

الف) $y = \sqrt{\frac{x^2-4x}{x^3-x}} \geq 0 \rightarrow \frac{x^2-4x}{x^3-x} \geq 0 \rightarrow \frac{x(x-4)}{x(x^2-1)} \geq 0$

Sign chart for $\frac{x(x-4)}{x(x^2-1)}$:

-	0	1	4	+
+	-	+	-	+

$D_f = (-\infty, -1) \cup (0, 1) \cup [4, +\infty)$

ب) $y = \sqrt{\frac{x^3-x^2}{x^2-x}} \geq 0 \rightarrow \frac{x^3-x^2}{x^2-x} \geq 0 \rightarrow \frac{x^2(x-1)}{x(x-1)} \geq 0$

Sign chart for $\frac{x^2(x-1)}{x(x-1)}$:

-	0	1	+
+	+	-	+

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

الف) $y = \frac{x+1}{\sqrt{x+|x|}} \rightarrow x+|x| > 0$

Sign chart for $x+|x|$:

0	+	+
-	-	-

$D_f = (0, +\infty)$

ب) $y = \frac{1}{\sqrt{x|x|}} \rightarrow x|x| > 0$

Sign chart for $x|x|$:

0	+	+
-	-	-

$D_f = (0, +\infty)$

الف) $y = \sqrt{2-[x]} \rightarrow 2-[x] \geq 0 \rightarrow [x] \leq 2 \rightarrow D_f = (-\infty, 2)$

ب) $y = \frac{1}{\sqrt{2-[x]}} \rightarrow 2-[x] > 0 \rightarrow [x] < 2 \rightarrow D_f = (-\infty, 2)$

الف) $y = \sqrt{\left[x - \frac{1}{p}\right] + \left[x + \frac{p}{p}\right]} \rightarrow \left[x - \frac{1}{p}\right] + \left[x + \frac{p}{p}\right] \geq 0 \rightarrow \left[x + \frac{p}{p} - 1\right] + \left[x + \frac{p}{p}\right] \geq 0$

$\left[x + \frac{p}{p}\right] - 1 + \left[x + \frac{p}{p}\right] \geq 0 \rightarrow 2\left[x + \frac{p}{p}\right] \geq 1 \rightarrow \left[x + \frac{p}{p}\right] \geq \frac{1}{2} \rightarrow$

$x + \frac{p}{p} \geq 1 \rightarrow D_f = \left[\frac{1}{p}, +\infty\right)$

ب) $y = \sqrt{\left[x - \frac{1}{p}\right] + \left[-x + \frac{1}{p}\right]} \geq 0 \rightarrow \left[x - \frac{1}{p}\right] + \left[-\left(x - \frac{1}{p}\right)\right] \geq 0 \rightarrow \begin{cases} n \in \mathbb{Z} & [n] + [-n] = 0 \\ n \notin \mathbb{Z} & [n] + [-n] = -1 \end{cases}$

$x - \frac{1}{p} \in \mathbb{Z} \rightarrow \left\{x \mid x = k + \frac{1}{p}, k \in \mathbb{Z}\right\}$

الف) $y = \frac{p}{\sin x - 1} \neq 0 \rightarrow \sin x \neq 1$



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

ب) $y = \frac{p}{p \sin^2 x - 1} \neq 0 \rightarrow p \sin^2 x \neq 1 \rightarrow \sin^2 x \neq \frac{1}{p} \rightarrow \sin x \neq \pm \frac{1}{\sqrt{p}}$

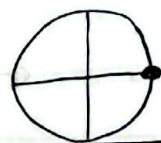
$D_f = \mathbb{R}$

الف) $\sqrt{p \sin x - 1} \geq 0 \rightarrow p \sin x \geq 1 \rightarrow \sin x \geq \frac{1}{p}$



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

ب) $y = \sqrt{\cos x - 1} \geq 0 \rightarrow \cos x \geq 1$



$D_f = 2k\pi$

الف) $\cos y = |x| - 3 \rightarrow -1 \leq |x| - 3 \leq 1 \rightarrow p \leq |x| \leq f$

$D_f = [-f, -p] \cup [p, f]$

ب) $y = \arcsin(x^p + 3x + 1) \rightarrow -1 \leq x^p + 3x + 1 \leq 1 \rightarrow \begin{cases} x^p + 3x + 1 \geq -1 \rightarrow x^p + 3x + 2 \geq 0 \\ x^p + 3x + 1 \leq 1 \rightarrow x^p + 3x \leq 0 \end{cases}$

$(x+1)(x+2) \geq 0$

-1	-2
+	-
-	+

$x(x+3) \leq 0$

-3	0
+	-
-	+

$D_f = (-\infty, -2] \cup [0, +\infty)$

الف) $y = \sqrt{p - \log_p(x-2)} \rightarrow x-2 > 0 \rightarrow \boxed{x > 2}$

$p - \log_p(x-2) \geq 0 \rightarrow \log_p(x-2) \leq p \rightarrow x-2 \leq p \rightarrow x \leq 11$ $D_f = (2, 11]$

ب) $y = \log(x^3 - x) \rightarrow x^3 - x > 0 \rightarrow x(x^2 - 1) > 0$

-1	0	1
-	+	-
+	-	+

$D_f = (-1, 0) \cup (1, +\infty)$

$$\text{الف) } y = \frac{w}{f^x + 1} \neq 0 \rightarrow f^x \neq -1 \quad D_f = \mathbb{R}$$

$$\text{ب) } y = \frac{w}{f^x - 1} \neq 0 \rightarrow f^x \neq 1 \rightarrow x \neq 0 \quad D_f = \mathbb{R} - \{0\}$$

$$\text{ج) } y = \frac{w}{f^x - 2} \neq 0 \rightarrow f^x \neq 2 \quad D_f = \mathbb{R} - \{\log_f 2\}$$

$$\text{د) } y = \frac{w}{f^x - 3} \neq 0 \rightarrow f^x \neq 3 \quad D_f = \mathbb{R} - \{\log_f 3\}$$

$$\text{الف) } y = (fx + 1)! \rightarrow fx + 1 \in \mathbb{W} \rightarrow fx \in \mathbb{W} - 1 \rightarrow x = \frac{\mathbb{W} - 1}{f} \quad -10$$

$$\{x \mid x = \frac{k-1}{f}, k \in \mathbb{W}\}$$

$$\text{ب) } y = \left(\frac{wx - 2}{2x - 5} \right)! \rightarrow \frac{wx - 2}{2x - 5} \in \mathbb{W} \rightarrow \frac{-5\mathbb{W} + 2}{2\mathbb{W} - 3} \rightarrow$$

$$\{x \mid x = \frac{-5k + 2}{2k - 3}, k \in \mathbb{W}\}$$