

x و $f(x)$ هر دو هم علامت یا یکی از آنها صفر باشد $\rightarrow x f(x) \geq 0$

$D_f = [-5, 0] \cup [2, 5]$

✓
(۲)

با x و $f(x)$ مختلف علامت باشد و مخرج نباید صفر باشد $f(x) \neq 0$ $\frac{-x}{f(x)} \geq 0$

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

D_f علامت $\begin{cases} -2 \\ -1 \\ 1 \end{cases}$

✓
(۲)

$x=2 \rightarrow f(2) - 2f(2) = 4 - 6 + 2 = 0$

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

$x=-2 \rightarrow f(-2) - 2f(-2) = 4 + 6 + 4 = 14$

$f(-2) = 14 - 4 = 10$

✓
(۲)

$f(\omega) = \omega - \sqrt{\omega + 4} = 2$

$f(f(\omega)) = f(2) = 2 \times 2 + 3 = 7$

$f(1) = 2 \times 1 + 3 = 5$

$f(f(1)) = f(5) = 2$

$\underbrace{f(f(\omega))}_7 + \underbrace{f(f(1))}_2 = 9$

✓
(۲)

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

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

$(-2a)x + (a+b) = 2x + 2$

✓
(۲)

$-2a = 2 \rightarrow a = -1$

$a+b = 2 \rightarrow b = 3$

$a-b = -1-3 = -4$

$$f(9) = 9 - 9 + 1 = 1$$

$$f(-1) = 1 + 9 + 1 = 11$$

$$f(1) = 1 - 9 + 1 = -7$$

$$\frac{9 \times 1 + 11}{(-1)^9} = \frac{20}{-1} = -20$$

✓

8

$$f(13) = 13 \times 13 + 1 = 170$$

$$f(-1) = (-1)^9 = -1$$

$$f(1) = 1 \times 1 + 1 = 2$$

$$\frac{13 \times 170 - 1 \times (-1)}{1} = \frac{2210 + 1}{1} = 2211$$

✓

9

$$\frac{f(f(9)) - f(f(1))}{f(1) - 9} = \frac{9 - 9}{1} = 0$$

✓

10

$$f(\sqrt{13} - 2) = \frac{(\sqrt{13} - 2)^9 + f(\sqrt{13} - 2) + 9}{(\sqrt{13} - 2)^9 + f(\sqrt{13} - 2) + 11} = \frac{13 - f(\sqrt{13}) + f + f(\sqrt{13}) - 1 + 9}{13 - f(\sqrt{13}) + f + f(\sqrt{13}) - 1 + 11} = \frac{17}{20} = 0.85$$

$$f(1) = \frac{1^9 + f \times 1 + 9}{1^9 + f \times 1 + 11} = \frac{10}{20} = 0.5$$

✓

11

$$(f(\frac{1}{x}))^9 = (x + \frac{1}{x})^9 = x^9 + 9x^7 + \dots + \frac{1}{x^9}$$

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

$$x^9 + 9x^7 + \frac{1}{x^9} - x^9 - \frac{1}{x^9} = 9x^7$$

✓

12