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الف) $\sqrt{2-x} \geq 0 \rightarrow 2-x \geq 0 \rightarrow x \leq 2$

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

$\rightarrow \begin{cases} -1 \leq x \leq 2 \\ D_f = [-1, 2] \end{cases}$

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ب) $\sqrt{x-2} \geq 0 \rightarrow x-2 \geq 0 \rightarrow x \geq 2$

$2-\sqrt{x-2} \geq 0 \rightarrow 2 \geq \sqrt{x-2} \rightarrow 4 \geq x-2 \rightarrow x \leq 6$

$\begin{cases} x \leq 6 \\ x \geq 2 \\ D_f = [2, 6] \end{cases}$

ج) $\sqrt{4-x} \geq 0 \rightarrow 4-x \geq 0 \rightarrow 4 \geq x \rightarrow x \leq 4$

~~$\sqrt{4-x} \geq 0 \rightarrow 4-x \geq 0 \rightarrow 4 \geq x \rightarrow x \leq 4$~~

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~~$D_f = (-\infty, 4]$~~

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د) $\sqrt{x-9} \geq 0 \rightarrow x-9 \geq 0 \rightarrow x \geq 9$

$\rightarrow D_f = (-\infty, 9] \cup [9, \infty)$

ه) $|x| \neq 2 \rightarrow x \neq \pm 2$

$D_f = \mathbb{R} - \{\pm 2\}$

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و) $\sqrt{x} \geq 0 \rightarrow x \geq 0$

$\sqrt{x-9} \neq 0 \rightarrow x \neq 9$

$\sqrt{x} \neq 9 \rightarrow x \neq 81$

$\sqrt{x} \geq 0 \rightarrow x \geq 0$

$\begin{matrix} \oplus \checkmark \\ \ominus \checkmark \\ \oplus \times \\ \ominus \times \end{matrix}$

$D_f = \{x \geq 0, x \neq 9\}$

ز) $\frac{\sqrt{2-x}}{|x|+2}$

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

$\rightarrow D_f = [-2, 2]$

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ح) $\frac{\sqrt{4-x^2}}{|x|-1}$

$4-x^2 \geq 0 \rightarrow x^2 \leq 4 \rightarrow -2 \leq x \leq 2$
 $|x|-1 \neq 0 \rightarrow |x| \neq 1 \rightarrow x \neq \pm 1$

ط) $x+|x| \geq 0$

$|x| \geq -x$

$D_f = \mathbb{R}^+$

$\begin{matrix} \oplus \checkmark \\ \ominus \checkmark \\ \oplus \times \\ \ominus \times \end{matrix}$

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ی) $x|x| \geq 0$

$\begin{matrix} \oplus \checkmark \\ \ominus \times \\ \oplus \times \\ \ominus \times \end{matrix}$

$D_f = \mathbb{R}^+$

الف) $2 - [x] \geq 0 \rightarrow [x] \leq 2 \rightarrow x > 1$

$D_f = (-\infty, 2)$

1, v, w

ب) $2 - [x] > 0 \rightarrow x > 1 \rightarrow x > 1$

$D_f = (-\infty, 2)$

الف) $x[x] \neq 0$

$0 \leq x < 1$

$D_f = [0, 1)$

$R = [0, 1)$

1, w

ب) $-x[x] > 0$

$\begin{matrix} + & x \\ 0 & x \\ - & x \end{matrix}$

$D_f = \mathbb{Q}$

الف) $[x - \frac{1}{p}] + [x + \frac{1}{p}] \geq 0 \rightarrow \begin{cases} [x - \frac{1}{p}] + [- (x - \frac{1}{p})] \\ \rightarrow [x] + [-x] = 0 \rightarrow a \in \mathbb{Z} \\ [x] + [-x] = -1 \rightarrow a \notin \mathbb{Z} \end{cases} \rightarrow x - \frac{1}{p} \in \mathbb{Z}$

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

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

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

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الف) $|\sin^2 x| \neq 1 \rightarrow |\sin x| \neq 1 \rightarrow \sin x \neq \pm 1$

$\sin x \neq \sqrt{\frac{1}{5}}$

$\sin x \neq \frac{\sqrt{5}}{5}$

$D_f = \mathbb{R} - \left\{ \frac{1}{5}k\pi + \frac{\pi}{5}, \frac{1}{5}k\pi + \frac{4\pi}{5} \right\}$

o, w

ب) $\tan x \neq -1$

$D_f = \mathbb{R} - \left\{ \frac{1}{5}k\pi + \frac{3\pi}{4} \right\}$

الف) $|\sin x| \geq \sqrt{\frac{1}{5}} \rightarrow \sin x \geq \frac{\sqrt{5}}{5}$

$D_f = \left[\frac{1}{5}k\pi + \frac{\pi}{5}, \frac{1}{5}k\pi + \frac{4\pi}{5} \right]$



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ب) $1 - \cos x \geq 0 \rightarrow \cos x \leq 1 \rightarrow \cos x \leq \frac{1}{5}$



$D_f = \left[\frac{1}{5}k\pi + \frac{\pi}{5}, \frac{1}{5}k\pi + \frac{4\pi}{5} \right]$