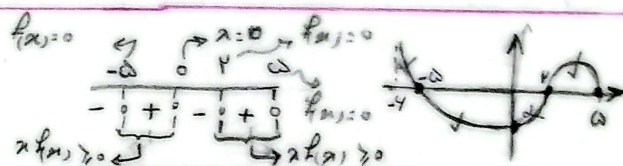
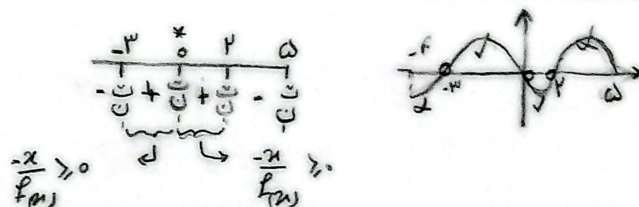


$$y = \sqrt{x f(x)} \leadsto x f(x) \geq 0 \Rightarrow D_f = (-\infty, 0] \cup [2, \infty)$$



$$y = \sqrt{\frac{-x}{f(x)}} \leadsto \frac{-x}{f(x)} \geq 0 \Rightarrow D_f = (-3, 0) \cup (0, 2) \leadsto \{2, -1, 1\}$$

← شامل ۳ عدد صحیح



$$f(x) - f(x-1) = x^2 - 13x + 4 \leadsto x^2 - f(x-1) = 2 \leadsto f(x) = x^2 - 3x \Rightarrow f(-2) = 4 + 6 = 10$$

$$f(x) = \begin{cases} x - \sqrt{x+1} & ; x > 3 \\ 2x+3 & ; x \leq 3 \end{cases} \quad \begin{aligned} f(f(5)) + f(f(1)) &= f(1) + f(5) = 7 + 2 = 9 \\ f(5) &= 5 - 3 = 2, f(1) = 2 + 3 = 5, f(1) = f+3 = 7 \end{aligned}$$

$$f(x) = ax^2 - bx + 2 \leadsto f(x-1) - f(x) = 4x + 2 \leadsto a(x-1)^2 - b(x-1) + 2 - ax^2 + bx - 2 = 4x + 2 \leadsto a + b - 2ax = 4x + 2 \Rightarrow a = (-3), b = 5 \Rightarrow a - b = -3 - 5 = -8$$

$$f(x) = \frac{x^2 + 4x + 5}{x^2 + 4x + 7} \leadsto f(\sqrt{3}-1) = \frac{(\sqrt{3}-1)^2 + 4(\sqrt{3}-1) + 5}{(\sqrt{3}-1)^2 + 4(\sqrt{3}-1) + 7} = 1 - \frac{4}{-1+7} = \frac{4}{6} = \frac{2}{3}$$

$$f(x - \frac{1}{x}) = \frac{x^2 + 1}{x^2}, f(-3) = ? \leadsto f(x - \frac{1}{x}) = \frac{x^2 + 1}{x^2} = (x - \frac{1}{x})^2 + 2 \leadsto f(-3) = 9 + 2 = 11$$

$$g(x) = \sqrt{9-x^2} \leadsto 9-x^2 \geq 0 \leadsto -3 \leq x \leq 3$$

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

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

الف) $2f(x) = \{(2, 2), (3, 8), (-5, 4), (1, -4)\}$ ب) $f(x) + 1 = \{(2, 3), (3, 9), (-5, 5), (1, -3)\}$

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

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

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