

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

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

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

$$Dy = (-5, 2) - \{0\}$$

۳ صحیح

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

$$f(-2) = 4^2 - 3(-2) = 16 + 6 = 22$$

$$\frac{10}{1} = \text{جواب}$$

$$f(1) = 1 - 4 + 1 + 2f(1) \Rightarrow f(1) = -2 \Rightarrow f(x) = x^2 - 3x$$

$$f(x) - 2f(1) = x^2 - 3x + 4$$

$$f(x) = x^2 - 3x + 4 + 2f(1)$$

$$\underbrace{f(f(5))}_7 + \underbrace{f(f(1))}_{-2} = 7 - 2 = 5$$

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

$$f(n-1) - f(n) = an^2 + 2an - b/n + a + b + 1 - an^2 - bn - 1 = 4n + 2$$

$$2an + a + b = 4n + 2 \rightarrow \begin{cases} a = -2 \\ b = 2 \end{cases} \rightarrow a - b = -4$$

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

$$\rightarrow \frac{3+2-2\sqrt{3}+2\sqrt{3}-1+5}{3+2-2\sqrt{3}+2\sqrt{3}-1+1} = \frac{3+2-1+5}{3+2-1+1} = \frac{9}{4} = f(x) = \frac{x^2+2x+5}{x^2+2x+1}$$

$$\Rightarrow \frac{9}{4} \quad \checkmark$$

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

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

$$f(-1) = (-1)^2 + 2 = 3$$

$$f(x) = \{(2,0), (1,-2), (0,2), (7,1)\} \quad g(x) = \sqrt{9-x^2}$$

$$\text{الف) } \frac{f}{g} = \left\{ \left(2, \frac{0}{\sqrt{5}}\right), \left(1, \frac{-2}{\sqrt{10}}\right), \left(0, \frac{2}{\sqrt{9}}\right), \left(7, \frac{1}{\sqrt{20}}\right) \right\} = \left\{ \left(2, \frac{0}{\sqrt{5}}\right), \left(1, \frac{-2}{\sqrt{10}}\right), \left(0, \frac{2}{3}\right) \right\}$$

$$\text{ب) } \frac{g}{f} = \left\{ \left(2, \frac{\sqrt{5}}{0}\right), \left(1, \frac{\sqrt{10}}{-2}\right), \left(0, \frac{\sqrt{9}}{2}\right), \left(7, \frac{\sqrt{20}}{1}\right) \right\} = \left\{ \left(1, \frac{\sqrt{10}}{-2}\right), \left(0, \frac{3}{2}\right) \right\}$$

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

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

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

$$\text{ج) } 3f^2(x)+1 = \{(2,10), (3,13), (-5,13), (1,5)\}$$

$$\text{د) } f(2x) = \{(1,1), \left(\frac{3}{2}, 2\right), \left(-\frac{5}{2}, 2\right), \left(\frac{1}{2}, -2\right)\}$$

$$f(x) = \{(2,3), (7,2), (1,2), (3,1), (5,2)\}$$

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

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

$$\text{ب) } \frac{2f}{g} = \{(2,4), \left(1, \frac{4}{0}\right), (3,-2)\} = \{(2,4), (3,-2)\}$$