بهار سپهرشمساری کلاس دهم دختر تکلیف شماره ۴ دانه

۱) الف) $\sqrt{4-\sqrt{2-x}}$

$2-x \geq 0 \Rightarrow 2 \geq x$

$4-\sqrt{2-x} \geq 0 \Rightarrow 4 \geq \sqrt{2-x} \Rightarrow 16 \geq 2-x \Rightarrow -14 \leq x$

$D_f = [-14, 2]$

ب) $\sqrt{3-\sqrt{x-2}}$

$x-2 \geq 0 \Rightarrow x \geq 2$

$3-\sqrt{x-2} \geq 0 \Rightarrow 3 \geq \sqrt{x-2} \Rightarrow 9 \geq x-2 \Rightarrow 11 \geq x$

$D_f = [2, 11]$

۲) الف) $\sqrt{4-2x^2}$

$4-2x^2 \geq 0 \Rightarrow 2 \geq x^2 \Rightarrow -\sqrt{2} \leq x \leq \sqrt{2}$

$D_f = [-\sqrt{2}, \sqrt{2}]$

ب) $\sqrt{3|x|-9}$

$3|x|-9 \geq 0 \Rightarrow 3|x| \geq 9 \Rightarrow |x| \geq 3 \Rightarrow x \geq 3$ یا $x \leq -3$

$D_f = (-\infty, -3] \cup [3, +\infty)$

۳) الف) $\sqrt[3]{\dfrac{|x|+1}{|x|-3}}$

$|x|-3 \neq 0$

$|x| \neq 3$

$x \neq \pm 3$

$D_f = \mathbb{R} - \{-3, 3\}$

ب) $\sqrt[3]{\dfrac{\sqrt{x}+1}{\sqrt{x}-3}}$

$x \geq 0$

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

$\sqrt{x} \neq 3$

$x \neq 9$

$D_f = [0, +\infty) - \{9\}$

۴) الف) $\dfrac{\sqrt{3-|x|}}{|x|+2}$

$3-|x| \geq 0$

$|x| \leq 3 \Rightarrow -3 \leq x \leq 3$

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

چون $|x| \geq 0$ پس این رابطه برقرار است.

$D_f = [-3, 3]$

ب) $\dfrac{\sqrt{4-x^2}}{|x|-1}$

$4-x^2 \geq 0$

$4 \geq x^2 \Rightarrow -2 \leq x \leq 2$

$|x|-1 \neq 0$

$|x| \neq 1 \Rightarrow x \neq \pm 1$

$D_f = [-2, 2] - \{-1, +1\}$

۵) الف) $\dfrac{x+1}{\sqrt{x+|x|}}$

$x+|x| > 0$ (+) → ✓ (−) → ✗ (0) → ✗

$D_f = \mathbb{R}^+$

ب) $\dfrac{1}{\sqrt{x|x|}}$

$x|x| > 0$

(+) → ✓

(−) → ✗

(0) → ✗

$D_f = \mathbb{R}^+$

۶) الف) $\sqrt{2-[x]}$

$2-[x] \geq 0$

$2 \geq [x] \Rightarrow x < 3$

$D_f = (-\infty, 3)$

ب) $\dfrac{1}{\sqrt{2-[x]}}$

$2-[x] > 0$

$2 > [x]$

$x < 2$

$D_f = (-\infty, 2)$

۷) الف) $\dfrac{1}{x[x]}$

$x[x] \neq 0$

$D_f = \mathbb{R} - [0, 1)$

ب) $\dfrac{1}{\sqrt{-x[x]}}$

$-x[x] > 0$

x و $[x]$ هیچگاه مختلف العلامت نیستند

$\Rightarrow D_f = \varnothing$

۸)

الف) $\sqrt{[x-\frac{1}{3}]+[x+\frac{2}{3}]}\geq 0$

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

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

$\Rightarrow x+\frac{2}{3}\geq 1 \Rightarrow x\geq \frac{1}{3}$

$D_f=[\frac{1}{3},+\infty)$

ب) $\sqrt{[\underbrace{x-\frac{1}{3}}_{a}]+[\underbrace{-x+\frac{1}{3}}_{-a}]}\geq 0$

if $a\in Z \Rightarrow [a]+[-a]=0$

if $a\notin Z$ $[a]+[-a]=-1$

$\Rightarrow a\in Z \Rightarrow x-\frac{1}{3}\in Z \Rightarrow x\in Z+\frac{1}{3}$

$D_f=\{x \mid x=k+\frac{1}{3}, k\in Z\}$

۹)

الف) $\frac{1}{2\sin^2 x-1}$

$2\sin^2 x-1\neq 0$

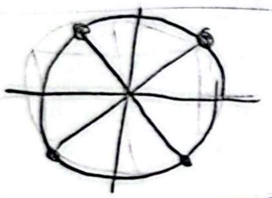
$2\sin^2 x\neq 1$

$\sin^2 x\neq \frac{1}{2}$

$\sin x\neq \pm\sqrt{\frac{1}{2}}$

$\sin x\neq \pm\frac{\sqrt{2}}{2}$

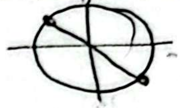
$D_f=\mathbb{R}-\{\frac{k\pi}{2}+\frac{\pi}{4}\}$



ب) $\frac{\cot x+1}{\tan x+1}$

$\tan x+1\neq 0$

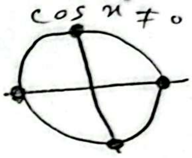
$\tan x\neq -1$



$\frac{\frac{\cos x+\sin x}{\sin x}}{\frac{\sin x+\cos x}{\cos x}}$

$\sin x\neq 0$

$\cos x\neq 0$



$\sin x+\cos x\neq 0$

که مشابه شکل بالا است.

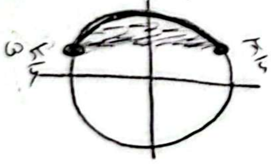
$D_f=\mathbb{R}-\{\frac{k\pi}{2}, k\pi+\frac{3\pi}{4}\}$

۱۰)

الف) $\sqrt{2\sin x-1}$

$2\sin x-1\geq 0 \Rightarrow 2\sin x\geq 1 \Rightarrow \sin x\geq \frac{1}{2}$

$-1\leq \sin x\leq 1$, $\frac{1}{2}\leq \sin x\leq 1$



$D_f=[2k\pi+\frac{\pi}{6}, 2k\pi+\frac{5\pi}{6}]$

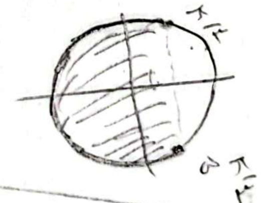
ب) $\sqrt{1-2\cos x}$

$-1\leq \cos x\leq 1$

$1-2\cos x\geq 0$

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

$-1\leq \cos x\leq \frac{1}{2}$



$D_f=[2k\pi+\frac{\pi}{3}, 2k\pi+\frac{5}{3}\pi]$