

خوبی شلونی و کتفه خایه بهت غره غیل

الف) $x \neq 0, x \neq 1, \frac{x-1}{x} - \frac{x}{x-1} \geq 0 \rightarrow \frac{x^2-2x+1-x^2}{x^2-x} = \frac{1-2x}{x^2-x} \geq 0$ (۲)

$+\frac{1}{x} - \frac{x}{x-1} + \frac{1}{x} - \frac{x}{x-1} \rightarrow Df = (-\infty, 0) \cup [\frac{1}{2}, 1)$ ✓

ب) $x \neq -1, x \neq 0, x \neq 1, x \neq -2, \frac{3}{x} + \frac{1}{x-1} \neq 0 \rightarrow \frac{3x+1-x-1}{x^2-x-2} \neq 0 \rightarrow x \neq -\frac{1}{3}$

$\rightarrow x \neq -\frac{1}{3} \rightarrow Df = \mathbb{R} - \{-\frac{1}{3}, 0, 1, -2\}$ ✓

الف) $(\frac{1}{x})^n = 9 \rightarrow x = -\frac{1}{3}, 3^2 = 9 = (3^1)^n \rightarrow x = 3, \omega$ (۲)

$Df = (-\infty, -2] \cup [2, \omega, +\infty)$ ✓

الف) $x > 1, y > -1, y = -1 \rightarrow \sqrt{x^2-1} + 0 = 0 \Rightarrow x = 1$

$\Rightarrow Df = [1, \omega]$ ✓

الف) $x^2 - x - 2 > 0, (x-2)(x+1) > 0, x^2 - 1 > 0 \rightarrow \frac{1}{x-2} + \frac{1}{x+1} > 0$ (۲)

$\Rightarrow Df = (-\infty, -1) \cup (2, +\infty)$ ✓

الف) $-x^2 - 2x + 3 = 0 \rightarrow x = -1, 3$ (۲)

باتوجه به جدول بودن و علامت منفی x^2 یکی از ریشه ها است

الف) $-x^2 - \frac{1}{x} + 3 = 0 \rightarrow \frac{1}{x} \pm \sqrt{\frac{1}{x^2} + 3} = 0 \rightarrow \frac{1}{x} \pm 3, \omega = -2, 1, \omega$ (۲)

$\Rightarrow Df = [-2, 1, \omega]$

$\Rightarrow b = 1, \omega$ و $a+b = -\frac{1}{x} + 1, \omega$ (۱) ✓

$x \geq 1 \rightarrow g(x) = \sqrt{x^2-2} - x \rightarrow x^2-2 \geq 0 \rightarrow x \geq 1$ (۲)

$x < 1 \rightarrow g(x) = \sqrt{x^2+3} - x \rightarrow x^2+3 \geq 0 \rightarrow x \geq -3$

$\Rightarrow Df = [-3, +\infty)$ (۲) ✓

الف) $f(a) = f(a + \frac{1}{a}) = 1/a + 1/a - f(1/a) = 3/a - 1/a = 2/a$ (۲)

$\Rightarrow ba = -1 \rightarrow a = -1/b$ ✓

الف) $\frac{c}{1+a} + \frac{c}{1+b} = c \rightarrow \frac{c}{3+\sqrt{3}} + \frac{c}{3-\sqrt{3}} = c$ (۲)

$\sqrt{x} + \frac{1}{\sqrt{x}} = \sqrt{x + \frac{1}{x} + 2} = \sqrt{x + \frac{1}{x} + 2} = \sqrt{4 + 2} = \sqrt{6} + 2$

$f(2+\sqrt{3}) = \sqrt{2+\sqrt{3} + \frac{1}{2+\sqrt{3}}} + 2 = 2 + \sqrt{4+2} = 2 + \sqrt{6} + 2 = 4 + \sqrt{6}$ ✓



$$\begin{aligned}
 & (1f(x) - 3f(-x) = 5x^2 - 2x) \quad (1f(-x) - 3f(x) = 5x^2 + 2x) \\
 \times & \quad (1f(x) - 3f(-x) = 1x^2 - 2x) \quad (4f(-x) - 9f(x) = 12x^2 + 2x) \\
 \rightarrow & \quad -6f(x) = 10x^2 + 2x \rightarrow f(x) = \frac{10x^2 + 2x}{-6} = -\frac{5}{3}x^2 - \frac{1}{3}x
 \end{aligned}$$

$$x=0 \rightarrow 1f(0) = 1m-1 \rightarrow f(0) = \frac{1m-1}{1} \quad x=1 \rightarrow 4f(0) = 12 + 1m-1 = 11$$

$$\rightarrow f(0) = 10 + 0m \rightarrow \frac{1m-1}{1} = \frac{10 + 0m}{1} \rightarrow 1m-1 = 10 + 0m$$

$$\rightarrow m = 11 \rightarrow f(0) = \frac{1m-1}{1} = \frac{11-1}{1} = 10$$

$$f(x) + f\left(\frac{1}{x}\right) = ax + b + \frac{a}{x} + b = \frac{ax^2 + 1bx + a}{x} = \frac{1x^2 - 12x + 11}{x}$$

$$\rightarrow a=1, b=-12 \rightarrow 1x-12=f(x) \rightarrow f(-1) = -9$$