

الف) $f(x) = \sqrt{\frac{x-1}{x} - \frac{x}{x-1}}$ $\frac{x^2+1-2x-x^2}{x^2-x} > 0$ $\frac{1}{1+\frac{1}{x}-\frac{1}{x}} -$ $D_f = (-\infty, 0) \cup [\frac{1}{2}, 1)$

ب) $f(x) = \frac{\frac{1}{x+1} - \frac{x}{x-1}}{\frac{x}{x-1} + \frac{1}{x+2}}$

$x \neq -1$
 $x \neq 0$
 $x \neq 1$
 $x \neq -2$

$\frac{x}{x-1} + \frac{1}{x+2} \neq 0$
 $2x+5 \neq 0$
 $x \neq -\frac{5}{2}$

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

الف) $f(x) = \sqrt{(\frac{1}{x}-9)(32-x^2)}$ $\frac{-2}{1+\frac{1}{x}-\frac{1}{x}} + \frac{2/5}{1+\frac{1}{x}-\frac{1}{x}}$ $D_f = (-\infty, -2] \cup [2/5, +\infty)$

ب) $\sqrt{x-1} + \sqrt{y+1} = 3$ $x-1 \geq 0$
 $\sqrt{y+1} = 3 - \sqrt{x-1}$ $x \geq 1$
 $3 - \sqrt{x-1} \geq 0$
 $\sqrt{x-1} \leq 3 \rightarrow x-1 \leq 9 \rightarrow x \leq 10$

$\Rightarrow D_f = [1, 10]$

$x^2 - x - 2 > 0$ $\frac{-1}{1+\frac{1}{x}-\frac{1}{x}} + \frac{2}{1+\frac{1}{x}-\frac{1}{x}}$
 $x^2 - 1 \geq 0$
 $x^2 \geq 1$ $\begin{cases} x \geq 1 \\ x \leq -1 \end{cases}$
 $D_f = (-\infty, -1) \cup (2, +\infty)$

$3-2a-x=0$
 $-2a=1$
 $a = -\frac{1}{2}$ $\rightarrow -x^2 - \frac{1}{2}x + 3$
 $\Delta = \frac{1}{4} + 12 = \frac{49}{4} \rightarrow x_{1,2} = \frac{-\frac{1}{2} \pm \frac{7}{2}}{-2} < \frac{3}{2} = b$
 $a+b = -\frac{1}{2} + \frac{3}{2} = 1$

$f(x) - x \geq 0 \Rightarrow f(x) \geq x \rightarrow 3x - 2 \geq x \rightarrow x \geq 1$ $\xrightarrow{\text{اشتراک دامنه}} [1, +\infty)$
 $\rightarrow 2x + 3 \geq x \rightarrow x \geq -3$ $\xrightarrow{\text{اشتراک دامنه}} [-3, 1)$

$D_g = [-3, +\infty)$

$$\begin{cases} 2f(\omega) = 2(a+1)(v) = 18a+18 \\ f(-2)+a = 2a-8+a = 8a-8 \end{cases} \Rightarrow \begin{cases} 10a = -18 \\ a = -1/5 \end{cases}$$

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$$\begin{aligned} f(2-\sqrt{3}) + f(2+\sqrt{3}) &= \sqrt{2-\sqrt{3}} + \sqrt{2+\sqrt{3}} + \frac{1}{\sqrt{2+\sqrt{3}}} + \frac{1}{\sqrt{2-\sqrt{3}}} + 8 \\ &\Rightarrow \frac{2\sqrt{2-\sqrt{3}}}{\sqrt{4-4\sqrt{3}}} + \frac{2\sqrt{2+\sqrt{3}}}{\sqrt{4+4\sqrt{3}}} + 8 = \sqrt{4-\sqrt{4}} + \sqrt{4+\sqrt{4}} + 8 = \boxed{8+2\sqrt{4}} \end{aligned}$$

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$$\begin{aligned} (2f(x) - 3f(-x) &= 8x^2 - x) \times 2 \\ (2f(-x) - 3f(x) &= 8x^2 + x) \times 3 \\ \hline -5f(x) &= 20x^2 + x \\ f(x) &= -4x^2 - \frac{x}{5} \end{aligned}$$

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$$\begin{cases} x=0 : 2f(0) = 3m-1 \\ x=-1 : 4f(0) = 14+2m+3m-1 \\ \quad \quad \quad 5m+13 \end{cases} \Rightarrow \begin{cases} -4f(0) = -20 \\ f(0) = 5/2 \end{cases}$$

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$$\begin{aligned} f(-1) + f(-1) &= \frac{3+12+3}{-1} \\ 2f(-1) &= -18 \\ f(-1) &= -9 \end{aligned}$$

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