

* بیان جعفری *

تکلیف شماره ۲

۱۸، ۲۵

$$\textcircled{1} x^2 - 4x + 4 + y^2 + 6y + 9 = 0 \Rightarrow 9 + 4 = k = \textcircled{11} \checkmark \textcircled{2}$$

$$\textcircled{2} a^2 + 4a = 4a + 4 \Rightarrow a^2 + a - 4 = 0 \Rightarrow (a-1)(a+4) \Rightarrow 1 + 4 = \textcircled{5} \checkmark$$

$$\textcircled{3} \Rightarrow 12 - a = 0 \Rightarrow a = 12, b - 4 = 0 \Rightarrow b = 4 \Rightarrow \frac{b}{a} = \frac{4}{12} = \frac{1}{3} \checkmark \textcircled{2}$$

$$\textcircled{4} \Rightarrow |n+1| \geq 2 \Rightarrow \begin{aligned} n+1 &\geq 2 \Rightarrow n \geq 1 \\ n+1 &\leq -2 \Rightarrow n \leq -3 \end{aligned} \textcircled{2}$$

$$\Rightarrow 11 - b = a - 4 \Rightarrow a + b = 11 + 4 = \textcircled{15} \checkmark$$

$$\textcircled{5} \textcircled{2}$$

$$\text{الف)} \sqrt{\frac{x+1}{|x-3|}} + \sqrt{\frac{4-x}{x^2+2x+4}} \Rightarrow$$

$$\begin{array}{c} \downarrow \quad \quad \quad \downarrow \\ \begin{array}{c} + \quad \quad \quad + \\ \hline - \quad 0 \quad + \quad \cancel{3} \quad + \end{array} \quad \quad \quad \begin{array}{c} \downarrow \quad \quad \quad \downarrow \\ \begin{array}{c} + \quad \quad \quad + \\ \hline + \quad 0 \quad \cancel{4} \end{array} \end{array}$$

$$\Rightarrow D_f = [-1, 4] - \{3\} \checkmark$$

$$\text{ب)} \sqrt{[x] - 4} + \sqrt{4 - [x]} \Rightarrow$$

$$[x] \geq 4 \Rightarrow x \geq 4, 4 \geq [x] \Rightarrow x < 5 \Rightarrow D_f = \emptyset \checkmark$$

$$\textcircled{6} \text{الف)} \sqrt{\frac{(x-3)(x+2)}{(x-2)(x+4)(x-4)(x+3)}} \Rightarrow \begin{array}{c} \begin{array}{c} -3 \quad \quad \quad -2 \quad \quad \quad 2 \quad \quad \quad -3 \\ + \quad \cancel{2} \quad \cancel{3} \quad \cancel{4} \quad \cancel{2} \quad \quad \quad + \end{array} \\ \hline \end{array} \Rightarrow D_f = (-\infty, -3) \cup (2, +\infty) - \{3\} \textcircled{2}$$

$$ج) \sqrt{\frac{x^3 - 2x^2 - 5x + 7}{x^3 + 2x^2 - 5x - 7}} = \sqrt{\frac{(x+2)(x-1)(x-3)}{(x-2)(x+1)(x+3)}}$$

$$\begin{array}{ccccccc} -3 & -2 & -1 & 1 & 2 & 3 \\ \hline + & - & + & - & + & - & + \end{array} \Rightarrow D_f = (-\infty, -2) \cup [-1, 1] \cup [1, 2) \cup [3, +\infty)$$

د) $\sqrt{[-x] - 2} \Rightarrow [-x] \geq 2 \Rightarrow -x \geq 2 \Rightarrow x \leq -2$
 $\Rightarrow D_f = (-\infty, -2]$ ✓

ج) $[x^2] - 2[x] - 3 \neq 0 \quad x^2 - 2x - 3 = 0 \Rightarrow x = -1, 3$
 $\Rightarrow D_f = \mathbb{R} - ([3, 4) \cup (-1, 0])$ ✓

د) $\tan x \neq -1$
 الف) $\sin x \neq 0 \Rightarrow x \neq k\pi$, $\cos x \neq 0 \Rightarrow x \neq k\pi + \frac{\pi}{2}$
 $\Rightarrow D_f = \mathbb{R} - \{k\pi, k\pi - \frac{\pi}{2}\}$ ✓

ج) $\sqrt{1 - 4\sin^2 x} \Rightarrow 4\sin^2 x \leq 1 \Rightarrow \sin^2 x \leq \frac{1}{4} \Rightarrow -\frac{1}{2} \leq \sin x \leq \frac{1}{2}$
 $D_f = [k\pi + \frac{\pi}{6}, k\pi + \frac{5\pi}{6}]$ ✓

د) $\sqrt{1 - \log^{\frac{1}{x}} n} \Rightarrow \log^{\frac{1}{x}} n \leq 1 \Rightarrow n - 1 \leq \frac{1}{x} \Rightarrow x \leq \frac{1}{n-1}$
 $D_f = (-\infty, \frac{1}{n-1}]$ ✓

ج) $x^2 - x \geq 0 \Rightarrow x(x-1) \geq 0$
 $\log^{\frac{1}{x}} n \neq 1 \Rightarrow x^2 - 2x - 4 \neq 0 \Rightarrow x \neq -1, 4$
 $D_f = (-\infty, 0] \cup [1, +\infty)$ ✓

$$n^2 - 3n > 0 \rightarrow \frac{0}{+} \frac{n}{-} \frac{n}{+}$$

$$D = (-\infty, 0) \cup (3, +\infty) - \{-1, 4\}$$

٥)

1, V5

الف) $n^2 - 3n \geq 1 \Rightarrow n^2 - 3n \geq 1 \Rightarrow n^2 - 3n - 1 \leq 0$

$$\frac{1}{+} \frac{n}{-} \frac{n}{+} \Rightarrow D_f = [1, 4] \checkmark$$

ب) $\frac{n^2 - 3n}{n^2 + 1} \in \mathbb{N} \Rightarrow \frac{n^2 - 3n}{-n^2 + 1} \in \mathbb{N}$ ~~$\Rightarrow n \in \mathbb{N}$~~

$$D_f = \left\{ n \mid n = \frac{k^2 - 3k}{-k + 1}, k \in \mathbb{Z} \right\} \checkmark$$