آنالیز

۱- دامنه توابع زیر را بدست آورید

الف) $y = \sqrt{4 - \sqrt{2-x}}$

$2-x \geq 0 \rightarrow -x \geq -2 \rightarrow x \leq 2$

$\sqrt{2-x} \geq 0$ ① $\quad 4 \geq \sqrt{2-x}$ ②

$16 \geq 2-x$

$14 \geq -x$

$-14 \leq x \quad x \leq 2$

$[-14, +\infty) \cap (-\infty, 2]$

ب) $\sqrt{4 - \sqrt{x-2}}$

$x-2 \geq 0 \rightarrow x \geq 2$

$4 - \sqrt{x-2} \geq 0$

$4 \geq \sqrt{x-2}$ ① ②

$9 \geq x-2$

$11 \geq x \quad / \quad x \geq 2$

$(-\infty, 11] \cap [2, +\infty)$

۲-

الف) $y = \sqrt{4 - 2x^2}$ ؟ $\quad 4 - 2x^2 \geq 0$

$2 \geq 2x^2 \rightarrow \sqrt{2} \geq \sqrt{x^2}$

$\sqrt{2} \geq \pm x$

$y = \sqrt{3|x| - 9}$ ؟

$3|x| - 9 \geq 0 \rightarrow \frac{3|x|}{3} \geq \frac{9}{3} \quad |x| \geq 3$

$x \geq 3$ یا $x \leq -3$ $\quad (-\infty, -3] \cup [3, +\infty)$

الف) $y = \sqrt[3]{\frac{|x|+1}{|x|-3}}$ ؟ $\quad |x| - 3 \neq 0$ ③

$|x| \neq 3 \rightarrow \mathbb{R} - \{\pm 3\}$

ب) $\sqrt[3]{\frac{\sqrt{x}+1}{\sqrt{x}-3}}$ $\quad \sqrt{x} \neq 3$ $\quad x \neq 9$ $\quad \mathbb{R} - \{\pm 9\}$

$\sqrt{x} - 3 \neq 0 \rightarrow \sqrt{x} \neq 3$

۱ ≥ x

$$x[x] \neq 0$$

۲۷

$$y = \frac{1}{x[x]} \quad D_f = R - \{0\}$$

$[x]$ و x هم علامت‌اند

$$y = \frac{1}{\sqrt{-x[x]}}$$

$x[x]$ همواره نامنفی است

$$-x[x] > 0 \rightarrow x[x] < 0 : (-\infty, 0)$$

۲۸

الف) $y = \sqrt{[x - \frac{1}{3}] + [x + \frac{2}{3}]}$

$$x + \frac{2}{3} \geq 1 \rightarrow [\frac{1}{3}, +\infty)$$

$$2[x + \frac{2}{3}] \geq 1 \rightarrow$$

$$[x - \frac{1}{3}] + [x + \frac{2}{3}] \geq 0 \rightarrow [x - \frac{1}{3} - 1] + [x + \frac{2}{3}]$$

ب) $y = \sqrt{[x - \frac{1}{3}] + [-x + \frac{1}{3}]}$

$$y = \sqrt{[x - \frac{1}{3}] + [-(x - \frac{1}{3})]} \rightarrow D_f = \{x \mid x = k + \frac{1}{3}, k \in Z\}$$

۲۹

$$y = \frac{1}{2\sin^2 x - 1} \quad 2\sin^2 x - 1 \neq 0$$

$$\sin^2 x \neq \frac{1}{2}$$ ← همه نقاط دایره

$$y = \frac{\cos x + 1}{\tan x + 1} \quad \tan x + 1 \neq 0 \rightarrow \tan x \neq -1$$

$$R - \{k\pi + \frac{\pi}{4}\}$$

۳۰

$$D: (2k\pi, 2k\pi + \pi)$$

$$y = \sqrt{2\sin x - 1} \rightarrow 2\sin x - 1 \geq 0$$

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

$$y = \sqrt{1 - 2\cos x}$$

SABA NOTBOOK

$$1 - 2\cos x \geq 0 \rightarrow \cos x \leq \frac{1}{2} \rightarrow ۲$$

الف) $y = \frac{\sqrt{4-|x|}}{|x|+2}$ $\rightarrow 4-|x| \geq 0 \rightarrow |x| \leq 4$ $\rightarrow -4 \leq x \leq 4$

$|x|+2 \neq 0 \rightarrow |x| \neq -2$

$[-4,4]-\{-2\}$

ب) $y = \frac{\sqrt{4-x^2}}{|x|-1}$ $\rightarrow 4-x^2 \geq 0 \rightarrow x^2 \leq 4$

$-2 \leq x \leq 2$

$|x| \neq +1 \rightarrow x \neq \pm 1$ $\rightarrow D_f = [-2,2] - \{\pm 1\}$

ج) $y = \frac{x+1}{\sqrt{x+|x|}}$ $\rightarrow x+|x| > 0 \rightarrow |x| > -x \rightarrow D_f = R^-$

د) $y = \frac{1}{\sqrt{x|x|}}$ $\rightarrow x|x| > 0 \rightarrow D_f = (0, +\infty)$

ه) $y = \sqrt{2-[x]}$ $\rightarrow 2-[x] \geq 0 \rightarrow [x] \leq 2 \rightarrow x < 3$

$D_f = (-\infty, 3)$

و) $y = \frac{1}{\sqrt{2-[x]}}$ $\rightarrow 2-[x] > 0$

$[x] < 2 \rightarrow x < 2 \rightarrow D_f = (-\infty, 2)$