

$$\text{الف) } \frac{x-1}{x} - \frac{x}{x-1} \geq 0 \Rightarrow \frac{x^2 - x^2 + 1 - x^2}{x^2 - x} \geq 0 \Rightarrow \frac{-x^2 + 1}{x(x-1)} \geq 0$$

$$D_f = (-\infty, 0) \cup [\frac{1}{2}, 1) \quad \checkmark$$

$$x+1 \neq 0 \quad x \neq -1 \quad / \quad x \neq 0$$

$$7.) \frac{y}{x-1} + \frac{1}{x+y} \neq 0 \Rightarrow \frac{yx + y + x - 1}{x^2 + x - y} \neq 0 \Rightarrow \frac{-8}{(x-1)(x+y)} \neq 0 \quad x \neq -8$$

$$(x \neq 1) / (x \neq -1)$$

$$\Rightarrow D_f = \mathbb{R} - \left\{ -x, -\frac{A}{x}, -1, 0, 1 \right\} \quad \checkmark$$

الف) $\left(\left(\frac{1}{x}\right)^x - \left(\frac{1}{x}\right)^{-x}\right)\left(x^{\frac{\Delta}{x}} - x^x\right) \geq 0 \Rightarrow \frac{-x}{+ \quad -} \frac{\frac{\Delta}{x}}{- \quad +} \Rightarrow D_f = (-\infty, -x] \cup \left[\frac{\Delta}{x}, +\infty\right)$ ✓ (2)

$$\begin{aligned} \sqrt{x-1} + \sqrt{y+1} &= 2 \\ \sqrt{x-1} &= 2 - \sqrt{y+1} \\ x-1 &\leq (2 - \sqrt{y+1})^2 \\ x &\leq 4 - 4\sqrt{y+1} + y+1 \\ x &\leq y+5 - 4\sqrt{y+1} \end{aligned}$$

$x^2 - x - 2 > 0 \Rightarrow \frac{-1 \pm \sqrt{1+8}}{2} \Rightarrow \begin{cases} x < -1 \\ x > 2 \end{cases} / x^2 - 1 \geq 0 \Rightarrow \begin{cases} x \geq 1 \\ x \leq -1 \end{cases} / \sqrt{x^2 - 1} \neq -1$
 $(x-2)(x+1)$
 $\Rightarrow D_f = (-\infty, -1) \cup (2, +\infty)$ ✓

$w + ax - x^r \geq 0 \Rightarrow w - ra - r = -1 - ra = 0 \Rightarrow a = -\frac{1}{r}$
 $w + bx - x^r = 0 \Rightarrow -br - \frac{1}{r} + w = 0$
 $\Rightarrow a + b = -\frac{1}{r} + \frac{r}{r} = 0$

$$\begin{aligned} f(x) - x \geq 0 &\Rightarrow \left. \begin{aligned} x \geq 1 &\rightarrow rx - r - x = rx - r \geq 0 \rightarrow x \geq 1 \\ x < 1 &\rightarrow rx + r - x = x + r \geq 0 \rightarrow x \geq -r \end{aligned} \right\} D_f = [-r, +\infty) \end{aligned}$$

$$\gamma\left(\frac{(a+v)(v)}{v_a+v}\right) = \gamma_a - \gamma + a \Rightarrow 1\gamma_a + 1\gamma = \gamma_a - \gamma \Rightarrow 1 \cdot a = -1 \Rightarrow \boxed{a = -1, 1} \quad \checkmark \quad (5) \quad (6)$$

$f(x) = \sqrt{x} + \frac{1}{\sqrt{x}} + 2 = \left. \begin{matrix} 2 - \sqrt{3} \text{ و } 2 + \sqrt{3} \\ \text{این دو نیز معکوس یکدیگرند} \end{matrix} \right\} \xrightarrow{\text{زیبا}} 2 - \sqrt{3} = \frac{1}{2 + \sqrt{3}} \Rightarrow 1 = 2 - 3 \Rightarrow 1 = 1$

این دو به مجلس ولایت می باشند

$$\Rightarrow \triangleleft f(x-\sqrt{x}) + f(x+\sqrt{x}) = \sqrt{x-\sqrt{x}} + \frac{1}{\sqrt{x-\sqrt{x}}} + x + \sqrt{x+\sqrt{x}} + \frac{1}{\sqrt{x+\sqrt{x}}} + x$$

$$= 2\sqrt{x-\sqrt{3}} + \frac{2}{\sqrt{x-\sqrt{3}}} + 2 = 2\left(\sqrt{x-\sqrt{3}} + \frac{1}{\sqrt{x-\sqrt{3}}} + 2\right)$$

$$\underbrace{\sqrt{x-\sqrt{3}} + \frac{1}{\sqrt{x-\sqrt{3}}}}_{\sqrt{x-\sqrt{3}} + \frac{1}{\sqrt{x-\sqrt{3}}} + 2 = \sqrt{4}} = 2(\sqrt{4} + 2) = \boxed{2\sqrt{4} + 4}$$

این رابطه در ازای $x = 1$ برقرار است.

این رابطه درازی

این رابطه در ازای
اعداد مختلف هم
برسان عمل می کنند

$$\Rightarrow \sqrt{x} + \frac{1}{\sqrt{x}} = \sqrt{x + \frac{1}{x} + 2}$$

$$\left. \begin{aligned} & \left(\begin{aligned} 4(f(x) - 3f(-x)) &= 5x^2 - x \\ 3(4f(-x) - 3f(x)) &= 5x^2 + x \end{aligned} \right) \Rightarrow \left\{ \begin{aligned} f(x) - 3f(-x) &= 1.25x^2 - 0.25x \\ 4f(-x) - 3f(x) &= 1.25x^2 + 0.25x \end{aligned} \right. \Rightarrow \begin{cases} -5f(x) = 2.5x^2 + x \\ f(x) = \frac{0.5x^2 + 0.2x}{-1} \end{cases} \end{aligned}$$

(2) (1) ✓

$$\begin{aligned} x = -2 \Rightarrow 4f(0) &= 16 + 2m + 3m - 1 \Rightarrow f(0) = \frac{5m + 15}{4} \\ x = 0 \Rightarrow 4f(0) &= 3m - 1 \Rightarrow f(0) = \frac{3m - 1}{4} \end{aligned}$$

(2) (9)

$$\left. \begin{aligned} 4m - 3 &= 5m + 15 \Rightarrow 5m = 11 \\ m &= \frac{11}{5} = 2.2 \end{aligned} \right\}$$

$$\Rightarrow f(0) = \frac{13.5 - 1}{4} = \frac{12.5}{4} = 3.125 \quad \checkmark$$

$$\textcircled{1} \quad x = -1 \Rightarrow 4f(-1) = \frac{3 + 12 + 3}{-1} = -18 \Rightarrow f(-1) = -4.5 \quad \checkmark$$

(2) (10)

یا می توان از راه دیگر رفت که از داده سوال نیز استفاده شود.

$$\textcircled{5} \quad f(x) + f\left(\frac{1}{x}\right) = ax + b + \frac{a}{x} + b = \frac{ax^2 + 2bx + a}{x} = \frac{3x^2 + 12x + 3}{x}$$

$$\Rightarrow a = 3, b = 6 \Rightarrow f(x) = ax + b \Rightarrow f(x) = 3x + 6 \xrightarrow{x=-1} f(-1) = -9$$

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بالاخره به به برده به نقص رسیدم ت