

الف) $y = \sqrt{2 \sin x - 1} \geq 0 \rightarrow \sin x \geq \frac{1}{2}$ $D = [2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}]$

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ب) $y = \sqrt{\cos x - 1} \geq 0 \rightarrow \cos x \leq 1$ $D = [2k\pi]$

الف) $\cos y = |x| - 3 \rightarrow -1 \leq |x| - 3 \leq 1 \rightarrow 2 \leq |x| \leq 4$ $D = [-4, -2] \cup [2, 4] = [-4, -2] \cup [2, 4]$

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ب) $y = \arcsin(x^2 + 2x + 1) \rightarrow -1 \leq x^2 + 2x + 1 \leq 1$ $D = [-3, -1] \cup [1, 3] = [-3, -1] \cup [1, 3]$

الف) $y = \sqrt{2 - \log_2(x-2)} \geq 0 \rightarrow \log_2(x-2) \leq 2 \rightarrow \log_2(x-2) \leq 9 \rightarrow \log_2 x \leq 11$ $D = (2, 11]$

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ب) $y = \log(x^3 - x) \rightarrow x(x^2 - 1) = x(x+1)(x-1) > 0$ $D = (-1, 0) \cup (1, +\infty)$

الف) $y = \frac{x}{x+1} \rightarrow x \neq -1$ $D = \mathbb{R}$

ب) $y = \frac{x}{x-1} \rightarrow x \neq 1$ $D = \mathbb{R} - \{1\}$

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ج) $y = \frac{x}{x-2} \rightarrow x \neq 2$ $D = \mathbb{R} - \{2\}$

د) $y = \frac{x}{x^2 - 2} \rightarrow x \neq \pm \sqrt{2}$ $D = \mathbb{R} - \{\pm \sqrt{2}\}$

الف) $y = (x+1)! \rightarrow x+1 = k$ $(k = 0, 1, 2, \dots) \rightarrow x = k - 1$ $D = \{-1, 0, 1, 2, \dots\}$

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ب) $y = \frac{x^2 - 2}{x^2 - 5} \rightarrow \frac{x^2 - 2}{x^2 - 5} = k \rightarrow x^2 - 2 = k(x^2 - 5) \rightarrow x^2 - 2 = kx^2 - 5k \rightarrow x^2(1 - k) = 5k - 2$

$D = \{\frac{2}{1-k}, -\frac{2}{1-k}, \frac{5k-2}{1-k}\}$

الف) $\sqrt{\frac{x^2-4x}{x^2-x}} \geq 0 \rightarrow \frac{x(x-4)}{x(x^2-1)} \rightarrow \frac{-1}{-} \frac{0}{+} \frac{1}{+} \frac{1}{+} \quad D = (-1, 0) \cup [4, +\infty)$

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ب) $\sqrt{\frac{x^5-9x^2}{x^2-x}} \geq 0 \rightarrow \frac{x^2(x^3-9)}{x(x^2-1)} \rightarrow \frac{-1}{+} \frac{0}{+} \frac{1}{+} \quad D = \mathbb{R} - \{1, 0, -1\}$

الف) $y = \frac{x+1}{\sqrt{x+|x|}} \geq 0 \quad D = (0, +\infty)$

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ب) $y = \frac{1}{\sqrt{2|x|}} \geq 0 \quad D = (0, +\infty)$

الف) $y = \sqrt{2-[x]} \geq 0 \rightarrow [x] \leq 2 \rightarrow D = (-\infty, 3)$

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

الف) $y = \sqrt{[x-\frac{1}{4}] + [x+\frac{1}{4}]} \geq 0 \quad D = [\frac{1}{4}, +\infty)$

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ب) $\sqrt{[x-\frac{1}{4}] + [-x+\frac{1}{4}]} \geq 0 \rightarrow D = (k + \frac{1}{4})$
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الف) $y = \frac{2}{\sin x - 1} \neq 0 \rightarrow \sin x \neq 1 \quad D = \mathbb{R} - \{2k\pi + \frac{\pi}{2}\}$

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ب) $y = \frac{3}{2\sin x - 1} \neq 0 \rightarrow \sin x \neq \frac{1}{2} \rightarrow \sin x \neq \frac{\sqrt{2}}{2} \quad D = \mathbb{R} - \{\frac{k\pi}{2} + \frac{\pi}{4}\}$