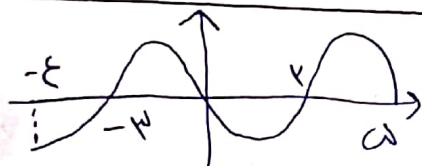


$$y = \sqrt{x f(x)} \rightarrow x f(x) \geq 0$$

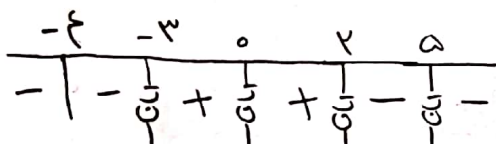
$$D_f = [-a, 0] \cup [a, +\infty)$$

| x    | -a | -a | 0    | a | a |
|------|----|----|------|---|---|
| x    | -  | -  | 0    | + | + |
| f(x) | +  | +  | منفی | - | + |
| p    | -  | -  | +    | - | + |



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

$$f(x) \neq -a, 0, a$$



$$D_f = (-a, a) - \{0\}$$

جواب: شامل ۳ عدد صحیح { -۲ و -۱ و ۰ }

$$f(x) - x f(x) = x^4 - 3x + \xi$$

$$\underline{x = -2} \rightarrow f(-2) - 2 f(x) = \xi + 4 + \xi$$

$$\underline{x = 2} \rightarrow f(2) - 2 f(x) = \xi - 4 + \xi$$

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

$$f(x) = -2$$

$$f(-2) + \xi = 1\xi$$

$$f(-2) = 10$$

$$f(f(a)) + f(f(1)) \Rightarrow f(f(a)) + f(a) \Rightarrow f(x) + 2 \Rightarrow 7 + 2 = 9$$

$$2x + 3 = a \quad \downarrow \quad x - \sqrt{x} + \xi = 2 \quad \downarrow \quad 2x + 3 = 7$$

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

$$\hookrightarrow f(x-1) = a(x-1)^4 - b(x-1) + 2 = a(x^4 + 1 - 4x) - b(x-1) + 2$$

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

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

$$\Rightarrow (a+b) - 4ax = 4x + 2 \Rightarrow -4a = 4 \Rightarrow a = -1 \Rightarrow a+b = 2 \Rightarrow b = 3 \Rightarrow a-b = -4$$

$$f(x) = \frac{x^2 + \varepsilon x + \omega}{x^2 + \varepsilon x + \nu} \Rightarrow \frac{(\sqrt{3}-1)^2 + \varepsilon(\sqrt{3}-1) + \omega}{(\sqrt{3}-1)^2 + \varepsilon(\sqrt{3}-1) + \nu}$$

$$= \frac{\nu - \varepsilon\sqrt{3} + \varepsilon\sqrt{3} - 1 + \omega}{\nu - \varepsilon\sqrt{3} + \varepsilon\sqrt{3} - 1 + \nu} = \frac{\nu - 1 + \omega}{\nu - 1 + \nu} = \frac{\varepsilon}{4} = \frac{\nu}{3}$$

$$f\left(x - \frac{1}{x}\right) = \frac{x^2 + 1}{x^2} \xrightarrow{x=-2} f(-2) = \frac{(-2)^2 + 1}{(-2)^2} = \frac{14}{4}$$

$$x - \frac{1}{x} = -2$$

$$x = -2$$

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

$$D_g = [-3, 3] \quad D_f = \{0, 1, 2, \nu\}$$

$$\text{ب) } \frac{g}{f} = \left\{ \left(0, \frac{\sqrt{2}}{\nu}\right), \left(1, \frac{\sqrt{2}}{-\varepsilon}\right), \left(2, \frac{\sqrt{2}}{\nu}\right) \right\} = \left\{ \left(0, \frac{\nu}{\sqrt{2}}\right), \left(1, \frac{-\sqrt{2}}{\nu}\right) \right\}$$

$$D_g = [-3, 3] \quad D_f = \{0, 1, 2, \nu\}$$

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

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

$$\text{ج) } \nu f^2(x) + 1 \Rightarrow \left\{ \begin{array}{l} \nu f^2(x) + 1 = \{(2, 3), (3, \varepsilon 1), (-\omega, 12), (1, 12)\} \\ \nu f^2(x) + 1 = \{(2, \varepsilon), (3, \varepsilon 9), (-\omega, 13), (1, 13)\} \end{array} \right.$$

$$\text{د) } f(\nu x) = \left\{ \left(1, 1\right), \left(\frac{\nu}{\nu}, \varepsilon\right), \left(-\frac{\omega}{\nu}, \nu\right), \left(\frac{1}{\nu}, -\nu\right) \right\}$$

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

$$\text{ب) } \frac{\nu}{g} = \nu f = \{(2, 4), (\nu, \varepsilon), (1, 1), (3, 2), (\omega, \varepsilon)\}$$

$$\frac{\nu}{g} = \{(2, \frac{\nu}{1}), (1, \frac{\omega}{\varepsilon}), (3, \frac{\nu}{1})\} = \{(2, 4), (3, -2)\}$$