

$$y = \sqrt{n(f(n))} \quad (1)$$

$$n f(n) \geq 0$$

$$f(n) \text{ و } n \text{ هر دو منفی}$$

$$D = [-\delta, 0] \cup [2, \delta]$$

$$f(n) \text{ و } n \text{ هر دو مثبت}$$

$$f(n) \text{ و } n \text{ یکی مثبت و دیگری منفی}$$

$$y = \sqrt{-n} \cdot f(n) + 0 \quad (2)$$

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

$$n \text{ و } f(n) \text{ مثبت و منفی}$$

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

$$f(n) - 2 = n^2 - 3n + 4 \rightarrow f(n) - 2 = n^2 - 3n + 4 \quad (3)$$

$$f(-2) = ? \rightarrow f(-2) + 4 = (-2)^2 + 9 + 4 \Rightarrow f(-2) = 10$$

$$f(2) \Rightarrow f(2) - 2 = 2^2 - 9 + 4 = 2 \Rightarrow f(2) = 4 \Rightarrow f(2) - 2 = 2$$

$$f(n) = \begin{cases} n \sqrt{n+4} & n > 3 \\ 2n+3 & n \leq 3 \end{cases} \quad f(f(5)) + f(f(1)) \quad (4)$$

$$\rightarrow f(5 - \sqrt{9}) + f(2(1) + 3) \Rightarrow 5 + 2 = 7$$

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

$$f(2) = 7$$

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$$f(n) = an^r - bn + r \Rightarrow f(n-1) - f(n) = 9n + r \quad (B)$$

$$a - b = ?$$

$$f(n-1) = a(n-1)^r - b(n-1) + r$$

$$f(n-1) - f(n) = a(n-1)^r - b(n-1) + r - an^r + bn - r = 9n + r$$

$$a(n^r + 1 - rn) - bn + b + r - an^r + bn - r = 9n + r$$

$$\cancel{an^r} + a - rna + \cancel{bn} + b + r - \cancel{an^r} + \cancel{bn} - r = 9n + r$$

$$a - rna + b = 9n + r$$

$$-rna + (a+b) = 9n + r$$

$$-ra(n) = 9n \Rightarrow -ra = 9 \Rightarrow a = -r$$

$$a + b = r \Rightarrow -r + b = r \Rightarrow b = 2r \Rightarrow a - b =$$

$$-r - 2r = -3r$$

$$f(n) = n^r - rn + 1 \Rightarrow f(r) = r^r - r(r) + 1 = 1 \quad (D)$$

$$rf(r) + f(-1) \Rightarrow f(-1) = (-1)^r - r(-1) + 1 = 2$$

$$\frac{f(r)}{r + 1} \Rightarrow f(r) = r^r - r(r) + 1 = 1$$

$$\frac{r + 1}{1} = r$$

$$(C) \checkmark$$

$$f(x) = \begin{cases} x^{n+1} & x \geq 1 \\ x^p & x < 1 \end{cases}$$

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

(7) ✓

$$f(x) \rightarrow x^q + 1 \geq 1 \quad f(1-x) = 1 \quad f(x) = 1^q$$

$$f_2 \{ (1, 4), (3, 2), (1, 1), (1, 4) \} \quad \frac{f(f(x)) - f(f(3))}{f(1) - 2}$$

$$\frac{0}{1} = 0$$

(8)

$$f(x) = 1 \rightarrow f(f(x)) = 9$$

$$f(x) = 2 \rightarrow f(f(x)) = 9$$

(9) ✓

$$f(\sqrt{x-1})$$

$$f(n) = \frac{n^p + 1}{n^p + 1} + 9$$

$$n^p + 1 \geq (\sqrt{x-1})^p + 1(\sqrt{x-1})$$

$$2^p + 1 \geq (\sqrt{x-1})^p + 1(\sqrt{x-1})$$

$$2^p + 1 \geq 1 + 1 = 2 \Rightarrow 2^p - 1 \geq 0 \Rightarrow 2^p \geq 1 \Rightarrow p \geq 0$$

$$f(x) = \frac{1^p + 9}{1^p + 1} = \frac{1}{1} = 1$$

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

(10) ✓

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

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

$$\frac{1}{n^p} + \frac{1}{n^p} = \frac{2}{n^p}$$

(11) ✓