نام و نام خانوادگی محمد عرفان ضیایی پاسخنامه تشریحی تکلیف شماره .... کلاس یازدهم B

1	الف) $F(x)=\sqrt{\frac{x-1}{x}-\frac{x}{x-1}} \geq 0 \Rightarrow \frac{(x-1)^2-x^2}{x(x-1)} \Rightarrow \frac{1-2x}{x(x-1)} \geq 0 \Rightarrow x=\frac{1}{2} \quad x=1 \quad x=0$ $\begin{array}{c\|ccccccc} x & & 0 & & \frac{1}{2} & & 1 & \\ \hline y & + & & - & & + & & - \end{array} \Rightarrow D_f=(-\infty,0)\cup[\frac{1}{2},1)$ ب) $\dfrac{\frac{1}{x+1}-\frac{2}{x}}{\frac{3}{x-1}+\frac{1}{x+2}} \Rightarrow \frac{3}{x-1}+\frac{1}{x+2} \neq 0 \Rightarrow \frac{3}{x-1} \neq -\frac{1}{x+2} \Rightarrow -x+1=3x+6 \Rightarrow (x=-5$ $\Rightarrow x=-\frac{5}{4} \Rightarrow D_f=\mathbb{R}-\{-\frac{5}{4},-1,-2,0,1\}$
2	الف) $\sqrt{((\frac{1}{3})^x-9)(32-4^x)} \Rightarrow (\frac{1}{3})^x-9=0 \Rightarrow x=3$ و $32-4^x=0 \Rightarrow x=2.5$ $\begin{array}{c\|ccccc} x & & -2 & & 2.5 & \\ \hline y & + & & - & & + \end{array} \Rightarrow D_f=(-\infty,-2]\cup[2.5,+\infty)$ ب) $\sqrt[4]{x-1}+\sqrt{y+1}=3 \Rightarrow \sqrt{y+1}=3-\sqrt[4]{x-1} \Rightarrow 3-\sqrt[4]{x-1} \geq 0 \Rightarrow 3 \geq \sqrt[4]{x-1}$ $\Rightarrow 1 \leq x \leq 82 \Rightarrow D_f=[1,82]$
3	$f(x)=\dfrac{\log_4 (x^2-x-2)}{\sqrt{x^2-1}+1} \Rightarrow x^2-x-2>0 \Rightarrow (x-2)(x+1)>0 \Rightarrow \begin{array}{c\|ccccc} x & & -1 & & 2 & \\ \hline y & + & & - & & + \end{array} \quad (-\infty,-1)\cup(2,+\infty)$ $\sqrt{x^2-1}+1 \Rightarrow \sqrt{x^2-1}+1 \neq 0 \Rightarrow \sqrt{x^2-1} \neq -1 \Rightarrow x^2-1 \neq 1 \Rightarrow x^2 \neq 2 \Rightarrow x \neq \pm\sqrt{2}$ $\Rightarrow D_f=(-\infty,-1)\cup(2,+\infty)-\{\pm\sqrt{2}\}$ Or $(-\infty,-1)\cup(2,+\infty)-\{-\sqrt{2}\}$
4	$\sqrt{3+ax-x^2} \Rightarrow -x^2+ax+3=0 \Rightarrow x=-2 \Rightarrow -(-2)^2+a(-2)+3=0$ $-4-2a+3=0 \Rightarrow -1-2a=0 \Rightarrow a=-\frac{1}{2} \Rightarrow -x^2-\frac{1}{2}x+3=0 \Rightarrow (x)^2+\frac{1}{2}x-3=0$ $\Rightarrow (x+2)(x-1.5)=0 \Rightarrow x=-2 \quad x=1.5 \Rightarrow D_f=[-2,1.5] \Rightarrow a+b=-2+1.5$ $\Rightarrow a+b=-0.5$
5	$F(x)=\begin{cases} 3x-2 & x \geq 1 \\ 2x+3 & x<1 \end{cases} \Rightarrow g(x)=\sqrt{f(x)-x} \Rightarrow f(x)-x \geq 0$ $3x-2-x \geq 0 \Rightarrow 2x-2 \geq 0 \Rightarrow 2x \geq 2 \Rightarrow x \geq 1 \Rightarrow I$ $2x+3-x \geq 0 \Rightarrow x+3 \geq 0 \Rightarrow x \geq -3 \Rightarrow -3 \leq x < 1 \Rightarrow II$ $D_f=I\cup II \Rightarrow [-3,1)\cup[1,+\infty)$ Or $[-3,+\infty)$

۶

$$f(x) = \begin{cases} (a+1)(x+2) & x \geq 1 \\ 3a + 2x & x \leq 1 \end{cases} \Rightarrow 2f(5) = f(-2) + a \Rightarrow x = 5 \Rightarrow 2(f(5)) = 2(7a+7)$$

$$\Rightarrow 14a + 14 \quad \text{و} \quad x = -2 \Rightarrow 3a - 4x \Rightarrow 14 + 14a = 3a - 4 + a \Rightarrow 14a + 14 = 4a - 4$$

$$\Rightarrow 10a = -18 \Rightarrow a = -1/8$$

۷

$$f(x) = \sqrt{x} + \frac{1}{\sqrt{x}} + 2 \Rightarrow f(2-\sqrt{3}) + f(2+\sqrt{3}) \Rightarrow \sqrt{x} = a = \sqrt{2+\sqrt{3}} \; ; \; \frac{1}{a} + \frac{1}{b} = \frac{a+b}{\underset{1}{ab}} = a+b$$

$$\sqrt{x} = b = \sqrt{2-\sqrt{3}} \Rightarrow ab = \sqrt{4-3} = 1 \quad a^2 + b^2 = (2+\sqrt{3})(2-\sqrt{3}) = 4$$

$$f(x_1) + f(x_2) = (a + \frac{1}{a} + 2) + (b + \frac{1}{b} + 2) \Rightarrow (a+b) + (\frac{1}{a} + \frac{1}{b}) + 4 \Rightarrow (a+b) + (a+b) + 4$$

$$\Rightarrow 2(a+b) + 4 \Rightarrow (a+b)^2 = a^2 + b^2 + 2ab = 4 + 2 = 6 \Rightarrow a + b = \sqrt{6}$$

$$\Rightarrow f(2+\sqrt{3}) + f(2-\sqrt{3}) = 2\sqrt{6} + 4$$

۸

$$2f(x) - 3f(-x) = 4x^2 - x \Rightarrow 2f(-x) - 3f(x) = 4x^2 + x$$

$$\Rightarrow \begin{cases} 2f(x) - 3f(-x) = 4x^2 - x \\ -3f(x) + 2f(-x) = 4x^2 + x \end{cases} \Rightarrow (4-9)f(x) = (8x^2 - 2x) + (12x^2 + 3x)$$

$$\Rightarrow -5f(x) = 20x^2 + x \Rightarrow f(x) = \frac{-(20x^2 + x)}{5} \Rightarrow f(x) = -4x^2 - \frac{x}{5}$$

۹

$$(x+2)f(x) - 3xf(x+2) = 4x^2 - mx + 3m - 1$$

$$\Rightarrow x = 0 \Rightarrow (2)(f(0)) - \cancel{3(0)(f(x+2))} = 3m - 1 \Rightarrow f(0) = \frac{3m-1}{2}$$

۱۰

$$f(x) + f(\frac{1}{x}) = \frac{3x^2 - 12x + 3}{x} \Rightarrow f(x) = ax + b \quad \text{و} \quad f(\frac{1}{x}) = \frac{a}{x} + b$$

$$\Rightarrow f(x) + f(\frac{1}{x}) = ax + b + \frac{a}{x} + b \Rightarrow \frac{ax^2}{x} + \frac{a}{x} + \frac{2bx}{x} \Rightarrow \frac{ax^2 + 2bx + a}{x} = \frac{3x^2 - 12x + 3}{x}$$

$$a = 3 \quad b = -6 \Rightarrow f(-1) = -a + b \Rightarrow -3 - 6 = -9$$