تکلیف شماره ۴ — ژرانک آقایی — ۲۰ — یازدهم دختر

1. الف) $\frac{x^2+1-2x-x^2}{x^2-x}=\frac{1-2x}{x^2-x}\geq 0 \longrightarrow$ (۰ ، $\frac{1}{2}$ ، ۱ : + ، − ، + ، −) $\longrightarrow (-\infty,0)\cup[\frac{1}{2},1)$ — ۵

ب) $\frac{\frac{x-2x-2}{x^2+x}}{\frac{24x+6+x-1}{x^2+1x-2}}=\frac{\frac{-x-2}{x^2+x}}{\frac{4x+5}{x^2+x-2}}\geq 0$ ($\to -1, 0$) ($\to -\frac{5}{4}, 1, -2$) $\longrightarrow \mathbb{R}-\{-1,0,-\frac{5}{4},-2,1\}$ — ۵

2. الف) $((\frac{1}{3})^x-9)(32-4^x)\geq 0 \longrightarrow x=\frac{5}{2}, -2$ (-2 ، $\frac{5}{2}$: + ، − ، +)

$(-\infty,-2]\cup[\frac{5}{2},+\infty)$ — ۵

ب) $x-1\geq 0 \longrightarrow x\geq 1$

$\sqrt{y+1}=3-\sqrt[4]{x-1} \longrightarrow 3-\sqrt[4]{x-1}\geq 0 \longrightarrow 3\geq\sqrt[4]{x-1} \longrightarrow 81\geq x-1 \longrightarrow 82\geq x$

$+$ پس این حتماً مثبته

$[1,82]$

s.a.m

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.3

$x^2-x-2>0 \rightarrow (x-2)(x+1)>0 \rightarrow$ (-1, 2: $+ \; - \; +$)

$x^2-1 \geq 0 \rightarrow$ (-1, 1: $+ \; - \; +$)

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

$\sqrt{x^2-1}+1 \neq 0 \rightarrow \sqrt{x^2-1} \neq -1$ × همیشه درسته

.4

$3+ax-x^2 \geq 0 \xrightarrow{x=-2} 3-2a-4=0 \rightarrow -2a-1=0 \rightarrow -2a=1 \rightarrow a=-\frac{1}{2}$

$-x^2-\frac{1}{2}x+3 \geq 0 \rightarrow \Delta = +\frac{1}{4} \underbrace{-4(3\times-1)}_{+12} > 0$

$-x^2-\frac{1}{2}x+3=0 \rightarrow \Delta=\frac{49}{4} \rightarrow \frac{-b \pm \sqrt{\frac{49}{4}}}{-2} = \frac{-\frac{1}{2} \pm \frac{7}{2}}{-2} = -\frac{3}{2}$

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

.5

$x \geq 1 \rightarrow \sqrt{3x-2-x} \rightarrow \sqrt{2x-2} \rightarrow x \geq 1$

$x<1 \rightarrow \sqrt{2x+3-x} \rightarrow x \geq -3$

$\sqrt{f(x)-x} \rightarrow f(x) \geq x \rightarrow x \geq -3$ ✓ $[-3,+\infty)$

.6

$2(a+1)(7)=3a-4+a \rightarrow 7(2a+2)=4a-4 \rightarrow 14a+14=4a-4 \rightarrow 10a=-18$

$a=-\frac{9}{5}$

.7

$\left(\sqrt[4]{x}+\frac{1}{\sqrt[4]{x}}\right)^2 \Rightarrow \left(\sqrt[4]{2-\sqrt{3}}+\frac{1}{\sqrt[4]{2-\sqrt{3}}}\right)^2+\left(\sqrt[4]{2+\sqrt{3}}+\frac{1}{\sqrt[4]{2+\sqrt{3}}}\right)^2$

$\sqrt{2-\sqrt{3}}+\frac{1}{\sqrt{2-\sqrt{3}}}+2=\sqrt{2-\sqrt{3}}+\frac{\sqrt{2+\sqrt{3}}}{1}+2=\sqrt{2-\sqrt{3}}+\sqrt{2+\sqrt{3}}+2$ ①

$\sqrt{2+\sqrt{3}}+\sqrt{2-\sqrt{3}}+2$ ② ①+② $=2\left(\sqrt{2-\sqrt{3}}+\sqrt{2+\sqrt{3}}\right)+4=4+2\sqrt{6}$

$\sqrt{2-\sqrt{3}}+\sqrt{2+\sqrt{3}}=A \rightarrow A^2=4+2=6 \rightarrow A=\sqrt{6}$

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.8

$$2f(x) - 3f(-x) = 4x^2 - x \longrightarrow 4f(x) - 6f(-x) = 8x^2 - 2x$$
$$2f(-x) - 3f(x) = 4x^2 + x \longrightarrow 6f(x) - 9f(x) = 12x^2 + 3x \xrightarrow{\text{جمع}} -5f(x) = x^2 + x$$
$$-\frac{4x^2 - x}{5} = f(x)$$

.9

$$2f(0) = 3m - 1 \longrightarrow f(0) = \frac{3m-1}{2}$$
$$x = -2 \longrightarrow 6f(0) = \underbrace{16 + 12m + 3m - 1}_{15+15m} \Rightarrow \frac{15+15m}{6} = f(0)$$
$$\left\{ \frac{3m-1}{2} = \frac{15+15m}{6} \right. \quad \left(\times \frac{6}{3} \right)$$
$$15+15m = 9m - 3$$
$$2f(0) = \frac{2b}{3} - 1 \longrightarrow f(0) = \frac{2b}{6}$$
$$\frac{2b}{3} \quad \frac{9}{2} = m \leftarrow 18 = 4m$$

.10

$$ax + b + \frac{a}{x} + b = \frac{3x^2 - 12x + 3}{x} \longrightarrow -a + b - a + b = \frac{3 + 12 + 3}{-1} \rightarrow -2a + 2b = -18$$
$$b - a = -9 \quad (1)$$
$$x = 1 \longrightarrow a + b + a + b = \frac{3 - 12 + 3}{1} \rightarrow 2a + 2b = -6 \rightarrow a + b = -3 \quad (2)$$
$$(1), (2) \xrightarrow{\text{جمع}} 2b = -12 \rightarrow \boxed{b = -6} \quad \boxed{a = 3}$$

$$x = -1 \longrightarrow -3 - 6 = -9$$