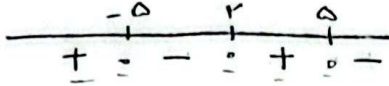


$$y = \sqrt{x f(x)} \rightarrow x f(x) \geq 0 \quad \begin{aligned} x &= 5 \\ x &= 2 \\ x &= -5 \end{aligned}$$



$$D_f = (-\infty, -5] \cup [2, 5]$$

۱

$$y = \sqrt{\frac{-x}{f(x)}} \Rightarrow \frac{-x}{f(x)} \geq 0 \text{ و } f(x) \neq 0 \quad \begin{aligned} x &\neq 5 \\ x &\neq 2 \\ x &\neq 0 \\ x &\neq -2 \end{aligned}$$

به ترتیب به سؤالات علامت $f(x)$ و $\frac{-x}{f(x)}$ را مشخص کنید.

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

۲

$$\begin{aligned} f(x) - 2f(2) &= x^2 - 3x + 2 \rightarrow f(x) = x^2 - 3x + 2 + \frac{2f(2)}{x-2} = f(x) = x^2 - 3x \\ f(-2) &= (-2)^2 - 3(-2) = 4 + 6 = 10 \\ f(2) - 2f(2) &= 2^2 - 3 \cdot 2 + 2 = -2 \\ -f(2) &= -4 + 2 = -2 \\ f(2) &= -2 \end{aligned}$$

۳

$$f(x) = \begin{cases} x - \sqrt{x+4} & ; x > 4 \\ 2x + 3 & ; x \leq 4 \end{cases} \quad \begin{aligned} f(1) &= 2 \cdot 1 + 3 = 5 \\ f(5) &= 5 - \sqrt{5+4} = 5 - 3 = 2 \\ 4+4 &= 8 \end{aligned}$$

$$f(f(5)) + f(f(1))$$

$$f(5) = 5 - \sqrt{5+4} = 5 - 3 = 2$$

$$f(2) = 2 \cdot 2 + 3 = 4 + 3 = 7$$

۴

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

$$f(x-1) - f(x) = 4x + 2$$

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

$$a - 2ax + b = 4x + 2$$

$$-2a = 4 \Rightarrow a = -\frac{4}{2} = -2$$

$$a + b = 2 \quad -2 + b = 2$$

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

$$b = 4$$

۵

$$f(x) = \frac{x^2 + 4x + 5}{x^2 + 4x + 5} = 1$$

$$f(\sqrt{3} - 1) = \frac{3 + 4 - 4\sqrt{3} + 4\sqrt{3} - 1 + 5}{3 + 4 - 4\sqrt{3} + 4\sqrt{3} - 1 + 5} = \frac{4}{4} = 1$$

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

$$f(-3)$$

$$\frac{x^2}{x^2} + \frac{1}{x^2} = x^2 + \frac{1}{x^2}$$

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

$$(-3)^2 + 2 = 9 + 2 = 11$$

$$f(x) = \{(2, -), (1, -4), (0, 2), (5, 1)\}$$

$$g(x) = \sqrt{9 - x^2} = \{(2, \sqrt{5}), (1, \sqrt{8}), (0, 3), (5, \sqrt{-4})\}$$

$$a) \frac{f}{g} = \{(2, -), (1, -\sqrt{2}), (0, \frac{2}{3}), (5, \frac{1}{\sqrt{-4}})\}$$

$$b) \frac{g}{f} = \{(2, \frac{\sqrt{5}}{-}), (1, -\frac{\sqrt{8}}{4}), (0, \frac{2}{2}), (5, \frac{\sqrt{-4}}{1})\}$$

$$a) 2f(x) = \{(2, 2), (3, 8), (-5, 4), (1, -4)\}$$

$$b) f(x) + 1 = \{(2, 2), (3, 5), (-5, 3), (1, -1)\}$$

$$c) 3f^2(x) + 1 = \{(2, 4), (3, 49), (-5, 13), (1, 13)\}$$

$$d) f(2x) = \{(1, 1), (\frac{2}{3}, 4), (-\frac{5}{2}, 2), (\frac{1}{2}, -2)\}$$

$$a) f - g = \{(2, 2), (1, 4), (3, 2)\}$$

$$b) \frac{2f}{g} = \{(2, 4), (5, 4), (1, 8), (3, 2), (5, 4)\}$$

$$g = \{(1, 0), (2, 1), (-1, 4), (-2, -3), (3, -1)\}$$

$$\frac{2f}{g} = \{(2, 4), (1, \frac{4}{-}), (3, -2)\}$$