

$$xf(x) \geq 0$$

$$\begin{array}{c|cccc} -1 & 0 & 1 & 2 \\ \hline + & - & + & + \end{array} = Df = [1, 2] \cup [-1, 0]$$

✓ (۲)

$$\frac{-x}{f(x)} \geq 0, f(x) \neq 0 \Rightarrow \begin{array}{c|cccc} -3 & 0 & 1 & 2 \\ \hline - & + & + & - \end{array}$$

✓ (۲)

$$Df = (-3, 0) \cup (0, 2)$$

نقطه
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$$f(2) - 2f(2) = 2 \Rightarrow f(-2) - 2f(2) = 4 + 4 + 2$$

$$\rightarrow f_2 = 2 \rightarrow f(2) = -2 \Rightarrow \frac{f(-2) + 4}{2} = 1$$

✓ (۲)

$$\hookrightarrow f(-2) = 1$$

$$f(1-3) + f(1) = f(2) + 1-3 = 1+1-3 = -1$$

✓ (۲)

$$\Rightarrow f(x-1) - f(x) = a(x^2 - 2x + 1) - (bx + 2 + b) - (ax^2 - bx + 2)$$

$$\Rightarrow f(x-1) - f(x) = -2ax + b + a = 9x + 1$$

$$\Rightarrow -2a = 9 \rightarrow a = -\frac{9}{2}, b = 1, a - b = -\frac{11}{2}$$

✓ (۲)

$$\left. \begin{aligned} f(3): 3^p - 3 \times 3 + 1 &= 1 \\ f(-1): (-1)^p - 3 \times (-1) + 1 &= 2 \\ f(2): 2^p - 3 \times 2 + 1 &= -1 \end{aligned} \right\} \frac{2 \times 1 + 2}{(-1)^2} = \underline{4}$$

④ ✓

$$\boxed{\text{f(x)}} \Rightarrow \left\{ \begin{aligned} f(4) &= 4^p - 4 \times 4 + 1 = 1^p \\ f(-2) &= (-2)^p = 2 \\ f(3) &= 3^p - 3 \times 3 + 1 = 1 \end{aligned} \right\} \frac{1 \times 9 - 1}{1} = \underline{8}$$

④ ✓

$$\begin{aligned} f(f(4)) &= 4 \\ f(f(3)) &= 4 \\ f(1) &= 4 \end{aligned} \Rightarrow \frac{4-4}{1} = 0$$

④ ✓

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

$$\Rightarrow f(x) = \frac{x^p + 9 + 1}{x^p + 1 + 2} = \underline{\frac{x^p + 1}{14}}$$

④ ✓

$$\begin{aligned} (f(\sqrt{x}))^p &= x^p + \frac{1}{x}x + 2 \Rightarrow (f(\sqrt{x}))^p - f(x) = \\ x^p + \frac{1}{x}x + 2 - x^p - \frac{1}{x}x &= \underline{2} \end{aligned}$$

④ ✓