

$$\frac{-4}{-} \frac{-5}{+} \frac{2}{-} \frac{5}{+} \frac{}{-} \quad D_f = [-4, -5] \cup [2, 5]$$

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$$\frac{-4}{-} \frac{-3}{+} \frac{2}{-} \frac{5}{+} \frac{}{-} \quad \text{درجه ۳} \rightarrow ۳, ۴$$

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$$\begin{aligned} f(x) - 2f(2) &= x^2 - 3x + 4 \rightarrow f(2) - 2f(2) = 4 - 4 + 4 \rightarrow -f(2) = 4 \rightarrow f(2) = -4 \\ f(x) - \underbrace{2f(2)}_{-4} &= x^2 - 3x + 4 \rightarrow f(x) + 4 = x^2 - 3x + 4 \rightarrow f(-2) = 4 + 4 + 4 - 4 \\ &= 10 \end{aligned}$$

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$$f(\sqrt{5}) + f(\sqrt{2}) = 2 + 7 = 9$$

$$f(x) = \begin{cases} x - \sqrt{x+4} & x > 3 \rightarrow f(5) = 5 - 3 = 2, f(5) = 2 \\ 2x + 4 & x \leq 3 \rightarrow f(1) = 2 + 3 = 5, f(2) = 7 \end{cases}$$

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$$\text{if } x=1 \Rightarrow f(x-1) - f(x) = 4x+2 \xrightarrow{x=1} f(0) - f(1) = 4+2 \rightarrow \underbrace{f(0)}_2 + f(1) = 8$$

$$f(x) = ax^2 - bx + 2 \xrightarrow{x=0} f(0) = 0 - 0 + 2 = 2 \quad \rightarrow \quad f(1) = -4$$

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$$f(1) = a \cdot 1 - b \cdot 1 + 2 \rightarrow -4 = a - b + 2 \rightarrow a - b = -6$$

$f(x) = x^r - 3x + 1 \xrightarrow{x=9} f(9) = 9 - 9 + 1 = 1 \xrightarrow{x=-1} f(-1) = 1 + 3 + 1 = 5$ $\xrightarrow{x=9} f(9) = 9 - 9 + 1 = 1$ $\Rightarrow \frac{9f(9) + f(-1)}{f'(9)} = \frac{(9 \times 1) + 5}{(-1)^r} = \frac{14}{1} = 14$	6
$f(x) = \begin{cases} 3x+1 & x \geq 2 \\ x^r & x < 2 \end{cases} \xrightarrow{x=4} f(4) = 12+1=13, \xrightarrow{x=2} f(2)=6$ $\xrightarrow{x=2} f(-2) = 4$ $\frac{3f(4) - 2f(-2)}{f'(2)} = \frac{(3 \times 13) - 8}{2} = \frac{39 - 8}{2} = \frac{31}{2}$	7
$f = \{(2, 4), (3, 2), (4, 1), (1, 4)\}$ $\Rightarrow \frac{f(f^{-1}(4)) - f(f^{-1}(2))}{f^{-1}(4) - 2} = \frac{4 - 4}{4} = \frac{0}{4} = 0$	8
$\frac{f(f(\sqrt{r-2}))}{r} = \frac{(\sqrt{r-2})^r + r(\sqrt{r-2}) + 9}{(\sqrt{r-2})^r + r(\sqrt{r-2}) + 5} = \frac{r + r - r\sqrt{r-2} + r\sqrt{r-2} - 1 + 9}{r + r - r\sqrt{r-2} + r\sqrt{r-2} - 1 + 5} =$ $= \frac{8}{4} = 2 \Rightarrow f(r) = \frac{r^r + r \times r + 9}{r^r + r \times r + 5} = \left(\frac{r+1}{r+2} \right)$	9
$(f(\sqrt{x}))^r = f(x) =$ $(\sqrt{x})^r + \frac{1}{(\sqrt{x})^r} \Rightarrow \left(x + \frac{1}{x}\right)^r \rightarrow x^r + \frac{1}{x} + r$ $x^r + \frac{1}{x^r} + r - x^r - \frac{1}{x^r} = r$	10