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الف) $y = \frac{x+3}{2x^3+3x^2-1x+3} \Rightarrow * \Rightarrow \frac{2x^3+3x^2-1x+3}{-2x^3+2x^2} \left| \frac{x-1}{2x^2+\omega x+3} \right. \Rightarrow D_f = IR - \left\{ \frac{1}{2}, -3 \right\}$

ب) $y = \frac{x+3}{2x^3+9x^2+10x+3} \Rightarrow * \Rightarrow \frac{2x^3+9x^2+10x+3}{-2x^3-2x^2} \left| \frac{x+1}{2x^2+1x+3} \right. \Rightarrow D_f = IR - \left\{ -1, -3, -\frac{1}{2} \right\}$

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الف) $y = \frac{x+3}{x^3-2x^2+2x-1} \Rightarrow * \Rightarrow \frac{x^3-2x^2+2x-1}{-2x^3+2x^2} \left| \frac{x-1}{x^2-x+1} \right. \Rightarrow D_f = IR - \{1\}$

ب) $y = \sqrt{\frac{x+3}{x^3-2x^2+2x-1}} = \sqrt{\frac{x+3}{(x-1)(x^2-x+1)}} \Rightarrow \frac{-3}{+0} \frac{1}{-0} \frac{1}{+0} \Rightarrow D_f = (-\infty, -3] \cup (1, +\infty)$

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$y = \frac{2}{x^2-\omega|x-1|-2x+\omega} \Rightarrow \textcircled{1} |x-1| \geq 0 \Rightarrow x-1 \geq 0 \Rightarrow x \geq 1 \Rightarrow x^2-1x+1 = (x-1)(x-\omega) \Rightarrow D_f = IR - \{-3, \omega, \omega\}$

$\textcircled{2} |x-1| < 0 \Rightarrow x-1 < 0 \Rightarrow x < 1 \Rightarrow x^2+3x = x(x+3) \Rightarrow$

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الف) $y = \sqrt{[x]-2} = [x]-2 \geq 0 \Rightarrow [x] \geq 2 \Rightarrow D_f = (-\infty, -1]$

ب) $y = \frac{\omega x^2+y}{[x]^2-1[x]-3} \Rightarrow * \xrightarrow{a+c=b} ([x]+1)([x]-3) \Rightarrow D_f = IR - ([-\omega, 0) \cup [3, \infty))$

$[x] = -1 \Rightarrow [-1, 0) \quad [x] = 3 \Rightarrow [3, \infty)$

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الف) $y = \sqrt{[x-\frac{1}{2}]+[x+\frac{2}{3}]} \Rightarrow [x-\frac{1}{2}]+[x+\frac{2}{3}] \geq 0 \Rightarrow [x+\frac{2}{3}]-1+[x+\frac{2}{3}] \geq 0 \Rightarrow [x+\frac{2}{3}] \geq \frac{1}{2} \Rightarrow x+\frac{2}{3} \geq 1 \Rightarrow x \geq \frac{1}{3} \Rightarrow D_f = [\frac{1}{3}, +\infty)$

ج) $y = \sqrt{\left[\frac{x-1}{3}\right] + \left[\frac{1}{3} - x\right]} \Rightarrow [a] + [-a] \geq 0 \Rightarrow a \in \mathbb{Z} \Rightarrow [a] + [-a] = 0 \Rightarrow \frac{x-1}{3} \in \mathbb{Z} \Rightarrow$
 $\frac{x-1}{3} = k \Rightarrow x = 3k+1, k \in \mathbb{Z}$
 $D_f = \left\{x \mid x = 3k+1, k \in \mathbb{Z}\right\}$

الف) $y = \frac{\cot x + 1}{\tan x + 1} \Rightarrow \left\{ \begin{array}{l} \textcircled{1} \tan x \neq -1 \Rightarrow x \neq \frac{3\pi}{4}, \frac{7\pi}{4} \\ \textcircled{2} \sin x \neq 0 \Rightarrow x \neq k\pi, \pi \\ \textcircled{3} \cos x \neq 0 \Rightarrow x \neq \frac{\pi}{2}, \frac{3\pi}{2} \end{array} \right\} \Rightarrow D_f = \mathbb{R} - \left\{ \frac{k\pi}{4}, k\pi - \frac{\pi}{4} \right\}$

ج) $y = \sqrt{1 - \sin^2 x} \Rightarrow 1 - \sin^2 x \geq 0 \Rightarrow \sin^2 x \leq 1 \Rightarrow \sin x \in [-1, 1] \Rightarrow D_f = \left[\frac{k\pi - \pi}{2}, \frac{k\pi + \pi}{2} \right]$
 ب-ج) $1 - 2\cos x \geq 0 \Rightarrow \cos x \leq \frac{1}{2} \Rightarrow D_f = [2k\pi + \frac{2\pi}{3}, 2k\pi + \frac{4\pi}{3}]$

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

ج) $y = \sqrt{1 - 2\cos x} \Rightarrow 1 - 2\cos x \geq 0 \Rightarrow \cos x \leq \frac{1}{2} \Rightarrow D_f = \left[2k\pi + \frac{2\pi}{3}, 2k\pi + \frac{4\pi}{3} \right]$
 انتباه: بازه تغییر از ابتدای بازه گرفته می باشد!

الف) $y = \arcsin(x^2 + 3x + 1) \Rightarrow -1 \leq x^2 + 3x + 1 \leq 1 \Rightarrow \left\{ \begin{array}{l} \textcircled{1} x^2 + 3x + 1 \leq 1 \Rightarrow x^2 + 3x \leq 0 \Rightarrow x(x+3) \leq 0 \Rightarrow x \in [-3, 0] \\ \textcircled{2} x^2 + 3x + 1 \geq -1 \Rightarrow x^2 + 3x + 2 \geq 0 \Rightarrow (x+1)(x+2) \geq 0 \Rightarrow x \in (-\infty, -2] \cup [-1, \infty) \end{array} \right\} \Rightarrow D_f = [-3, -2] \cup [-1, 0]$

ب) $\cos y = \sqrt{a - 2x} \Rightarrow \left\{ \begin{array}{l} \textcircled{1} a - 2x \geq 0 \Rightarrow x \leq \frac{a}{2} \\ \textcircled{2} -1 \leq \sqrt{a - 2x} \leq 1 \Rightarrow a - 2x \leq 1 \Rightarrow x \geq \frac{a-1}{2} \end{array} \right\} \Rightarrow D_f = \left[\frac{a-1}{2}, \frac{a}{2} \right]$
 همواره به قرار است

الف) $y = \log_2(1 - \log_3 x) \Rightarrow \left\{ \begin{array}{l} \textcircled{1} x > 0 \\ \textcircled{2} 1 - \log_3 x > 0 \Rightarrow \log_3 x < 1 \Rightarrow x < 3 \end{array} \right\} \Rightarrow D_f = (0, 3)$

ب) $y = \log_2\left(1 - \log_3 \frac{x}{3}\right) \Rightarrow \left\{ \begin{array}{l} \textcircled{1} x > 0 \\ \textcircled{2} 1 - \log_3 \frac{x}{3} > 0 \Rightarrow \log_3 \frac{x}{3} < 1 \Rightarrow \frac{x}{3} < 3 \Rightarrow x < 9 \end{array} \right\} \Rightarrow D_f = \left(\frac{1}{3}, 9\right)$

الف) $y = \sqrt{x^2 - 2x} \Rightarrow x^2 - 2x \geq 0 \Rightarrow x(x-2) \geq 0 \Rightarrow x \in (-\infty, 0] \cup [2, \infty)$
 $\frac{1}{3} \leq \frac{x}{3} \leq 1 \Rightarrow D_f = \left[\frac{1}{3}, 3\right]$

ب) $y = \left(\frac{3x+5}{2x+6}\right)! \Rightarrow \frac{3x+5}{2x+6} \in \mathbb{N} \Rightarrow D_f = \left\{x \mid x = \frac{5k+5}{3}, k \in \mathbb{N}\right\}$