

الف) $x \neq \pm \frac{2K\pi}{3} + 2K\pi, K \in \mathbb{Z} \Rightarrow D_f = \mathbb{R} - \{x \mid \cos x = -\frac{1}{2}\}$

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ب) $D_f = \mathbb{R} - \{x = 2K\pi, K \in \mathbb{Z}\}$

الف) $\tan x \neq -1 \Rightarrow D_f = \mathbb{R} - \{K\pi + \frac{3\pi}{4}, K\pi + \frac{7\pi}{4}\}$

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ب) $\cot x \neq 1 \Rightarrow D_f = \mathbb{R} - \{K\pi + \frac{\pi}{4}\}$

الف) $-1 \leq x^2 - 2 \leq 1 \Rightarrow 1 \leq x^2 \leq 3 \Rightarrow D_f = [-\sqrt{3}, -1] \cup [1, \sqrt{3}]$

ب) $\sqrt{x} - 3 > 0 \Rightarrow \sqrt{x} > 3 \Rightarrow x > 9$
 $-1 \leq \sqrt{x} - 3 \leq 1 \Rightarrow 4 \leq x, x \leq 16$ } $\Rightarrow D_f = [9, 16]$

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الف)

$-1 \leq |x| - 2 \leq 1$

$2 \leq |x| \leq 4$

$\pm 2 \leq |x| \leq \pm 4$

$D_f = [-4, -2] \cup [2, 4]$

ب) $x^2 + 5x + 1 > -1 \Rightarrow x^2 + 5x + 2 > 0$

$\Rightarrow (x+1)(x+2) > 0 \Rightarrow x < -2$ یا $x > -1$

$x^2 + 5x + 1 \leq 0 \Rightarrow x^2 + 5x \leq -1 \Rightarrow x(x+5) \leq 0$

$\Rightarrow -5 \leq x \leq 0 \Rightarrow D_f = [-5, -2] \cup [-1, 0]$

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الف) $x^2 - 4 > 0 \Rightarrow x^2 > 4 \Rightarrow x > 2$ یا $x < -2 \Rightarrow D_f = (-\infty, -2) \cup (2, +\infty)$

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ب) $2 - |x| > 0 \Rightarrow 2 > |x| \Rightarrow \pm 2 > x \Rightarrow D_f = (-2, 2)$

$$x > 0 \Rightarrow \begin{cases} x > 0 \\ x > 0 \end{cases} \Rightarrow \mathcal{D}_f = (0, \infty) \quad \text{الف)}$$

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$$x^2 - 1 > 0 \Rightarrow x^2 > 1 \Rightarrow x > 1 \quad \text{ب)}$$

$$x(x+2) > 0 \Rightarrow x > -2 \Rightarrow \mathcal{D}_f = (-2, +\infty)$$

$$\text{ج) } \frac{x^2 - 2x + 1}{x - 1} > 0 \Rightarrow x^2 - 2x + 1 > 0 \Rightarrow (x-1)(x-1) > 0 \Rightarrow \mathcal{D}_f = \mathbb{R} - \{1\}$$

$$\text{د) } \frac{x+1}{x-1} > 0 \Rightarrow x+1 > 0 \Rightarrow x > -1, x \neq 1$$

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$$x+8 > 0 \Rightarrow x > -8, x+8 \neq 1 \Rightarrow x \neq -7 \Rightarrow \mathcal{D}_f = (-8, -7) \cup (-7, +\infty)$$

$$\text{الف) } x(1-x)$$

$$x > 0$$

$$x \leq 1$$

$$x \leq 0$$

$$\mathcal{D}_f = [1, 0]$$

$$\text{ب)}$$

$$x \log_r x - 1 > 0 \Rightarrow \log_r x > \frac{1}{r} \Rightarrow x > r^{\frac{1}{r}} \Rightarrow$$

$$\mathcal{D}_f = (r^{\frac{1}{r}}, +\infty)$$

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$$\text{الف)}$$

$$x \neq 0 \Rightarrow$$

$$\mathcal{D}_f = \mathbb{R}$$

$$\text{ب)}$$

$$x \neq 0 \Rightarrow x \neq 0$$

$$\mathcal{D}_f = \mathbb{R} - \{0\}$$

$$\text{ج)}$$

$$\mathcal{D}_f = \mathbb{R} - \left\{ \frac{1}{r} \right\}$$

$$\mathcal{D}_f = \mathbb{R} - \left\{ \log_r \frac{1}{r} \right\}$$

$$\text{د)}$$

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$$\text{الف) } x(x+1) \geq 0 \Rightarrow x(x+1) \in \mathbb{Z} \Rightarrow x = \frac{k-1}{r} \Rightarrow k \in \mathbb{W}$$

$$\Rightarrow \mathcal{D}_f = \left\{ -\frac{1}{r}, 0, \frac{1}{r}, \frac{2}{r}, \dots \right\}$$

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$$\text{ب)}$$

$$\frac{x^2 - r}{x - 0} \in \mathbb{W}, x \neq \frac{\sigma}{r} \Rightarrow \mathcal{D}_f = \left\{ x \in \mathbb{R} \mid \frac{x^2 - r}{x - 0} \in \mathbb{W}, x \neq \frac{\sigma}{r} \right\}$$