

۱۸، ۱۷۵  
A سر

پاسخنامه تشریحی تکلیف شماره ۲ کلاس ۲

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$$2x^2 + y^2 - 4x + 4y + k = 0 \Rightarrow \begin{cases} 2x^2 - 4x + 0 \rightarrow \text{مربع کامل} \Rightarrow 2(x-2n+1) = 0 \Rightarrow 2 \\ 0^2 + 4y + \Delta \rightarrow \text{مربع کامل} \Rightarrow (y+2)^2 \Rightarrow \Delta = 4 \end{cases}$$

$$\Rightarrow k = 0 + \Delta \Rightarrow k = 4 \quad \checkmark$$

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$$f(n) = \begin{cases} n^2 + 4n; n \geq a \\ 2n + a + 2; n < a \end{cases} \quad \begin{aligned} & a) a^2 + 4a = 2(a+a+2) \Rightarrow a^2 + a - 2 = 0 \\ & \Rightarrow (a-1)(a+2) = 0 \Rightarrow a = 1 \quad \checkmark \end{aligned}$$

$$\Rightarrow f(n) = \begin{cases} n^2 + 4n; n \geq 1 \\ 2n + 2; n < 1 \end{cases} \quad \Rightarrow f(1) = 5 \quad \checkmark$$

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$$y = \sqrt{4n-a} + \sqrt{b-2n} \xrightarrow{\text{D.F.}} \sqrt{12-a} + \sqrt{b-6} \Rightarrow \begin{aligned} & a \neq 12 \Rightarrow b = 6 \Rightarrow \frac{b}{a} = \frac{1}{2} \quad \checkmark \end{aligned}$$

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$$f(n) = \begin{cases} 2x^2 - b; |n+1| \geq 2 \Rightarrow n+1 \geq 2, n+1 \leq -2 \Rightarrow n \geq 1, n \leq -3 \\ a+2n; -3 \leq n \leq -1 \end{cases}$$

$$x = -3 \Rightarrow 11 - b = a + (-6) \Rightarrow b + a = 17 \quad \checkmark$$

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الف)  $\sqrt{\frac{x+1}{|x-3|}} + \sqrt{\frac{9-x}{x^2+2x+5}}$   $\textcircled{1} \frac{-1}{-3+3} + \textcircled{2} \frac{4}{+0} =$   $\textcircled{1} \frac{-1}{[-1, +\infty) - \{3\}} + \textcircled{2} \frac{4}{(-\infty, 4] - \{-1, 3\}} \Rightarrow \text{D.F.} = \textcircled{1} (3, \infty) \cup \textcircled{2} [-1, 4] - \{3\}$

ب)  $\sqrt{[x]-4} + \sqrt{4-[x]} \Rightarrow \begin{cases} [x] \geq 4 \Rightarrow x \geq 4 \quad \textcircled{1} \\ [x] \leq 4 \Rightarrow x \leq 4 \quad \textcircled{2} \end{cases} \Rightarrow \text{D.F.} = \textcircled{1} [4, \infty) \cup \textcircled{2} (-\infty, 4] = \mathbb{R} \quad \checkmark$

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الف)  $\sqrt{x^2 - x - 6} = \begin{cases} (x-3)(x+2) \leftarrow \text{مشتق} \\ +2 - 1x + x^2 + 6 \end{cases} \begin{matrix} t=3 \rightarrow x=3-2 \\ t=-2 \rightarrow x=3-2 \end{matrix}$

ب)  $\frac{-2 - 2}{t - 3 - 3 + 3 + 3} \Rightarrow Df = (-\infty, -3) \cup (-2, 3) \cup (3, +\infty)$

ج)  $\sqrt{\frac{x^3 - 2x^2 - 5x + 6}{x^3 + 2x^2 - 5x - 6}} = \sqrt{\frac{(x-1)(x-3)(x+2)}{(x+1)(x-2)(x+3)}}$   $Df = (-\infty, -3) \cup [-2, -1) \cup [1, 2) \cup (3, +\infty)$

الف)  $\sqrt{-x} - 2 \geq 0 \Rightarrow [-x] - 2 \geq 0 \Rightarrow [-x] \geq 2 \Rightarrow -x \geq 2 \Rightarrow x \leq -2$

ب)  $[x] = t \Rightarrow t^2 - 2t - 3 = (t-3)(t+1) \Rightarrow \begin{cases} t=3 \rightarrow [x] = 3 \Rightarrow x < 4 \\ t=-1 \rightarrow [x] = -1 \Rightarrow x < 0 \end{cases}$

ج)  $\frac{-1}{t} - \frac{3}{t} + \frac{3}{t} \Rightarrow Df = (-\infty, -1) \cup [3, +\infty)$

الف)  $\frac{\cot x + 1}{\tan x + 1} \Rightarrow \begin{cases} \sin x, \cos x \neq 0 \\ \tan x + 1 \neq 0 \Rightarrow \tan x \neq -1 \end{cases}$

ب)  $\sqrt{1 - \sin^2 x} \Rightarrow 1 - \sin^2 x \geq 0 \Rightarrow \sin^2 x \leq 1 \Rightarrow \sin x \leq \frac{1}{\sqrt{2}} \Rightarrow \frac{1}{\sqrt{2}} \leq \sin x \leq \frac{1}{\sqrt{2}}$

ج)  $Df = [k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4}]$

الف)  $\sqrt{1 - \log_{\frac{1}{f}} x - 1} \Rightarrow \begin{cases} x - 1 > 0 \Rightarrow x > 1 \\ 1 - \log_{\frac{1}{f}} x - 1 \geq 0 \Rightarrow \log_{\frac{1}{f}} x \leq 0 \Rightarrow x - 1 \geq \frac{1}{f} \Rightarrow x \geq \frac{1}{f} + 1 \end{cases}$

ب)  $\frac{\sqrt{x(x-1)}}{1 - \log_{\frac{1}{f}} x - 1} \Rightarrow \begin{cases} x(x-1) \geq 0 \Rightarrow x \geq 1 \text{ or } x \leq 0 \\ x^2 - x > 0 \Rightarrow x(x-1) > 0 \Rightarrow x > 1 \text{ or } x < 0 \\ \log_{\frac{1}{f}} x \neq 1 \Rightarrow x^2 - x \neq f \Rightarrow x^2 - x - f = (x-f)(x+1) \Rightarrow x \neq f-1 \end{cases}$

ج)  $Df = \mathbb{R} - [0, 3] - \{f-1\}$

الف)  $\sqrt{x^2 - x^2} - 1 \Rightarrow \begin{cases} x^2 - x^2 > 0 \Rightarrow -x(x-1) > 0 \Rightarrow \frac{0}{x+1} \text{ or } \frac{0}{x-1} \\ x^2 - x^2 - 1 \geq 0 \Rightarrow x^2 - x^2 \geq 1 \Rightarrow \log_{\frac{1}{f}} x \leq x^2 - x^2 \end{cases}$

ب)  $\left(\frac{x^2 + d}{x + e}\right) \in W$

ج)  $2x + d \in W = x + d \Rightarrow 2x + d - x - d = -x \Rightarrow x = -x \Rightarrow x = 0$

د)  $2(2x - 3) = -x + d \Rightarrow x = \frac{-x + d}{4x - 3}$

هـ)  $Df = \{x | x = \frac{-x + d}{4x - 3}, k \in W\}$