

$x f(x) \geq 0$
 $D_f = [-\infty, 0] \cup [2, \infty]$
 مثبت ها منفی ها و صفر
 -4 -6 0 2 6
 - + - + -
 (Regions are shaded with diagonal lines)

$f(x) \neq 0$

$\frac{-x}{f(x)} \geq 0$

$-3, -2, -1, 2, 3, 4, 5$

$- \quad | \quad + \quad | \quad - \quad | \quad + \quad | \quad -$

$\rightarrow (-3, 0] \cup [2, 5]$

$\text{ریشه های نمودار} \rightarrow -3, 2, 5$

پایین صفر بنویس

$$f(x) - xf(x) = 1 - 9 + 1 \rightarrow -f(x) = x \rightarrow f(x) = -x$$
$$f(-x) - x(-x) = 1 + 9 + 1 \rightarrow \underline{f(-x) = 10}$$

① ✓

$$\begin{array}{ccccccc} f(f(\omega)) + f(f(1)) & = & f(v) + f(\omega) & = & v + v = 9 \\ \swarrow & \searrow & \downarrow & \downarrow & & & \\ \omega - v = v & v \times 1 + v = \omega & v \times v + v = v & \omega - v = v & & & \end{array}$$

$$\underbrace{a(x-1)^p}_{\cdot} - \underbrace{b(x-1)}_{\cdot} + \cancel{1} - ax^p + bx - \cancel{1} = 4x + 1$$
$$\xrightarrow{x=1} -a + b = 1 \rightarrow a - b = \underline{\underline{-1}} \quad \textcircled{1} \quad \checkmark$$

$$\left. \begin{aligned} f(3) &= 9 - 9 + 1 = 1 \\ f(-1) &= 1 + 3 + 1 = 5 \\ f(2) &= 4 - 9 + 1 = -1 \end{aligned} \right\}$$

$$\frac{3 \times 1 + 5}{(-1)^2} = \frac{8}{1} = \underline{8}$$

(D) ✓

6

$$\left. \begin{aligned} f(4) &= 3 \times 4 + 1 = 13 \\ f(-2) &= (-2)^2 = 4 \\ f(2) &= 3 \times 2 + 1 = 7 \end{aligned} \right\}$$

$$\frac{3 \times 13 - 2 \times 4}{1 \times 7} = \frac{31}{7}$$

(D) ✓

7

$$\frac{f(f(3)) - f(f(2))}{f(3) - 2} = \frac{9 - 4}{1} = \underline{5}$$

(D) ✓

8

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

$$f(2) = \frac{2 + 1 + 9}{2 + 1 + 5} = \frac{12}{8} = \underline{3}$$

(D) ✓

9

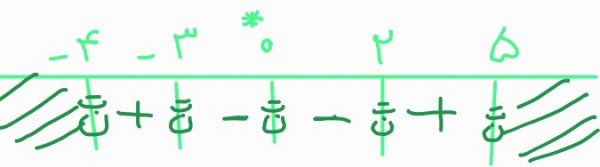
$$f(\sqrt{x}) = x + \frac{1}{x}$$

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

(D) ✓

10

$$\frac{-x}{f(x)} \geq 0 \rightarrow \frac{x}{f(x)} \leq 0$$



حالت اول : $f(x) < 0$, $x > 0$

حالت دوم : $f(x) > 0$, $x < 0$

$$D_y = (-3, 2) - \{0\}$$