ریحانه مجبی — تکلیف ۵ — دهم تجربی C

۱) الف)

$y = \frac{\sin x - 2}{2\cos x + 1}$

$2\cos x + 1 \neq 0$

$2\cos x \neq -1$

$\cos x \neq -\frac{1}{2} \rightarrow x = \frac{2\pi}{3} + 2k\pi$, $x = \frac{4\pi}{3} + 2k\pi$

cos زوایایی که در ربع دوم و سوم قرار دارند $= -\frac{1}{2}$

$D_f = \{x \in R \mid x \neq \frac{2\pi}{3} + 2k\pi, x \neq \frac{4\pi}{3} + 2k\pi, k \in Z\}$

ب)

$y = \frac{\sin x + 3}{\cos x - 1}$

$\cos x - 1 \neq 0$

$\cos x \neq 1 \rightarrow x = 2k\pi$

$D_f = \{x \in R \mid x \neq 2k\pi, k \in Z\}$

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۲) الف)

$y = \frac{2\sin x + 1}{\tan x + 1} \rightarrow \tan x = \frac{\sin x}{\cos x} \rightarrow \cos x \neq 0$, $\tan x + 1 \neq 0$

$\tan x \neq -1 \rightarrow x = \frac{3\pi}{4} + k\pi$

$D_f = \{x \in R \mid x \neq \frac{\pi}{2} + k\pi, x \neq \frac{3\pi}{4} + k\pi, k \in Z\}$

ب)

$y = \frac{\cos x + 1}{\cot x - 1} \rightarrow \cot x = \frac{\cos x}{\sin x} \rightarrow \sin x \neq 0$, $\cot x - 1 \neq 0$

$\sin x \neq 0 \rightarrow x = k\pi$

$\cot x \neq 1 \rightarrow x = \frac{\pi}{4} + k\pi$

$D_f = \{x \in R \mid x \neq k\pi, x \neq \frac{\pi}{4} + k\pi, k \in Z\}$

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۳) الف)

$\sin y = x^2 - 2$

$-1 \leq \sin y \leq 1$

$-1 \leq x^2 - 2 \leq 1$

$-1 + 2 \leq x^2 - 2 + 2 \leq 1 + 2$

$1 \leq x^2 \leq 3$

$x \geq 1$ یا $x \leq -1$

$-\sqrt{3} \leq x \leq \sqrt{3} \rightarrow$ از هر دو اشتراک می‌گیریم

$D_f = [\sqrt{3}, -1] \cup [1, \sqrt{3}]$

ب)

$y = \arccos(\sqrt{x} - 3)$

$x \geq 0$

$-1 \leq \sqrt{x} - 3 \leq 1$

$-1 \leq \sqrt{x} - 3$ | $\sqrt{x} - 3 \leq 1$

$-1 + 3 \leq \sqrt{x}$ | $\sqrt{x} \leq 1 + 3$

$(2 \leq \sqrt{x})^2$ | $(\sqrt{x})^2 \leq (4)^2$

$4 \leq x$ | $x \leq 16$

$D_f = [4, 16]$

۴) الف)

$\cos y = |x| - 3$ $\quad \underbrace{-1 \leq |x| - 3 \leq 1}$ $\quad$ $D_f = [-4, -2] \cup [2, 4]$

$-1 + 3 \leq |x| \quad |x| \leq 1 + 3$

$x \geq 2$ یا $x \leq -2$ $\leftarrow 2 \leq |x|$ $\quad |x| \leq 4 \rightarrow -4 \leq x \leq 4$

ب)

$y = \arcsin(x^2 + 3x + 1)$ $\quad \underbrace{-1 \leq x^2 + 3x + 1 \leq 1}$ $\quad$ $D_f = [-3, -2] \cup [-1, 0]$

$-1 \leq x^2 + 3x + 1 \quad x^2 + 3x + 1 \leq 1$

$0 \leq x^2 + 3x + 1 \quad x^2 + 3x \leq 0$

$(x+1)(x+2) = 0 \quad x(x+3) \leq 0 \rightarrow -3 \leq x \leq 0$

$x = -1, x = -2$ ریشه‌ها

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۵) الف)

$y = \log_3 x^2 - 4$ $\quad x^2 - 4 > 0$ $\quad$ $D_f = (-\infty, -2) \cup (2, +\infty)$

$x^2 - 4 = 0 \rightarrow x^2 = 4$ → $x = 2$ ، $x = -2$

$x^2 - 4 > 0 \rightarrow x < -2$ یا $x > 2$

$y = \log_2 2 - |x|$ $\quad 2 - |x| > 0$

$2 > |x| \rightarrow -2 < x < 2 \Rightarrow$ $D_f = (-2, 2)$

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۶) الف)

$y = \log_{x-3} 5 - x$ $\quad 5 - x > 0 \rightarrow x < 5$ $\quad$ $D_f = (3, 4) \cup (4, 5)$

$x - 3 > 0 \rightarrow x > 3$

یا

$D_f = \{x \in R \mid 3 < x < 5, x \neq 4\}$

ب)

$y = \log_{x+3} x^2 - 1$ $\quad x^2 - 1 > 0 \rightarrow x > 1$ یا $x < -1$

$x + 3 \neq 1 \rightarrow x \neq -2$

$D_f = (-3, -2) \cup (-2, -1) \cup (1, +\infty)$

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۷) الف)

$y = \log \dfrac{x^2 - 4x + 3}{x - 3}$ $\quad \dfrac{x^2 - 4x + 3}{x - 3} > 0 \rightarrow \dfrac{(x-1)(x-3)}{x-3} > 0$

$x \neq 3$

$x > 1$

$D_f = (1, 3) \cup (3, +\infty)$

ب)

$y = \log_{x+5} \dfrac{x+3}{x-2}$ $\quad \dfrac{x+3}{x-2} > 0$ $\quad$ $D_f = (-5, -4) \cup (-4, -3) \cup (2, +\infty)$

$x + 5 > 0$ و $x + 5 \neq 1$

۷) الف)

$y = \sqrt{2 - \log_2(x-2)}$

$2 - \log_2(x-2) \geq 0 \rightarrow \log_2(x-2) \leq 2$

$x-2 > 0$

$x > 2$

$x-2 \leq 2^2$

$x-2 \leq 4$

$x \leq 6$

$D_f = (2, 6]$

ب)

$y = \log(2\log_2 x - 1)$

$x > 0$

$\log x - 1 > 0 \rightarrow 2\log_2 x > 1 \rightarrow \log x > \frac{1}{2} \rightarrow x > \sqrt{2}$

$D_f = (\sqrt{2}, +\infty)$

۹) الف)

$y = \frac{3}{x^2+1}$ → $D_f = R$

ب)

$y = \frac{2}{x^2-1}$ $D_f = R - \{0, 1\}$

ج)

$y = \frac{3}{x^2-2}$ → $D_f = (-\infty, -\frac{1}{2}) \cup (0, +\infty)$

د)

$y = \frac{2}{x^2-4}$ $D_f = R - \log_2^2$

$D_f = R - \{\frac{1}{2}\}$

۱۰) الف)

$y = (2x-1)!$

$2x-1 \geq 0$

$2x \geq 1$

$x \geq \frac{1}{2}$

$D_f = \{\frac{n+1}{2} \mid n \in Z, n \geq 0\}$

ب)

$y = \left(\frac{2x-2}{5-2x}\right)!$

$\frac{2x-2}{5-2x} = n \rightarrow n \geq 0$

$2x-2 = n(5-2x)$

$2x-2 = 5n-2nx$

$2nx-2x = 5n-2$

$x(2n-2) = 5n-2$

$D_f = \{x \in R \mid \frac{2x-2}{5-2x} \in Z \cup \{0\}, x \neq 2, 5\}$