محمدرضا امیری روشن

$\underbrace{x}_{0}\,\underbrace{f(x)}_{-5,2,5} \geq 0 \to$ $\frac{-6 \quad -5 \quad 0 \quad 2 \quad 5}{\text{علامت} + - + + - + +} \to D_f = [-5,0] \cup [2,\infty]$

$\frac{-x}{\underbrace{f(x)}_{f(x)=-3,2,0,5}} \geq 0 \to$ $\frac{-4 \quad -3 \quad \overset{\star}{0} \quad 2 \quad 5}{\text{علامت} - \| + \| + \| - \|} \to D_f = (-3,0] \cup (0,2)$ اعداد صحیح: $-2,-1,1$ ، $x=3$

$x=2 \to f(2) - 2f(2) = 2^2 - 3(2) + 4 \to f(2) = 2 \xrightarrow{x=-2} f(-2) - 2(-2) = (-2)^2 - 3(-2) + 4 \to f(-2) = 1$

$\xrightarrow{x=1} f(1) = 2(1) + 3 = 5 \xrightarrow{x=5} f(5) = 5 - \sqrt{5+4} = 2$

$\xrightarrow{x=5} f(5) = 5 - \sqrt{5+4} = 2 \xrightarrow{x=2} f(2) = 2(2) + 3 = 7$

$\to 2 + 7 = 9$

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

$\cancel{ax^2} + a - 2ax - \cancel{bx} + b + \cancel{2} \underbrace{- \cancel{ax^2} + \cancel{bx} - \cancel{2}}_{-f(x)} = 4x + 2$

$a + b - 2ax = 4x + 2 \to a = -3$ $\qquad a - b = -3 - 5 = -8$

$b = -(-3) + 2 = 5$

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

$f(x - \frac{1}{x}) = \frac{x^4 + 1}{x^2} = x^2 + \frac{1}{x^2} + 2 - 2 = (x - \frac{1}{x})^2 + 2 \to f(-3) = (-3)^2 + 2 = 11$

الف) $\frac{f}{g} \to D_f = \{2,1,0,7\}$, $D_g = 9 - x^2 \geq 0 \to x^2 \leq 9 \to -3 \leq x \leq 3 \to [-3,3] \to D_{\frac{f}{g}} = D_f \cap D_g$

ب) $D_{\frac{g}{f}} = D_g \cap D_f - \{x \mid f(x) = 0\} = \{0,1,2\} - \{2\} \to \{0,1\} \to \{(1, \frac{\sqrt{2}}{2}), (0, \frac{3}{2})\}$

$\{x \mid g(x) = 0\}$

$\{0,1,2\} - \{\pm 3\}$

$\{0,1,2\}$

$\{(2, \frac{0}{\sqrt{6}}), (1, -\frac{2}{\sqrt{5}})$

$\{(0, \frac{2}{3})$

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

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

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

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

الف) $f-g = \{(2,2)(1,4)\ (3,4)\}$

ب) $\frac{2f}{g} = \{(2,4)\ (1,\frac{8}{5})(3,-2)$

تعریف نشده