

$$f(x) = ax + b$$

$$f(f(x)) = a(ax+b) + b = \underbrace{a^2x}_{b(a+b)} + \underbrace{ab+b}_{b(a+b)} = \underbrace{4x}_{b(a+b)} + \underbrace{3}_{b(a+b)}$$

$$g(x) = a'x + b'$$

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

$$\left. \begin{array}{l} f(-1) \rightarrow 2(-1) + 1 = -1 \\ \quad \quad \quad -2(-1) - 2 = -1 \end{array} \right\} \Rightarrow g(-1) = ?$$

$$2x + 2 = -1 \Rightarrow 2x = -3 \Rightarrow \boxed{x = -1.5}$$

$$a^2 = 4 \Rightarrow a = \pm 2$$

$$a = 2, b = 1$$

$$a = -2, b = -3$$

$$g(-1) = 2(-1) - 2$$

$$\boxed{g(-1) = -4}$$

$$g \circ f :$$

$$\frac{1}{|x+|x|| - \sqrt{x+|x|}}$$

$$x > 0$$

$$x+|x| \neq \sqrt{x+|x|} \quad \begin{array}{l} x < 0 \rightarrow 0 = 0 \times \\ x = 0 \rightarrow 0 \times \\ x > 0 \rightarrow 2x - \sqrt{2x} \end{array}$$

$$Df = \mathbb{R}$$

$$Dg = 2x \neq 0, 1$$

$$D_{g \circ f} = \mathbb{R}^+$$

$$\sqrt{x+|x|} \neq 0 \rightarrow x > 0$$

$$\sqrt{x+|x|} \neq 2 \rightarrow x \neq 1$$

$$(1, \infty)$$

$$D_{g \circ f} = (0, +\infty) - \{1\}$$

$$(f+g) \circ f$$

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

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

$$Df = [-1, 1]$$

$$Dg = [0, +\infty)$$

$$D_{(f+g) \circ f} : \{x \in Df, f(x) \in D_{f+g}\} \quad Df \cap Dg = [0, 1]$$

$$D_{(f+g) \circ f} = [-1, 1]$$

$$1) f\left(\frac{rx+1}{x-r}\right) = rx + \delta$$

$$\frac{rx+1}{x-r} = t \Rightarrow x = -\frac{-rt-1}{t-r} = \frac{rt+1}{t-r}$$

$$f\left(\frac{rt+1}{t-r}\right) = \frac{r\left(\frac{rt+1}{t-r}\right) + 1}{\frac{rt+1}{t-r} - r} = \frac{r^2t + r + 1}{t - r^2}$$

$$f(t) = t(t^2 - r^2) = t^3 - r^2t \Rightarrow \boxed{f(x) = x^3 - r^2x}$$

$$f(x) = x\sqrt{x}$$

$$g(x) = (x-1)(x-\sqrt{2})$$

$$(x\sqrt{x}-1)(x\sqrt{x}-\sqrt{2})$$

$$\downarrow \quad \downarrow$$

$$\boxed{x=1} \quad \boxed{x=2}$$

$$2-1=1$$

$$(5) 10$$



$f\left(\frac{x}{y}\right) \xrightarrow{\frac{y}{x}(1)} \cot \frac{\pi}{4} = \sqrt{1}$ $f(\sqrt{x}) \xrightarrow{\sqrt{x} \rightarrow 1} \sqrt{(\sqrt{x})^2 + 1} \Rightarrow \sqrt{2} = \text{دو}$	$\log\left(\frac{x}{y}\right) = ?$ $d(x) = \begin{cases} \cos \frac{\pi x}{4} & x \leq 1 \\ \sqrt{x^2 + 1} & x > 1 \end{cases}$
$\frac{2x-1}{x^2} = \frac{x}{x^2} - \frac{1}{x^2} \Rightarrow f(t) = 2t - t^2 \Rightarrow f(x) = -x^2 + 2x$ $f\left(\frac{1}{x}\right) = 2\left(\frac{1}{x}\right)^2 = \frac{1}{x^2}$ $f\left(\frac{1}{\sqrt{x}}\right) = \frac{1}{\left(\frac{1}{\sqrt{x}}\right)^2} = \frac{1}{\frac{1}{x}} = x$	$f\left(\frac{1}{x}\right) = \sqrt{\frac{2x-1}{x^2}}$ (الف) $g(x) = 2 \cos^2 x$ (ب) $d(x) = [x]$ (ج) $g(x) = \frac{2x}{1-x}$
$f\left(\frac{\pi}{4}\right) = \sin \frac{\pi}{4} = \frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$ $g\left(\frac{1}{\sqrt{x}}\right) = \frac{\sqrt{x}}{2} \sqrt{1 - \frac{1}{x}} = \frac{1}{2}$	$d(x) = \sin x$ $g(x) = x \sqrt{1-x^2}$
$d(x) = \{(4,5), (4,5), (8,12), (10,12)\}$ $g(x) = \{(4,4), (2,4), (4,1), (8,10)\}$ $(R \cap Dg) = \emptyset$ هیچ عضو از برد در دامنه g نیست $(Df \cap Rg) = \emptyset \Rightarrow \emptyset \in \text{دومین}$	الف: $\log(x)$ (د) ب: $g \circ f$ هیچ عضو از برد در دامنه g نیست ج: $d \circ f$ هیچ عضو از برد در دامنه d نیست د: $g \circ g$ هیچ عضو از برد در دامنه g نیست
$(4,1) (2,4) (4,10)$	$(4,1) \in \text{دومین}$ $(4,1) \in \text{دومین}$ $(4,1) \in \text{دومین}$