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تاریخ: ... / ... / ...

سوال 1: ϕ, κ, α

الف) $f(x) = \sqrt{x+1}, g(x) = x$
 $R: x \geq -1$
 $D_f \cap D_g = [-1, \infty)$

ب) $f(x) = \frac{(x+3)(x+1)+x+1}{x^2+2x+1}, g(x) = 1$
 $R: x \neq -1$
 $D_f \cap D_g = \mathbb{R} \setminus \{-1\}$

ج) $f(x) = \frac{r \sin x - 4 \sin x}{r \sin x - r^2}, g(x) = r \sin x$
 $R: \sin x \neq \frac{r}{4}$
 $D_f \cap D_g = \{x \mid \sin x \neq \frac{r}{4}\}$

د) $f(x) = \frac{x}{|x|}, g(x) = \frac{|x|}{x}$
 $R: x \neq 0$
 $D_f \cap D_g = \mathbb{R} \setminus \{0\}$

هـ) $f(x) = \left[\frac{x^2}{x^2+1} \right], g(x) = \left[x - \left[x \right] \right]$
 $R: x \in \mathbb{R}$
 $D_f \cap D_g = \mathbb{R}$

و) $f(x) = \frac{1}{[x]}, g(x) = \frac{1}{r[x]}$
 $R: x \neq 0$
 $D_f \cap D_g = \mathbb{R} \setminus \{0\}$

ز) $f(x) = \frac{1}{\sqrt{x-1}}, g(x) = \frac{1}{\sqrt{|x|-x}}$
 $R: x > 1$
 $D_f \cap D_g = (1, \infty)$

ح) $f(x) = \begin{cases} \frac{x^2-x}{x-1} & x \neq 1 \\ 2 & x = 1 \end{cases}, g(x) = \frac{x^2}{x}$
 $R: x \neq 0, 1$
 $D_f \cap D_g = \mathbb{R} \setminus \{0, 1\}$

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

ج) $f(x) = x - \sqrt{x^2-1}, g(x) = x + \sqrt{x^2-1}$
 $R: x \geq 1$
 $D_f \cap D_g = [1, \infty)$

$f \circ g = (x - \sqrt{x^2-1})(x + \sqrt{x^2-1}) = x^2 - (x^2-1) = 1$

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

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

$$am-bn = p$$

$$-r-a = -1$$

سوال 2

$$f(x) = \frac{bx+r}{ax+b}$$

$$g(x) = c \quad D_g = R - \{a\}$$

$$\frac{bx+r}{ax+b} = c \rightarrow bx+r = axc+bc$$

$$bx = axc \rightarrow b = \frac{1}{x}c$$

$$bc = r$$

$$\frac{1}{x}c \cdot c = r \rightarrow c^2 = rx \rightarrow c = \sqrt{rx}$$

$$\frac{ab}{c} = p$$

$$\begin{cases} -1a \rightarrow -1x \left(\frac{1}{x}x + \frac{1}{x} \right) = -1x \left(\frac{1}{x}x + \frac{1}{x} \right) \\ 1a \rightarrow 1x \left(\frac{1}{x}x + \frac{1}{x} \right) = 1x \left(\frac{1}{x}x + \frac{1}{x} \right) \\ \rightarrow \frac{1x + \frac{1}{x}}{1} = \frac{1x + \frac{1}{x}}{1} \\ \rightarrow \frac{1x + \frac{1}{x}}{1} = \frac{1x + \frac{1}{x}}{1} \end{cases}$$

$$r f^{-1} = \{(-1, r), (r, v), (r, a), (0, 0)\}$$

$$f = \{(1, r), (r, c), (r, -r), (0, \frac{1}{r})\}$$

$$r f^{-1} = r \rightarrow r f^{-1} = r$$

$$r f^{-1} = r \rightarrow r f^{-1} = r$$

$$r f^{-1} = r \rightarrow r f^{-1} = r$$

$$\frac{rg}{f+g} = ?$$

$$g = \{(r, \frac{1}{x}), (\frac{1}{r}, y), (-1, \frac{1}{x}), (a, 0)\}$$

$$\Rightarrow \begin{cases} x+r \rightarrow \frac{1}{x} \cdot \frac{1}{x} \\ x=-1 \rightarrow \frac{1}{-1} = -1 \\ x=r \rightarrow \frac{1}{r} = \frac{1}{r} \end{cases}$$

$$\rightarrow \{(r, 1), (-1, \frac{1}{x}), (r, r)\}$$

سوال 3

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

$$d = a = -1$$

$$d+c = p$$

$$-1+a = p$$

سوال 4

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

$$-r-rb = 1 \rightarrow rb = -2$$

$$b = -2$$

$$a-rb = c \rightarrow 1, 4 = a = c$$

سوال 5

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

$$x^2+x-m \geq 0 \quad m \leq \frac{1}{4}$$

$$m = \frac{1}{4} \rightarrow x = \frac{1}{4} \rightarrow \frac{1}{4} + \frac{1}{4} - \frac{1}{4} = 0 \rightarrow a+b = ?$$

سوال 6

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

$$a = \frac{1 \pm \sqrt{1-4m}}{2}$$

$$b = \frac{1 \pm \sqrt{1-4m}}{2}$$

$$b \in [0, \infty) \rightarrow (-\infty, \frac{1-\sqrt{1-4m}}{2}] \cup [\frac{1+\sqrt{1-4m}}{2}, \infty)$$

سوال 7

$$f(x) = \frac{rx+a}{x^2+4x+b}$$

$$\frac{rx+a}{x^2+4x+b} = \frac{r}{x-c}$$

$$a+b+c = ?$$

سوال 8

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

$$\begin{aligned} rx+a &= r(x-c) \\ rx+a &= rx-rc \\ a &= -rc \\ a+rc &= 0 \\ a+rc &= 0 \\ a+rc &= 0 \\ a+rc &= 0 \end{aligned}$$

$$\begin{aligned} 1x+4R-R^2+R &= 0 \\ R^2+4R+1 &= 0 \\ R^2+4R+1 &= 0 \end{aligned}$$

$$\frac{rx+1+rc}{x^2+4x+4c-c^2} = \frac{r}{x-c}$$

$$R = c$$