

$$x f(x) \geq 0$$

$$\begin{array}{c} \downarrow \\ -5 \\ 0 \\ 2 \\ 5 \end{array}$$

$$\begin{array}{c} -5 & 0 & 2 & 5 \\ - & + & - & + \end{array}$$

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

۱

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

$$\begin{array}{c} \downarrow \\ 0 \\ 2 \\ -3 \\ 5 \end{array}$$

$$\begin{array}{c} -3 & 0 & 2 & 5 \\ - & + & - & + \end{array}$$

$$D_f = (-3, 2) \cup (5, \infty)$$

۲

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

۳

$$x=-2 \rightarrow f(-2) - 2f(2) = 4 + 4 + 4 = 12 \neq f(-2) = 1 \rightarrow f(-2) = 1$$

۴

$$f(5) \rightarrow x > 2 \rightarrow 5 - \sqrt{5+4} = 2$$

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

$$7 + 2 = 9$$

$$f(1) \rightarrow x \leq 2 \rightarrow 2(1) + 3 = 5$$

$$f(5) \rightarrow x > 2 \rightarrow 5 - \sqrt{5+4} = 2$$

$$f(x-1) - f(x) = 4x+2 \rightarrow x=1 \rightarrow f(0) - f(1) = 6 \rightarrow f(0) = a-b+2$$

طبق گفته سوال به ازای x معادله برقرار است.

$$2 - (a-b+2) = 6$$

$$2 - a + b - 2 = 6$$

$$a - b = -6$$

۵

$$\frac{n^2 + 4n + 4 + 1}{n^2 + 4n + 4 + 3} \rightarrow \frac{(n+2)^2 + 1}{(n+2)^2 + 3} \rightarrow \frac{(\sqrt{3} - 2 + 2)^2 + 1}{(\sqrt{3} - 2 + 2)^2 + 3} = \frac{2+1}{3+3} = \frac{3}{6} = \left(\frac{1}{2}\right)$$

6

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

$$\left(n - \frac{1}{n}\right)^2 = n^2 + \frac{1}{n^2} - 2 \xrightarrow{\text{نقطة ٢}} f\left(n - \frac{1}{n}\right) = \left(n - \frac{1}{n}\right)^2 + 2$$

$$f(n) = n^2 + 2$$

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

7

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

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

$$\text{إذن } \frac{f}{g} = \{(0, \frac{2}{2}), (1, -\sqrt{3}), (2, 0)\}$$

8

$$\text{ـ) } \frac{g}{f} = \{(0, \frac{2}{2}), (1, \frac{\sqrt{3}}{1}), (\cancel{2, 0})\}$$

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

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

$$\text{ـ) } f(x)_{x=1} = \{(2, 2), (3, 8), (-2, 4), (1, -1)\}$$

9

$$\begin{cases} x=2 \rightarrow f(2)=1 \rightarrow 2 \times 1^2 + 1 = 3 \\ x=3 \rightarrow f(3)=4 \rightarrow 3 \times 4^2 + 1 = 49 \\ x=-2 \rightarrow f(-2)=2 \rightarrow 2 \times 2^2 + 1 = 9 \\ x=1 \rightarrow f(1)=-2 \rightarrow 1 \times (-2)^2 + 1 = 5 \end{cases} \Rightarrow f(x)_{x=1} = \{(2, 3), (3, 49), (-2, 9), (1, 5)\}$$

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

$$\text{ـ) } \frac{f}{g} = \{(2, \frac{2 \times 2}{1}), (3, \frac{1 \times 1}{-1}), (\cancel{1, \frac{2 \times 2}{1}})\} \rightarrow \{(2, 4), (3, -1)\}$$

10