۶-

$$x=5 \rightarrow f(5) = (a+1)7 = 7a+7$$
$$x=-2 \rightarrow f(-2) = 3a-4$$
$$\Rightarrow 2f(5) = f(-2)+a$$
$$14a+14 = 3a-4+a$$
$$10a = -18 \rightarrow a = -1/8$$

۷-

$$f(2-\sqrt{3}) = \sqrt{2-\sqrt{3}} + \frac{1}{\sqrt{2-\sqrt{3}} \times \sqrt{2+\sqrt{3}}} + 2 = \sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} + 2$$
$$f(2+\sqrt{3}) = \sqrt{2+\sqrt{3}} + \frac{1}{\sqrt{2+\sqrt{3}} \times \sqrt{2-\sqrt{3}}} + 2 = \sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}} + 2$$
$$\rightarrow 2\underbrace{\left(\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}}\right)}_{A=\sqrt{6}} + 4 \Rightarrow 2\sqrt{6}+4$$
$$A^2 = \left(\sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}}\right)^2 = 2-\sqrt{3}+2+\sqrt{3}+2\underbrace{\sqrt{\left(\sqrt{2-\sqrt{3}}\right)\left(\sqrt{2+\sqrt{3}}\right)}}_{\sqrt{4-3}=1 \;\; 1} = 6 \Rightarrow A = \sqrt{6}$$

۸-

$$\begin{cases} 2f(x) - 3f(-x) = 4x^2 - x \xrightarrow{\times 2} 4f(x) - 6f(-x) = 8x^2 - 2x \\ -3f(x) + 2f(-x) = 4x^2 + x \xrightarrow{\times 3} -9f(x) + 6f(x) = 12x^2 + 3x \end{cases}$$
$$-5f(x) = 20x^2 + x \rightarrow f(x) = \frac{20x^2+x}{-5} = -4x^2 - \frac{x}{5}$$

۹-

$$x=0 \rightarrow 2f(0) = 3m-1 \xrightarrow{\times -3}$$
$$x=-2 \rightarrow 6f(0) = \underbrace{16+2m+3m-1}_{5m+15}$$
$$\Rightarrow \begin{cases} -6f(0) = -9m+3 \\ 6f(0) = 5m+15 \end{cases}$$
$$0 = -4m + 18 \rightarrow m = \frac{9}{2}$$
$$\Rightarrow 2f(0) = \frac{27}{2} - 1$$
$$\boxed{f(0) = \frac{25}{4}}$$

۱۰-

$$x=-1 \Rightarrow f(-1)+f(-1) = \frac{3+12+3}{-1} \Rightarrow 2f(-1) = -18$$
$$f(-1) = -9$$

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۱-

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

$-\infty$	0	$\frac{1}{2}$	1	$+\infty$
+	-	+	-	

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

ب) $\begin{cases} x \neq 0 \\ x+1 \neq 0 \to x \neq -1 \\ x-1 \neq 0 \to x \neq 1 \\ x+2 \neq 0 \to x \neq -2 \end{cases}$, $\frac{3x+6+x-1}{(x-1)(x+2)} \neq 0 \to x = -\frac{5}{4}$

$\Rightarrow D_f = \mathbb{R} - \{0, -1, 1, -2, -\frac{5}{4}\}$

۶

۲-

الف) $((\frac{1}{3})^x - 9)(32 - 4^x) \geq 0 \to$

$-\infty$	-2	$\frac{5}{2}$	$+\infty$
+	-	+	

$\to D_f = (-\infty, -2] \cup [\frac{5}{2}, +\infty)$

ب) $\sqrt{y+1} = -\sqrt[4]{x-1} + 3$

$x-1 \geq 0 \to x \geq 1$ (I) و جواب رادیکال مثبت $\Rightarrow 3 - \sqrt[4]{x-1} \geq 0$, $\sqrt[4]{x-1} \leq 3$

رادیکال که نمیتونه منفی باشه

$0 \leq \sqrt[4]{x-1} \leq 3 \Rightarrow (I) \cap (II) = D_f = [1, 82]$

$0 \leq x-1 \leq 81$

$1 \leq x \leq 82$ (II)

۶

۳-

$x^2 - 1 \geq 0 \to x^2 \geq 1 \to x \leq -1$, $x \geq 1$

$x^2 - x - 2 > 0 \to (x-2)(x+1) > 0 \to$

$-\infty$	-1	2	$+\infty$
+	-	+	

$\to (-\infty, -1) \cup (2, +\infty)$

$\Rightarrow D_f = [1, 2)$

$D_f = (-\infty, -1) \cup (2, +\infty)$

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۴-

$x = 2 \to -4 - 2a + 3 = 0$
$-2a = 1 \to a = -\frac{1}{2}$

$\Rightarrow$ ریشه $= b \to -b^2 - \frac{1}{2}b + 3 = 0$

$b^2 - \frac{1}{2}b - 3 = 0$

$(b + \frac{3}{2})(b - 2) = 0$ → $-\frac{3}{2} \xrightarrow{\div -1} \frac{3}{2}$ ق‌ق ; $2 \xrightarrow{\div -1} -2$ غ‌ق $\Rightarrow$

$a + b = -\frac{1}{2} + \frac{3}{2} = \boxed{1}$

۳

۵-

$f(x) - x \geq 0$, $f(x) \geq x$

$\sqrt{3x - 2 - x} \to 2x - 2 \geq 0$, $2x \geq 2 \to x \geq 1$

$\sqrt{2x + 3 - x} \to x + 3 \geq 0$, $x \geq -3$

$\Rightarrow D_f = [-3, +\infty)$

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