

$$y = \sqrt{x f(x)} \rightarrow x f(x) \geq 0 \quad \begin{array}{cccc} -\delta & 0 & 2 & \delta \\ -\phi + & \phi - & \phi + & \phi - \end{array}$$

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

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$$y = \sqrt{\frac{-x}{f(x)}} \quad \frac{-x}{f(x)} \geq 0 \quad \begin{array}{cccc} -3 & 0 & 2 & \delta \\ -\phi + & \phi - & \phi + & \phi - \end{array}$$

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

۳ عدد صحیح دارد: $\{-2, -1, 1\}$

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

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

$$f(2) = -2 \quad f(-2) = 14 + 2f(2) \rightarrow -14$$

$$f(-2) = 10$$

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$$f(f(8)) + f(f(1)) = 7 + 2 = 9$$

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

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

$$f(8) = 8 - \sqrt{8+3} = 8 - 3 = 5 \quad f(2) = 2 \times 2 + 3 = 7$$

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

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

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

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

$$-2ax = 4x \quad a+b = 2 \quad a-b = -1$$

$$a = -3 \quad b = 5$$

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$$f(x) = \frac{x^2 + 2x + 3}{x^2 + 2x + 1}$$

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

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

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

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

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

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

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

$$g(2) = \sqrt{9-4} = \sqrt{5} \quad g(1) = \frac{\sqrt{1}}{\sqrt{2}} = \frac{1}{\sqrt{2}} \quad g(0) = 3 \quad g(1) \text{ غير معرف}$$

$$\therefore \frac{g}{f} = \left\{ (2, \frac{\sqrt{5}}{0}), (1, \frac{\sqrt{2}}{-2}), (0, \frac{3}{2}) \right\}$$

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

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

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

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

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

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

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