

$$y = \sqrt{\frac{x^5 - x^3}{x^3 - x}} = \sqrt{\frac{x^3(x^2 - 1)}{x(x^2 - 1)}}$$

* * *

-1 0 1

+ - + - +

$D_f = \mathbb{R} - \{-1, 0, 1\}$ (۲) ✓

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

-1 0 1 4

- + + - +

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

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

$D_f = \mathbb{R}^+$ (۲) ✓

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

$D_f = \mathbb{R}^+$

$$y = \frac{1}{\sqrt{2-x}} \rightarrow 2-x > 0$$

$\Rightarrow 2 > x$

$D_f = (-\infty, 2)$

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

$\Rightarrow 2 \geq x$

$D_f = (-\infty, 2]$ (۲) ✓

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

$\Rightarrow \left[x - \frac{1}{x}\right] + \left[-\left(x - \frac{1}{x}\right)\right] \geq 0 \Rightarrow 2 - \frac{1}{x} \geq 0 \Rightarrow x - 1 + \frac{1}{x} \geq 0 \Rightarrow x \left(x - 1 + \frac{1}{x}\right) \geq 0$

$\Rightarrow x \in \mathbb{Z} + \frac{1}{x}$

$D_f = \left\{x \mid x = k + \frac{1}{x}, k \in \mathbb{Z}\right\}$ (۲) ✓

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

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

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

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

$x \sin^2 x \neq 1$

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

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

$D_f = \mathbb{R} - \left\{k\pi \pm \frac{\pi}{x}\right\}$

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

$\Rightarrow \sin x \neq 1$

$\Rightarrow x \neq \left\{2k\pi + \frac{\pi}{2}\right\}$

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

$y = \sqrt{\cos x - 1} \rightarrow \cos x - 1 \geq 0$ $\cos x \geq 1$  $\Rightarrow D_f = \{2k\pi\}$ (P) ✓	$y = \sqrt{\psi \sin x - 1} \rightarrow \psi \sin x - 1 \geq 0$ $\Rightarrow \psi \sin x \geq 1$ $\Rightarrow \sin x \geq \frac{1}{\psi}$  $\Rightarrow D_f = \left[2k\pi + \frac{\pi}{2}, 2k\pi + \frac{\pi}{2}\right]$ (P) ✓									
$y = \arcsin(x^2 + 3x + 1)$ $\Rightarrow -1 \leq x^2 + 3x + 1 \leq 1$ $\Rightarrow 0 \leq x^2 + 3x + 2 \leq 1$ $\Rightarrow \begin{cases} 0 \leq x^2 + 3x + 2 \rightarrow \frac{-3 \pm \sqrt{9-8}}{2} \rightarrow (-\infty, -2] \cup [-1, +\infty) \\ x^2 + 3x + 2 \leq 1 \rightarrow \frac{-3 \pm \sqrt{9-4}}{2} \rightarrow \left[-\frac{5}{2}, -\frac{1}{2}\right] \end{cases}$ $\Rightarrow D_f = \left[-\frac{5}{2}, -\frac{1}{2}\right] \cup [-1, +\infty)$ (P) ✓	$\cos y = x - \psi \rightarrow -1 \leq x - \psi \leq 1$ $\Rightarrow D_f = [-\psi, -1] \cup [1, \psi]$ (P) ✓									
$y = \log(x^2 - x)$ $x^2 - x > 0 \Rightarrow x(x-1) > 0$ <table border="1" data-bbox="205 1028 604 1162"><tr><td>-1</td><td>0</td><td>1</td></tr><tr><td>-</td><td>+</td><td>-</td></tr><tr><td>+</td><td>+</td><td>+</td></tr></table> $\Rightarrow D_f = (-1, 0) \cup (1, +\infty)$ (P) ✓	-1	0	1	-	+	-	+	+	+	$y = \sqrt{\psi - \log_p(x-1)}$ $x-1 > 0 \Rightarrow x > 1$ $\log_p(x-1) \leq \psi \Rightarrow x-1 \leq p \Rightarrow x \leq p+1$ $\Rightarrow D_f = (1, p+1]$ (P) ✓
-1	0	1								
-	+	-								
+	+	+								
$y = \frac{\psi}{x^2 - \psi}$ $x^2 - \psi \neq 0 \Rightarrow x^2 \neq \psi$ $\Rightarrow x \neq \pm \sqrt{\psi}$ $\Rightarrow D_f = \mathbb{R} - \{\pm \sqrt{\psi}\}$	$y = \frac{\psi}{x^2 - \psi}$ $x^2 - \psi \neq 0 \Rightarrow x^2 \neq \psi$ $\Rightarrow x \neq \pm \sqrt{\psi}$ $\Rightarrow D_f = \mathbb{R} - \{\pm \sqrt{\psi}\}$	$y = \frac{\psi}{x^2 - 1}$ $x^2 - 1 \neq 0 \Rightarrow x \neq \pm 1$ $\Rightarrow x \neq 0$ $\Rightarrow D_f = \mathbb{R} - \{0\}$	$y = \frac{\psi}{x^2 + 1}$ $x^2 + 1 \neq 0 \Rightarrow x^2 \neq -1$ $\Rightarrow x \in \mathbb{R}$ $\Rightarrow D_f = \mathbb{R}$							
$y = \left(\frac{x^2 - 1}{x^2 - 0}\right)! \rightarrow \frac{x^2 - 1}{x^2 - 0} \in \mathbb{W}$ $\Rightarrow x \in \frac{-0W + 1}{-1W + 0}$ $\Rightarrow D_f = \left\{x \mid x = \frac{-0k + 1}{-1k + 0}, k \in \mathbb{W}\right\}$ (P) ✓	$y = (x^2 + 1)! \rightarrow x^2 + 1 \in \mathbb{W}$ $\Rightarrow x^2 \in \mathbb{W} - 1 \Rightarrow x \in \frac{\mathbb{W} - 1}{\psi}$ $\Rightarrow D_f = \left\{x \mid x = \frac{k-1}{\psi}, k \in \mathbb{W}\right\}$ (P) ✓									