

$D_{g \circ f} = \{x \mid x \in D_f, f(x) \in D_g\}$ $D_f: x-1 > 0 \rightarrow x > 1$ A B
 $D_g: -x^2 + 2x - 2 \geq 0 \rightarrow \frac{x^2 - 2x + 2}{-1} \leq 0 \rightarrow (x-1)^2 + 1 \leq 0 \rightarrow x=1$ B
 $D_{g \circ f} = \{1\}$ $f(x) = 1 \rightarrow \sqrt{x-1} = 1 \rightarrow x-1 = 1 \rightarrow x = 2$ $P \cap D = \{1\}$
 $P \cap D = \{1\}$ $D_{g \circ f} = \{1\}$

$f \circ g(x) = g \circ f(x) \rightarrow 2(x^2 - 3x + 1) - 5 = (2x - 4)^2 - 2(2x - 4) + 1$
 $\rightarrow 2x^2 - 6x + 2 - 5 = 4x^2 - 16x + 16 - 4x + 8 + 1 \rightarrow 2x^2 - 6x - 3 = 4x^2 - 20x + 25$
 $4x^2 - 26x + 27 = 0$ $\rightarrow x = \frac{26 \pm \sqrt{26^2 - 4 \cdot 4 \cdot 27}}{2 \cdot 4} = \frac{26 \pm \sqrt{676 - 432}}{8} = \frac{26 \pm \sqrt{244}}{8}$
 $x = \frac{26 \pm 2\sqrt{61}}{8} = \frac{13 \pm \sqrt{61}}{4}$

$g(f(x)) = 5x^2 + 11$ $f(x) = 2x$
 $g(2x) = 5(2x)^2 + 11 = 20x^2 + 11$
 $g(x) = 5x^2 + 11$

$f(x) = 3x - 2$ $f(g(x)) = 3(2x^2 - 4x + 3) - 2 = 6x^2 - 12x + 7$
 $g(f(x)) = (3x - 2)^2 - 2(3x - 2) + 1 = 9x^2 - 12x + 4 - 6x + 4 + 1 = 9x^2 - 18x + 9 = 9(x - 1)^2$

$f - g = -x + 5 = f(x) - g(x) \rightarrow f(x) = g(x) + 5 - x$
 $2g(x) = 2f(x) + 2x - 1 \Rightarrow 2(2x^2 - 4x + 3) = 2(3x - 2) + 2x - 1 \Rightarrow 4x^2 - 8x + 6 = 6x - 4 + 2x - 1 \Rightarrow 4x^2 - 12x + 11 = 0$
 $x = \frac{12 \pm \sqrt{144 - 176}}{8} = \frac{12 \pm \sqrt{-32}}{8}$

$q^{\log m} \leq \log^q m \rightarrow x^{\log q} \leq x \log^q m$ $\rightarrow x^r \leq 2m \rightarrow x^r - 2m \leq 0 \rightarrow x^{(r-2m)} \leq 0 \rightarrow \frac{0}{1+1} + \frac{0}{1+1} \rightarrow [0, 2]$ $D_{f \circ g} = (0, +\infty)$: x با یغنی دانه هر دو باشد بنابراین : $D_{g \circ f} = \mathbb{R}$	$f\left(\frac{x-r}{\alpha}\right) = \frac{x-r}{\alpha} + \frac{x^2-r^2}{\alpha^2} \rightarrow f(t) = t^2 + t$ $f(x) = x^2 + x$	$D_{f \circ g} = A \rightarrow \{x x \in D_g, g(x) \in D_f\} \rightarrow D_g : \mathbb{R}$ $D_f : x > 0 \rightarrow (0, +\infty)$ $R_{f \circ g} = B$ $R_g \rightarrow (0, 1/4]$ $R_f \rightarrow (-\infty, 1/4] \rightarrow B$ $A \cap B = (0, 1/4]$ $f(x) = \frac{x^2 - 1}{4}$	$f(f(x)) = 1 - 3f^2(x) \rightarrow f(t) = 1 - 3t^2 \rightarrow f(x) = 1 - 3x^2$ $h(g(x)) = f(x) \rightarrow 1 - 3x^2 = (x-1)^3 + 2(x-1) + 1 \rightarrow 0 = x^3 + 3x^2 - 3x - 1$ $3x^2 + 5 = 3x^2 - 5$ $3x^2 = -5$ $x = \pm \sqrt{-5/3}$	$g\left(\frac{f(x)}{3}\right) = ax^3 + 2m$ $f(x) = x - \frac{x}{\alpha}$ $g(3) = 1$ $1 \rightarrow g(1^3) = -a - 2 = 1 \rightarrow -a = 1$ $a = -1$ $2 \rightarrow g(4) = 4a + 1 = 1 \rightarrow a = 0$
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