

الف) $2 \cos x + 1 \neq 0 \Rightarrow 2 \cos x \neq -1 \Rightarrow \cos x \neq -\frac{1}{2}$

$D_f = \mathbb{R} \setminus \left[\frac{2\pi}{3} + 2k\pi, \frac{4\pi}{3} + 2k\pi \right] \quad k \in \mathbb{Z}$
 مقادیر x که $\cos x = -\frac{1}{2}$

ب) $\cos x - 1 \neq 0 \Rightarrow \cos x \neq 1 \quad x = 2k\pi \quad k \in \mathbb{Z}$

$D_f = \mathbb{R} \setminus [2k\pi, 2k\pi] \quad k \in \mathbb{Z}$

الف) $\tan x + 1 \neq 0$, $\tan x = \frac{\sin x}{\cos x} \Rightarrow \cos x \neq 0$

$\cos x = 0 \Rightarrow x = \frac{\pi}{2} + k\pi \quad (k \in \mathbb{Z}) \Rightarrow x \neq \frac{\pi}{2} + k\pi$
 $\tan x + 1 = 0 \Rightarrow \tan x = -1 \Rightarrow x \neq -\frac{\pi}{4} + k\pi$

ب) $\cot x - 1 = 0 \Rightarrow \cot x = 1 \Rightarrow \tan x = 1 \quad x = \frac{\pi}{4} + k\pi$

$D_f = \mathbb{R} \setminus \left[k\pi, \frac{\pi}{2} + k\pi \right] \quad k \in \mathbb{Z}$

الف) $y = \sin(x^2)$ محدودیتی ندارد $\Rightarrow D_f = \mathbb{R}$
 $D_f = [-\sqrt{3}, -1] \cup [1, \sqrt{3}]$

ب) $-1 < \sqrt{x} \leq 1$
 $\sqrt{x} \leq 1 \Rightarrow x \leq 1$
 $0 \leq \sqrt{x} \Rightarrow \sqrt{x} \leq 1$
 $0 \leq x \leq 1$
 $D_f = [0, 1]$

الف) $y = \cos(|x| - 3)$ محدودیتی ندارد $\Rightarrow D_f = \mathbb{R}$
 $D_f = [-5, -2] \cup [2, 5]$

ب) $-1 \geq 1 + 3x + x^2 \Rightarrow x^2 + 3x + 2 \geq 0 \Rightarrow (x+1)(x+2) \geq 0$
 $x \geq -1$ یا $x \geq -2$
 $1 \leq 1 + 3x + x^2 \Rightarrow x^2 + 3x \leq 0 \Rightarrow x(x+3) \leq 0$
 $-3 \leq x \leq 0$ اشتراک $0 \leq x \leq -1$ و $-2 \leq x \leq -3$
 $D_f = [-3, -2] \cup [-1, 0]$

الف) $t = \log_3 x^2 - 2 = x^2 - 2 > 0 \Rightarrow (x-2)(x+2) > 0$
 $D_f = (-\infty, -2) \cup (2, +\infty)$

ب) $t = \log_2 \frac{2-|x|}{2-|x|} = 2 - |x| > 0 \Rightarrow |x| < 2 \Rightarrow -2 < x < 2$

$D_f = (-2, 2)$

$$D_f = (w, \infty) - \{f\}$$

الف) $0 < \frac{a-x}{x-w} \Rightarrow a-x > 0 \Rightarrow a-x > 0, w-x > 0 \Rightarrow 0 < x-w$
 $(-\infty, w) \cup (w, \infty) \Rightarrow \frac{x-w}{x-w} > 0 \Rightarrow x < w \cup x > w$
 $D_f = (-\infty, w) \cup (w, \infty)$

ب) $0 < \frac{x^2-1}{x+w} \Rightarrow x=1, x=-1$
 $\leftarrow x = -w$
 $(-\infty, -w) \cup (-w, -1) \cup (-1, 1) \cup (1, \infty)$

$$D_f = (-w-1) \cup (1+\infty) - \{f\}$$

$$D_f = [1, +\infty]$$

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الف) $\frac{x^2-x+w}{x-w} > 0 \Rightarrow \frac{x^2-x+w}{x-w} = \frac{(x+1)(x-w)}{x-w} \Rightarrow x+1 > 0 \Rightarrow x > -1$
 $x > 1, x \neq w \Rightarrow D_f = [1, w) \cup (w, +\infty]$

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ب) $x+w > 0 \Rightarrow x > -w, x+w > 0 \Rightarrow x > -w, x-w > 0 \Rightarrow x > w$
 $D_f = [-\infty, -w) \cup (w, +\infty] - \{f\}$

$$D_f = (-w-1) \cup (1, +\infty) - \{f\}$$

الف) $x-w > 0 \Rightarrow x > w, w - \log w > 0 \Rightarrow \log w \leq w \Rightarrow x-w \leq 1 \Rightarrow x \leq 1 \Rightarrow D_f = (w, 1]$

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ب) $\log w^x - 1 > 0 \Rightarrow x > 0 \Rightarrow \log w^x - 1 > 0 \Rightarrow \log w^x > 1$
 $x > \sqrt{w} \Rightarrow D_f = (\sqrt{w}, +\infty)$

الف) $f^x + 1 \neq 0 \Rightarrow f^x \neq -1 \Rightarrow D_f = \mathbb{R}$

ب) $f^x - 1 \neq 0 \Rightarrow f^x \neq 1 \Rightarrow x \neq 0 \Rightarrow D_f = (\mathbb{R} - \{0\})$

ج) $f^x - w \neq 0 \Rightarrow f^x \neq w \Rightarrow x \neq \log_f w \Rightarrow D_f = (\mathbb{R} - \log_f w)$

د) $f^x - w \neq 0 \Rightarrow f^x \neq w \Rightarrow x \neq \log_f w \Rightarrow D_f = (\mathbb{R} - \log_f w)$

الف) $f^x + 1 \in W \Rightarrow f^x \in W-1 \Rightarrow x \in \frac{W-1}{f} \Rightarrow D_f = \left\{x \mid x = \frac{k-1}{f}, k \in W\right\}$

ب) $f^x - f = f^w x - a \Rightarrow f^x = f^w x - a \Rightarrow x = \frac{f^w x - a}{f}$
 $x = \frac{f^w x + f}{f} \Rightarrow D_f = \left\{x \mid x = \frac{-f^w x + f}{f}, k \in W\right\}$

$$D_f = \left\{x \mid x = \frac{0k-f}{fk-f}, k \in W\right\}$$