

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

$\frac{x^2 - 4x}{x^3 - x} \geq 0$

$\frac{x(x-4)}{x(x^2-1)} = \frac{x(x-4)}{x(x-1)(x+1)} \geq 0$

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ب) $y = \sqrt{\frac{x^2 - x^3}{x^3 - x}}$

$\frac{x^2 - x^3}{x^3 - x} \geq 0$

$Df = (0, 1) \cup [7, +\infty)$

$\frac{x^3(x^2-1)}{x(x^3-1)} = \frac{x^3(x-1)(x+1)}{x(x-1)(x+1)} \geq 0$

$\frac{x}{x^3-1} \geq 0$

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

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الف) $y = \frac{x+1}{\sqrt{x+|x|}}$

$x+|x| \geq 0$

$x = \mathbb{R}^+$

$Df = \mathbb{R}^+$

ب) $y = \frac{1}{\sqrt{x+|x|}}$

$x+|x| \geq 0$

$x = \mathbb{R}^+$

$Df = \mathbb{R}^+$

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الف) $y = \sqrt{2-[x]}$

$2-[x] \geq 0$

$-[x] \geq -2$

ب) $y = 1$

$\sqrt{2-[x]} = 1$

$2-[x] = 1$

$2 > [x]$

$[x] \leq 2$

$Df = (-\infty, 3)$

$Df = (-\infty, 2)$

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

$[x+\frac{1}{n}] = [x-\frac{1}{n} + 1] = [x-\frac{1}{n}] + 1$

$[x-\frac{1}{n}] + [x-\frac{1}{n}] + 1 = 2[x-\frac{1}{n}] + 1$

$Df = [\frac{1}{n}, +\infty)$

$x \geq \frac{1}{n} \Leftrightarrow x - \frac{1}{n} \geq 0$

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

$[-x+\frac{1}{n}] = -[x-\frac{1}{n}] \Rightarrow [x-\frac{1}{n}] - [x-\frac{1}{n}] = 0$

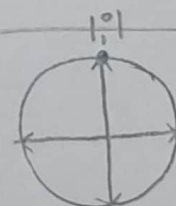
$Df = \mathbb{R}$

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الف) $y = \frac{1}{\sin x - 1}$

$\sin x - 1 \neq 0 \Rightarrow \sin x \neq 1$

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



ب) $y = \frac{1}{1 - \sin^2 x}$

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

$\sin^2 x \neq 1$

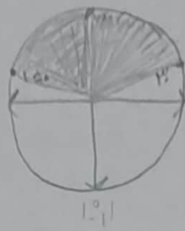
$Df = \mathbb{R} - \{2k\pi + \frac{\pi}{2}, 2k\pi + \frac{3\pi}{2}\}$



الف) $y = \sqrt{2 \sin u - 1}$

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

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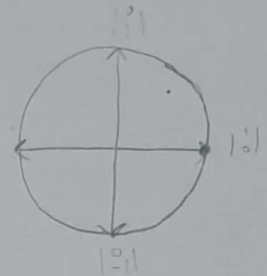


$Df = [2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}]$

ب) $y = \sqrt{\cos u - 1}$

$\cos u - 1 \geq 0 \Rightarrow \cos u \geq 1$

$Df = [2k\pi]$



الف) $\cos y = |u| - 3$

$-1 \leq |u| - 3 \leq 1 \Rightarrow 2 \leq |u| \leq 4 \Rightarrow Df = [-4, -2] \cup [2, 4]$

ب) $y = \arcsin(2u^2 + 3u + 1)$

$2u^2 + 3u + 1 \leq 1 \Rightarrow 2u^2 + 3u \leq 0 \Rightarrow u(2u + 3) \leq 0$

$2u^2 + 3u + 1 \geq -1 \Rightarrow 2u^2 + 3u + 2 \geq 0 \Rightarrow (u+1)(2u+2) \geq 0$

$[-\frac{3}{2}, 0] \cap [-1, +\infty) \cup (-\infty, -2]$

$Df = [-\frac{3}{2}, 0] \cup [-1, +\infty) \cup (-\infty, -2]$

$Df = [-\frac{3}{2}, -2] \cup [-1, 0]$

الف) $y = \sqrt{2 - \log_p(u-2)}$

$2 - \log_p(u-2) \geq 0 \Rightarrow -\log_p(u-2) \geq -2 \Rightarrow \log_p(u-2) \leq 2$

ب) $y = \log(2u^3 - u)$

$u-2 > 0 \Rightarrow u > 2$ $u-2 \leq 9 \Rightarrow u \leq 11$

$Df = (2, 11]$

$-1 < 0 < 1$

$Df = (1, 90) \cup (1, +\infty)$

الف) $y = \frac{3}{f^u + 1}$

$\Rightarrow f^u + 1 \neq 0 \Rightarrow f^u \neq -1 \Rightarrow Df = \mathbb{R}$

ب) $\frac{3}{f^u - 1}$ $f^u - 1 \neq 0 \Rightarrow f^u \neq 1 \Rightarrow u \neq 0$

ج) $y = \frac{3}{f^u - 2}$

$\Rightarrow f^u - 2 \neq 0 \Rightarrow f^u \neq 2 \Rightarrow Df = \mathbb{R} - \{\log_f 2\}$

$Df = \mathbb{R} - \{0\}$

د) $y = \frac{3}{f^u - 3}$

$\Rightarrow f^u - 3 \neq 0 \Rightarrow f^u \neq 3 \Rightarrow Df = \mathbb{R} - \{\log_f 3\}$

الف) $y = (f(u+1))!$

$f(u+1) \in \mathbb{N} \Rightarrow f(u) \in \mathbb{N} - 1 = \mathbb{N} \Rightarrow u \in \frac{\mathbb{N}-1}{f}$ $Df = \{u/u = \frac{k-1}{f}, k \in \mathbb{N}\}$

ب) $y = \left(\frac{f(u-2)}{f(u-5)}\right)!$

$\frac{f(u-2)}{f(u-5)} \in \mathbb{N} = f(u-2) \in f(u-5) \cdot \mathbb{N} = f(u-5) \cdot \mathbb{N} \Rightarrow u = \frac{f-5k}{f-5}$

$Df = \{u/u = \frac{f-5k}{f-5}, k \in \mathbb{N}\}$