

۲۰۱۳

$$xy \geq 0 \Rightarrow \begin{matrix} \text{یا هر دو باید + باشند} \\ \text{یا هر دو باید - باشند} \end{matrix} \Rightarrow D_f = [-\omega, 0] \cup [2, \omega]$$

✓ (۲)

$$f(n) \neq 0 \Rightarrow f(n) \neq \{-3, 0, 2, \omega\}$$

$$\frac{-n}{f(n)} \geq 0 \Rightarrow \begin{matrix} \text{با } f(n) \text{ هم علامت} \\ \text{هم باشند} \end{matrix} \Rightarrow D_f = \{-2, -1, 1\} \rightarrow$$

شماره ۳ در

$$\frac{x}{f(x)} = \frac{n}{y} \leq 0 \quad -\frac{n}{y} \geq 0 \Rightarrow \frac{n}{y} \leq 0$$

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

✓ (۲)

$$f(2) \rightarrow f(2) - 2f(2) = 2$$

$$-f(2) = 2 \Rightarrow f(2) = -2$$

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

$$f(-2) = 10$$

✓ (۲)

$$* f(\omega) \rightarrow \omega - \sqrt{\omega + \epsilon} = 2 \Rightarrow f(f(\omega)) = f(2)$$

$$f(2) \rightarrow 2(2) + 3 = 7 \Rightarrow f(f(\omega)) = 7$$

$$f(1) \rightarrow 2(1) + 3 = \omega \Rightarrow f(f(1)) = f(\omega) \xrightarrow{*} 2$$

$$\rightarrow f(f(\omega)) + f(f(1)) = 7 + 2 = 9$$

✓ (۲)

$$a(n-1)^2 - b(n-1) + 2 - an^2 + bn - 2 = 4n + 2$$

$$an^2 - 2an + a - bn + b + 2 - an^2 + bn - 2 = 4n + 2$$

$$-2an + a + b = 4n + 2 \rightarrow \begin{cases} -2an = 4n \rightarrow a = -2 \\ a + b = 2 \rightarrow b = 4 \end{cases}$$

$$a - b = -2 - 4 = -6$$

✓ (۲)

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

$$f(-1) \rightarrow ((-1)^2 - x(-1) + 1) = 2$$

$$f^2(x) \rightarrow (x^2 - x(x) + 1)^2 = 1$$

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

Ⓟ ✓

6

$$x f(x) = x(x(x) + 1) = x^2$$

$$x f(-x) = x(1 - x^2) = x - x^3$$

$$f(x) = x(x) + 1 = x^2$$

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

Ⓟ ✓

7

$$f(f(x)) \rightarrow f(x) = 1 \rightarrow f(1) = 4$$

$$f(f(x)) \rightarrow f(x) = x \rightarrow f(x) = x$$

$$f(1) = x \rightarrow f(1) = 4 \rightarrow 4 - x = x$$

$$\frac{f(f(x)) - f(f(x))}{f(1) - x} = \frac{4 - 4}{x} = 0$$

Ⓟ ✓

8

$$f(\sqrt{x} - x) = \frac{(\sqrt{x} - x)^2 + x(\sqrt{x} - x) + 9}{(\sqrt{x} - x)^2 + x(\sqrt{x} - x) + 6} = \frac{x + x - 5\sqrt{x} + 5\sqrt{x} - 1 + 9}{x + x - 5\sqrt{x} + 5\sqrt{x} - 1 + 6} = \frac{1}{x} = x$$

$$f(x) \rightarrow \frac{x^2 + x(x) + 9}{x^2 + x(x) + 6} = \frac{x^2}{x^2} = 1$$

Ⓟ ✓

9

$$(f(\sqrt{n}))^2 \rightarrow \left(n + \frac{1}{n}\right)^2 = n^2 + \frac{1}{n^2} + 2$$

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

Ⓟ ✓

10

$$(f(\sqrt{n}))^2 - f(n) = n^2 + \frac{1}{n^2} + 2 - n^2 - \frac{1}{n^2} = 2$$