

از روی نمودار $x < 0$ تابع $f(x)$ از $[-5, 0]$ است $x f(x) \geq 0$ $[-5, 0]$ $[2, 5]$ $D_f = [-5, 0] \cup [2, 5]$	۱
$x = -5, -3, 0, 2, 5$ برای $x < 0$ صورت مثبت است پس $f(x) \leq 0$ $-3 < x < 0$ برای $x > 0$ صورت منفی است پس $f(x) > 0$ $0 < x < 2$ $D_f = (-3, 0) \cup (0, 2) \rightarrow (-3, 2) \rightarrow \text{مجموعه}$	۲
$f(x) - 2f(1) = x^2 - 3x + 4$ $\rightarrow x = 2 \quad f(2) - 2f(1) = 4 - 4 + 4$ $-f(1) = 2$ $f(1) = -2$ $\rightarrow x = -2 \Rightarrow f(-2) - 2f(-2) = 4 + 4 + 4$ $f(-2) = 10$	۳
$f(f(\omega)) + f(f(1))$ $f(\omega) \rightarrow \omega - \sqrt{3} = 2$ $f(1) \rightarrow 1 + 3 = 5$ $f(2) \rightarrow 4 + 3 = 7$ $f(\omega) \rightarrow 2 \quad 7 + 2 = 9$	۴
$f(x) = ax^2 - bx + 1$ $f(x-1) = a(x-1)^2 - b(x-1) + 1 =$ $f(x-1) - f(x) = -2ax + a + b$ $4x + 2$ $-2a = 4 \quad a = -2$ $a + b = 2$ $a - b = -3 \quad a = -1$	۵

$$f(x) = x^3 - 3x + 1$$

$$x=3 \rightarrow 3^3 - 3 \cdot 3 + 1 = 9 - 9 + 1 = 1$$

$$x=-1 \rightarrow (-1)^3 - 3(-1) + 1 = -1 + 3 + 1 = 3$$

$$x=2 \rightarrow (2)^3 - 3 \cdot 2 + 1 = 8 - 6 + 1 = 3$$

$$\frac{3x+1}{(x-1)^2} = \frac{3}{1} = 3$$

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$$f(x) = \begin{matrix} 3x+1 & x \geq 2 \\ x^2 & x < 2 \end{matrix}$$

$$f(2) = 3 \cdot 2 + 1 = 7$$

$$f(-2) = (-2)^2 = 4$$

$$f(2) = 4 + 1 = 5$$

$$3f(2) - 2f(-2)$$

$$f(2)$$

$$\frac{3(7) - 4}{5} = \frac{17 - 4}{5} = \frac{13}{5}$$

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$$\frac{f(f(2)) - f(f(1))}{f(1) - 2} = \frac{0}{5} = 0$$

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$$f(\sqrt{3}-2) = \frac{(\sqrt{3}-2)^3 + 5(\sqrt{3}-2) + 9}{(\sqrt{3}-2)^3 + 5(\sqrt{3}-2) + 9} = \frac{1}{5} = 2$$

$$f(2) = \frac{5 + 5 \cdot 2 + 9}{5 + 5 \cdot 2 + 9} = \frac{14}{14} = 1$$

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

$$(f(x))' - f(x)$$

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

$$(f(x))' = \left(x + \frac{1}{x}\right)' = 1 - \frac{1}{x^2}$$

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

$$x^2 + \frac{1}{x^2} - \left(x^2 + \frac{1}{x^2}\right) = 0$$

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