

$$y = \sqrt{x f(x)} \rightarrow x f(x) \geq 0$$

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

$$y = \sqrt{\frac{-x}{f(x)}} \rightarrow \frac{-x}{f(x)} > 0$$

$$\downarrow f(x) \neq 0 \rightarrow -2, 0, 2, 5$$

$$\Rightarrow D_f = (-2, 0) \cup (0, 2) \Rightarrow \text{مقادیر } = \underline{C^3}(-2, -1, 1)$$

صعوب

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

$$f(-2) = ?$$

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

$$\rightarrow f(-2) - x f(x) = \frac{(-2)^2}{-2} - \frac{2(-2)}{+2} + 2 \Rightarrow f(-2) = 10$$

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

$$f(f(5)) + f(f(1)) = ? \rightsquigarrow 4 + 4 = 8$$

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

$$f(x-1) - f(x) = 4x + 2 \rightarrow ax^2 - 2ax + a - bx + b + 2 - (ax^2 - bx + 2) = 4x + 2$$

$$a - b = 0$$

$$\rightsquigarrow -2ax + a + b = 4x + 2 \rightarrow -2a = 4 \rightarrow a = -2$$

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

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

$$f(x) = x^r - rx + 1$$

$$\rightarrow f(r) = (r)^r - r(r) + 1 = 1$$

$$\frac{rf(r) + f(-1)}{f(r)} = 0$$

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

$$\rightarrow f(r) = (r)^r - r(r) + 1 = -1$$

$$\Rightarrow \frac{r(1) + 2}{(-1)^r} = r$$

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

$$\rightarrow f(r) = r(r) + 1 = 1^r$$

$$\rightarrow f(-r) = (-r)^r = r^r$$

$$\rightarrow f(r) = r(r) + 1 = r$$

$$\frac{rf(r) - rf(-r)}{f(r)} = 0$$

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

$$f = \{(r, 4), (r, r), (r, 1), (1, 4)\}$$

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

$$\rightarrow f(r) = r \rightarrow f(r) = 4$$

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

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

$$\Rightarrow \frac{4 - 4}{4 - r} = 0$$

$$f(x) = \frac{x^r + rx + 9}{x^r + rx + 9}$$

$$\rightarrow \frac{(r^r - r)^r + r(r^r - r) + 9}{(r^r - r)^r + r(r^r - r) + 9} = \frac{r - r^r + r + r^r - 1 + 9}{r - r^r + r + r^r - 1 + 9} = \frac{1}{r} = r$$

$$f(f(r^r - r)) = 0$$

$$\rightarrow \frac{(r)^r + r(r) + 9}{(r)^r + r(r) + 9} = \frac{r + 1 + 9}{r + 1 + 9} = \frac{r}{1^r}$$

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

$$\rightarrow f(\sqrt{r}) = (\sqrt{r})^r + \frac{1}{(\sqrt{r})^r} = r + \frac{1}{r} \xrightarrow{\text{rational}} r + \frac{1}{r} + r$$

$$(f(\sqrt{r}))^r - f(r) = 0$$

$$\rightarrow r^r + \frac{1}{r^r} + r - r^r - \frac{1}{r^r} = r$$