-x}}$

$\Rightarrow$ برابر نیستند ✓

$x-|x| > 0$
 $|x| < x \Rightarrow D_f = \emptyset$

$\begin{matrix} + & x \\ - & x \end{matrix} \Rightarrow D_g = (-\infty, 0)$

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

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

$D_f = \mathbb{R}$

$D_g = \mathbb{R}$

$\Rightarrow$ مساوی هستند ✓

سؤال 1: $d + c$

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

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

$$a = -1$$

$$d = -1$$

$$-r - rb = 1 \rightarrow -rb = r \rightarrow \boxed{b = -r}$$

$$\Rightarrow d + c = \omega - 1 = r$$

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

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$$f(x) = \sqrt{-x^2 + x - m} \rightarrow -(x^2 - x + m) > 0 \rightarrow \Delta \leq 0 \rightarrow \text{مربع} = -(x - a)^2$$

$$D_f = D_g \Rightarrow \{a\}$$

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

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

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

سؤال 10: $a + b + c$

$$f(x) = \frac{rx + a}{x^2 + rx + b}$$

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

$$\rightarrow \frac{rx + a}{x^2 + rx + b} = \frac{r}{x - c} \rightarrow \frac{r(x + \frac{a}{r})}{(x + r)^2} = \frac{r}{x + r}$$

$$\boxed{b = 9}$$

$$\boxed{a = 7}$$

$$\boxed{c = -3}$$

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$$\rightarrow 9 + 7 - 3 = 13$$